MATRIX OLYMPIAD

The Most Innovative Talent Recognition Exam

LOGICAL REASONING & IQ

Class - V

MATRIX

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Few words for the Readers

Dear Reader,

"*Matrix Olympiad is established to encourage school students to go a step further than their regular studies, and get a chance and exposure to competition on a wide scale. It also helps students enhance their learning of basic cognitive skills and deeper knowledge of subjects like Science, Mathematics, English, Mental Ability, Social Studies.“Matrix Olympiad helps students nurture their minds for higher targets of tomorrow and enables them to study School for JEE, NEET, CLAT, NDA, Olympiads , NSEJS, NTSE , STSE etc.*"

The above thought has been our guiding principle while designing and collating the study material for **Matrix Olympiad** . And hence, we hope that this particular material will be helpful towards your preparation for **Matrix Olympiad**.

Our team at **MATRIX** has put in their best efforts for making this particular module interesting and relevant for you. Additional efforts have been made to ensure that the content is easy to understand and error free to the extent possible. However, there might remain some inadvertent errors in answer keys and theoretical portion and we would welcome your valuable feedback regarding the same.

If there are any suggestions for corrections, please write to us at **smd@matrixacademy.co.in** and we would be highly grateful.

Finally, we would like to end this message by a famous quote by Ernest Hemingway - "*There is no friend as loyal as a book*." So, please give your study material the time and attention it deserves, and it will surely help you reach newer heights in your fight with competition examinations.

With love and best wishes !

Team MATRIX

CONTENTS

VERBAL-SERIES 1

INTRODUCTION

Series completion problem deals with numbers, alphabets and both together. While attempting to solve the question, you have to check the pattern of the series. Series moves with certain mathematical operations. You have to check the pattern. Type of questions asked in the examination :

(i) Find the missing term (s) (ii) Find the wrong term (s)

1.1 NUMBER SERIES

Some Important Patterns :

(i) a, a ± d, a ± 2d, a ± 3d ..... (Arithmetic Progression)

(ii) a, ak, ak^2, ak^3,.... (Geometric Progression)

(iii) a, $\frac{a}{k}$, $\frac{a}{k^2}$, $\frac{a}{k^3}$,..... (Geometric Progression)

(iv) Series of prime numbers - i.e. 2, 3, 5, 7, ...

(v) Series of composite numbers - i.e. 4, 6, 8, 9, 10, 12, ...

Classification :

I. Two-tier Arithmetic Series :

In an arithmetic series the difference of any two successive numbers is fixed. A two-tier arithmetic series shall be the one in which the differences of successive numbers themselves form an arithmetic series.

For Example :

(a) 1, 2, 5, 10, 17, 26, 37 .....

(b) 3, 5, 9, 15, 23, 33 .....etc. are examples of such series.

In (a) 1, 2, 5, 10, 17, 26, 37 ..... ; the difference of successive numbers are 1, 3, 5, 7, 9, 11 ..... which is a two tier arithmetic series.

Note : Two-tier arithmetic series can be denoted as a quadratic function. For example, the above series is $0^2 + 1$, $1^2 + 1$, $2^2 + 1$, $3^2 + 1$ ..... which can be denoted as $f(x) = x^2 + 1$, where x = 0,1,2.....

Similarly, example (b) can be denoted as $f(x) = x^2 + x + 3$, where x = 0, 1, 2, 3 .....

II. Three-tier Arithmetic Series :

This, as the name suggests, is a series in which the differences of successive numbers form a two-tier arithmetic series ; whose successive term's differences, in term, form an arithmetic series.

For example : 336, 210, 120, 60, 24, 6, 0 ..... is an example of three tier arithmetic series.

[The differences of successive terms are 126, 90, 60, 36, 18, 6 .....

Which is an two-tier arithmetic series]

Note : Three-tier arithmetic series can be denoted as a cubic function. For example, the above series is (from right end) $1^3 - 1$, $2^3 - 2$, $3^3 - 3$, $4^3 - 4$, ... which can also be denoted as $f(x) = x^3 - x$, $x = 1, 2$ .....

III. Twin Series :

We shall call these twin series, because they are two series packed in one.

1, 3, 5, 1, 9, –3, 13, –11, 17 .....is an example of twin series. In this series two series are 1, 3, 9, 13, 17,.....and 3, 1, –3, –11, ...

IV. Multiple Series :

A multiple series is a mixture of more than one series.

4, 27, 16, 125, 36, 343 ..... is an example of multiple series.

1.2 ALPHABET SERIES (SERIES OF LETTERS)

♦ **Pattern of Alphabets show Variation Based on :**

(i) Position of the Alphabets (ii) Difference between the alphabets

Position of alphabets :

• **Alphabets in order :**

A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	2	3	4	5	6	7	8	9	10	11	12	13	14
O	P	Q	R	S	T	U	V	W	X	Y	Z		
15	16	17	18	19	20	21	22	23	24	25	26		

• **Alphabets in reverse order :**

Z	Y	X	W	V	U	T	S	R	Q	P	O	N	M
1	2	3	4	5	6	7	8	9	10	11	12	13	14
L	K	J	I	H	G	F	E	D	C	B	A		
15	16	17	18	19	20	21	22	23	24	25	26		

1.3 LETTERS REPEATING SERIES

Pattern of such questions is that some letters in sequence are missing.

(i) The letters may be in cyclic order (clockwise or anti-clockwise).

(ii) To solve a problem, we have to select one of the alternative from the given alternatives. The alternative which gives a sequence of letters is the choice.

SOLVED EXAMPLES

NUMBER SERIES

Directions (1– 2) : Find the missing numbers :

SE. 1

16, 19, 22, 25, ?

(A) 23 (B) 28

(C) 29 (D) 21

Ans. As per series a, a + d, a + 2d, ...

a = 16

d = 3

a + 4d = 16 + 4 × 3

Hence, the answer is (B).

SE. 2

1, 1, 4, 8, 9, ?, 16, 64

(A) 27 (B) 28

(C) 29 (D) 21

Ans. (i) 1, 4, 9, 16 [1^2, 1^3, 2^2, 2^3, 3^3.....]

(ii) 1, 8, ___, 64 mixed combination

Hence, the answer is (A).

Directions (3– 5) : Find the wrong numbers :

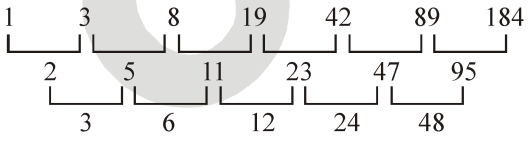
SE. 3

1, 3, 8, 19, 42, 88, 184

(A) 77 (B) 88

(C) 184 (D) 42

Ans.



Hence, number 88 is wrong and should be replaced by 89.

or 1 × 2 + 1, 3 × 2 + 2, 8 × 2 + 3, 19 × 2 + 4, 42 × 2 + 5, 89 × 2 + 6

Hence, the answer is (B).

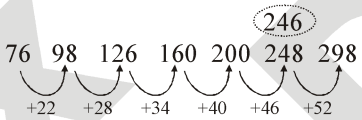
SE. 4

76, 98, 126, 160, 200, 248, 298

(A) 126 (B) 160

(C) 200 (D) 248

Ans.



So, 246 will be at the place of 248.

Hence, the answer is (D).

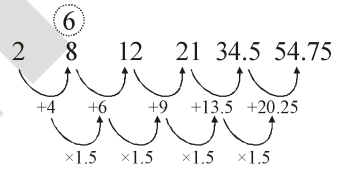
SE. 5

2, 8, 12, 21, 34.5, 54.75

(A) 2 (B) 8

(C) 34.5 (D) 21, 34.5, 54.75

Ans.



So, 6 will be at the place of 8.

Hence, the answer is (B).

ALPHABET SERIES

Directions (6–8) : Find the missing term :

SE. 6

A, C, F, J, ?,?

(A) L, P (B) M, O

(C) O, U (D) R, V

Ans. Clearly the first, second, third,.....letters of the series are respectively moved two, three, four, ... steps forward to obtain the successive terms of the series.

Thus, the fifth term in the series must be a letter which is five steps ahead of J i. e. O, while the sixth must be a letter six steps ahead of O i. e. U.

Thus, we have the following pattern :

$A \xrightarrow{+2} C \xrightarrow{+3} F \xrightarrow{+4} J \xrightarrow{+5} O \xrightarrow{+6} U$

So, the missing terms are O and U.

Hence, the answer is (C).

SE. 7

AC, FH, KM, PR, ?

(A) UW (B) VW

(C) UX (D) TV

Ans. Clearly, the first and second letters of each term are moved five steps forward to obtain the corresponding letters of the next term.

Thus, the first letter of the missing term must be five steps ahead of P i.e.U, while the second letter must be five steps ahead of R i.e. W.

So, the missing term is UW.

Hence, the answer is (A).

SE. 8

BMO, EOQ, HQS,?

(A) KSU

(B) LMN

(C) SOV

(D) SOW

Ans. Clearly, we observe the following pattern :

The first letters follow the pattern +3 i.e. $B \xrightarrow{+3} E \xrightarrow{+3} H \xrightarrow{+3} (K)$

The second letters follow the pattern +2 i.e. $M \xrightarrow{+2} O \xrightarrow{+2} Q \xrightarrow{+2} (S)$

The third letters follow the pattern +2 i.e. $O \xrightarrow{+2} Q \xrightarrow{+2} S \xrightarrow{+2} (U)$

Thus, the missing term is KSU.

Hence, the answer is (A).

SE. 9

Find the next term in the alpha-numeric series :

Z1A, X2D, V6G, T21J, R88M, P445P, ?

(A) N2676S (B) N2676T

(C) T2670N (D) T2676N

Ans. Clearly, the pattern followed by the letters are follows :

1st letter

$:Z \xrightarrow{-2} X \xrightarrow{-2} V \xrightarrow{-2} T \xrightarrow{-2} R \xrightarrow{-2} P \xrightarrow{-2} (N)$

2nd letter

$:A \xrightarrow{+3} D \xrightarrow{+3} G \xrightarrow{+3} J \xrightarrow{+3} M \xrightarrow{+3} P \xrightarrow{+3} (S)$

The series formed by the numberals i.e. 1, 2, 6, 21, 88, 445,.....follows the pattern

×1 + 1, ×2 + 2, ×3 + 3, ×4 + 4, ×5 + 5,.....

So, numeral in the desired term

= 445 × 6 + 6 = 2676.

Hence, desired term is N2676S.

Hence, the answer is (A).

SE. 10

Find the term which does not fit into the series given below :

G4T, J10R, M20P, P43N, S90L

(A) G4T (B) J10R

(C) M20P (D) P43N

Ans. The pattern followed by the letters are :

1st letter : $G \xrightarrow{+3} J \xrightarrow{+3} M \xrightarrow{+3} P \xrightarrow{+3} S$

3rd letter : $T \xrightarrow{-2} R \xrightarrow{-2} P \xrightarrow{-2} N \xrightarrow{-2} L$

The number–series 4,10,20,43,90 should follow the pattern × 2 + 1, × 2 + 2, × 2 + 3, × 2 + 4.

So, 10 is wrong and must be replaced by (4 × 2 + 1) i.e.9.

Thus, the term J10R does not fit in the given series. The correct term is J9R.

Hence, the answer is (B).

LETTER REPEATING SERIES

Directions (11 – 12) : Which sequence of letters when placed at the blanks one after the other will complete the given letter series ?

SE. 11

a_ab_ba_a_ab

(A) babb

(B) abba

(C) baba

(D) aabb

Ans. We proceed step by step to solve the above series:

Steps :

1. We have two letters 'a' and 'b' making the series.

2. The first blank space should be filled in by 'b' so that we have one 'a' followed by one 'b'.

3. Second blank space should be filled in by 'a' so that the same pattern followed till end.

Hence, the answer is (A).

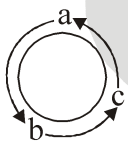
SE. 12

a_cab_a_c_bc

(A) bbac (B) abab

(C) abba (D) bcba

Ans.



Series is abc/abc/abc/abc. So, pattern abc is repeated.

Hence, the answer is (D).

SE. 13

The series given below is based in the letter series, In the series, some letters are missing. Select the correct alternative. If more than five letters are missing, select the last five letters of the series.

xyzu_yz_v__uv_ _ _ _ _ _ _

(A) uvxyz (B) vuzyx

(C) uvzyx (D) vuxyz

Ans. xyzuv | yzuvx | zuvxy | uvxyz

Thus the letters are written in a cyclic order.

Hence, the answer is (A).

SE. 14

There is a letter series in the first row and a number series in the second row. Each number in the number series stands for a letter in the letter series. Since in each of that series some term are missing you have to find out as to what those terms are, and answer the questions based on these as given below in the series.

_ m l a x _ l r x a _ _ m a _ _ _ _ _ _

4 _ 5 _ 7 3 _ _ _ 6 _ _ _ _ _ _ _ _ _ _

The last five term of the letter series are

(A) rmxla (B) xmral

(C) xrmal (D) rmlxa

Ans. a = 6, l = 5, m = 3, r = 4 and x = 7 the letter series runs as rmlax, mlrxa, lrmax, rmlxa. By taking the letter in the group of five, we find that first letter of the first group is the third letter of the second group and the last two letters have interchanged their positions. The same rule applies in other groups also.

Hence, the answer is (D).

EXERCISE – I

MULTIPLE CHOICE QUESTIONS

Directions (1 – 15) : Find the missing term.

1. 9,7,14,11,33,28,?,133,931
   (A) 64 (B) 46 (C) 140 (D) 123
2. 6, 12, 23, 44, 85, ?
   (A) 166 (B) 174 (C) 165 (D) 168
3. 92, 23,27,9, 12, 6, ?
   (A) 20 (B) 16 (C) 8 (D) 10
4. 0, 5, 8, 17, 24, 37, 48, ?
   (A) 65 (B) 67 (C) 56 (D) 71
5. 999,730,510,345,213,?
   (A) 122 (B) 126 (C) 68 (D) 128
6. 2,5,14,7,3,20,10,4,?
   (A) 26 (B) 30 (C) 22 (D) 28
7. 3,7, 35,47,?, 119
   (A) 99 (B) 98 (C) 64 (D) 89
8. 23, 27,43, 79, 143, ?
   (A) 242 (B) 241 (C) 190 (D) 243
9. 870,342, 132,?, 12,2
   (A) 90 (B) 42 (C) 64 (D) 66
10. 9,19,35,75,143,?
    (A) 287 (B) 285 (C) 196 (D) 295
11. 2,20,110,380,?
    (A) 424 (B) 650 (C) 982 (D) 992
12. 256, 125, 60, ? 12.5
    (A) 26 (B) 40 (C) 28 (D) 25
13. 6,15,35,77,143,221,323,?
    (A) 437 (B) 427 (C) 384 (D) 365
14. 9, 9, 14, 34, 124, ?
    (A) 576 (B) 532 (C) 448 (D) 604
15. 125,215,343,511,729,?
    (A) 754 (B) 683 (C) 845 (D) 999

Directions (16 – 25) : Find the wrong term.

16. 10,26,74,218,654,1946,5834
    (A) 26 (B) 74 (C) 218 (D) 654
17. 3,7,15,39,63,127,255,511
    (A) 15 (B) 39 (C) 63 (D) 127
18. 1236, 2346, 3456, 4566,5686
    (A) 1236 (B) 3456 (C) 4566 (D) 5686
19. 10, 15, 26, 35, 48, 63, 82
    (A) 48 (B) 26 (C) 63 (D) 82
20. 445, 221, 109, 46, 25, 11, 4
    (A) 25 (B) 46 (C) 109 (D) 221
21. 2, 6, 10, 20, 30, 42, 56
    (A) 6 (B) 10 (C) 20 (D) 30
22. 3, 9, 27, 82, 243
    (A) 27 (B) 54 (C) 82 (D) 162
23. 320, 254, 200, 155, 122, 100, 89
    (A) 155 (B) 320
    (C) 254 (D) 200
24. 15,34,71,134,223,350
    (A) 71 (B) 134
    (C) 223 (D) 350
25. 5, 10, 40, 80, 320, 550, 2560
    (A) 80 (B) 320
    (C) 550 (D) 2560

EXERCISE – II

Directions (1 – 18) : What comes in place of question mark(s) in the following letter series?

1. ATL, BUM, CVN, DWO, ?
   (A) EZP (B) EYQ (C) EFP (D) EXP
2. TYU, NSO, HMI, ?
   (A) AGC (B) CGC (C) GBC (D) BGC
3. MAAL, AALM, ALMA, LMAA, ?
   (A) AMLA (B) MAAL
   (C) AAML (D) LAAM
4. A3P, C5N, E8K, G12G, ?
   (A) I16D (B) I17B (C) I17D (D) J16B
5. Q1F, S2E, U6D, W21C, ?
   (A) Y66B (B) Y44B (C) Y88B (D) Z88B
6. B3M,E7J,H15G,K31D, ?
   (A) N65A (B) O63A (C) N63A (D) N63Z
7. V,T,R,?,N,?
   (A) P, M (B) P, L (C) O, L (D) O, M
8. AB, BA, ABD, DBA, PQRS, ?
   (A) SRQP (B) SRPQ
   (C) SQRP (D) RSQP
9. 17Z5, 15X4, 13V3, ?, 9R1
   (A) 11S2 (B)11T2 (C)11U2 (D) 11T3
10. ABC, PQR, DEF, STU,?
    (A) GKL (B) VWX (C) GHI (D) IJK
11. ACE, BDF, CEG,?
    (A) DFE (B) DBF (C) DFH (D) DEH
12. CIG, FLJ, IOM,?
    (A) LRP (B) JLG (C) PSU (D) QUB
13. OTE, PUF, QVG, RWH,?
    (A) SYJ (B) TXI (C) SXJ (D) SXI
14. FUGT, HSIR, JQKP,?
    (A) KNLO (B) LNNM
    (C) LOMM (D) LOMN
15. Y,?,?, M, I, E
    (A) Z,X (B) P, R (C) Q, T (D) U, Q
16. W, T, P, M, I, F, B,?,?
    (A) Z,V (B) X,U (C) Y, U (D) Y, V
17. A,P,C,Q,E,R,G,?,?
    (A) S, I (B) H, I (C) I, S (D) T, J
18. PQRS, QPRS, RPQS,?
    (A) SPQR (B) RPQS
    (C) QSPR (D) SQPR

Directions (19 – 23) : There is a wrong term in the following numbers / letters series. Find the wrong term of the series.

19. ABC, BCD, CDE, DEF, PEG
    (A) BCD (B) CDE (C) DEF (D) PEG
20. AACC, BBED, CCHE, DDMF, EEQG
    (A) AACC (B) DDMF
    (C)BBED (D)EEQG
21. ECA, JHF, OMK, TQP, YWU
    (A) ECA (B) JHF (C) TQP (D) YWU
22. EPV, FQW, GRX, HTY, ITZ
    (A) FQW (B) GRX (C) HTY (D) ITZ
23. PON, RQP, TSR, VVT, XWV, ZYX
    (A) VVT (B) TSR (C) XWV (D) RQP

Directions (24 – 25) : The series given below are based on the letter series, In each of these series, some letters are missing. Select the correct alternative. If more than five letters are missing, select the last five letters of the series.

24. abcd _ be _ e _ _ de _ _ _ _ _ _ _

(A) deabc (B) edcba

(C) decba (D) edabc

25. _ _r_tqrptsrpqst _ _ _ _ _

(A) pqrts (B) pqtrs (C) pqrst (D) qrpst

Directions (26 – 32) : Which sequence of letters when placed at the blanks one after the other will complete the given letter series ?

26. abc _ c _ c _ ba _ _ bca

(A) abacb (B) babac (C) baabc (D) bacba

27. abb _ baa _ a _ bab _ ab

(A) abba (B) abab (C) ccac (D) aabb

28. cccbb _ aa _ cc _ bbbaa _ c

(A) acbc (B) baca (C) baba (D) aaba

29. _ sr _ tr _ srs _ r _ srst _

(A) ttssrr (B) tsrtsr (C) strtrs (D) tstttr

30. _ zy _ zxy _ yxzx _ zyx _ xy

(A) yxzyz (B) zxyzy (C) yzxyx (D) xyzzy

31. a _ b _ a_ _ n _ bb _ abbn

(A) abnabb (B) bnbban

(C) bnbbna (D) babban

32. pqr _ _ rs_ rs _ _ s _ q _

(A) spqpprr (B) pqrrppq

(C) sqppqpr (D) sqprrqr

Space for Notes :

EXERCISE – III

PREVIOUS YEAR QUESTIONS (NTSE)

Directions (1 – 4) : Find the missing term

1. 65, 48, 64, 49, 63, ?

[NTSE Stage -I/Raj.2015]

(A) 53 (B) 52 (C) 51 (13) 50

2. 7,23, ? ,79, 119

[NTSE Stage-I/Raj.2015]

(A) 47 (B) 49 (C) 44 (D) 46

3. 16,8, 12, ? , 105

[NTSE Stage -I/Raj.2015]

(A) 6 (B) 30 (C) 24 (D) 35

4. 748, 737, 716,685, 644, ?

[NTSE Stage-I/Raj.2015]

(A) 634 (B) 643 (C) 503 (D) 593

Directions (5 – 8) : In each of the question 5 to 8 some of the numbers are missing in the given series with one term missing shown by question mark (?). This terms is one of the alternatives among the four numbers given under it. Find the right alternative.

[NTSE Stage-I/Raj.2016]

5. 8,27,64,?,216,343

(A) 125 (B) 81 (C) 100 (D) 196

6. 5,11,19,?,41

(A) 28 (B) 29 (C) 30 (D) 35

7. 120, ?, 24, 6, 0

(A) 100 (B) 70 (C) 60 (D) 20

8. 729, 81, 9, 1, $\frac{1}{9}$, ?, $\frac{1}{729}$

(A) $\frac{1}{27}$ (B) $\frac{1}{81}$

(C) $\frac{1}{243}$ (D) $\frac{1}{486}$

Directions (9 – 34) : Find the wrong term

9. 3, 7, 9, 21, 27, 66, 81, 189, 243

[NTSE Stage -I/Raj.2007]

(A) 27 (B) 66 (C) 243 (D)21

10. 27, 34, 40, 45, 49, 53, 54, 55

[NTSE Stage -I/Raj .2007]

(A) 53 (B) 45 (C) 56 (D) 34

11. 0, 2, 3, 6, 6, 20, 9, 54,12

[NTSE Stage -I/Raj.2007]

(A) 3 (B) 6 (C) 20 (D) 54

12. 0, 2, 10, 36, 68, 130

[NTSE Stage -I/Raj.2007]

(A) 10 (B) 36 (C) 68 (D) 130

13. 9, 54, 44, 264, 254, 1520, 1514

[NTSE Stage-I/Raj .2007]

(A) 1514 (B) 1520 (C) 264 (D) 44

14. 10, 15, 26, 35, 48, 63, 82

[NTSE Stage -I/Raj.2008]

(A) 48 (B) 26 (C) 63 (D) 82

15. 3, 10, 30, 66, 127, 218

[NTSE Stage -I/Raj .2008]

(A) 3 (B) 66 (C) 30 (D) 218

16. 7, 9, 17, 42, 91, 172, 293

[NTSE Stage-I/Raj .2008]

(A) 91 (B) 42 (C) 17 (D) 9

17. 2, 12, 24, 34, 68, 78, 158, 166

[NTSE Stage-I/Raj .2008]

(A) 68 (B) 78 (C) 158 (D) 166

18. 2, 6, 10, 20, 30, 42, 56

[NTSE Stage -I/Raj.2008]

(A) 6 (B) 10 (C) 20 (D) 30

19. 7, 9, 16, 25, 41, 68, 107, 173
[NTSE Stage -II 2008]
(A) 16 (B) 41 (C) 68 (D) 107

20. 3, 9, 27, 82, 243
[NTSE Stage-I/Raj.2009]
(A) 27 (B) 54 (C) 82 (D) 162

21. 5,9,17,35,65,129
[NTSE Stage-I/Raj .2009]
(A) 65 (B) 35 (C) 17 (D) 9

22. 1,5, 6, 11, 17, 27, 45, 73
[NTSE Stage -I/Raj.2009]
(A) 27 (B) 45 (C) 17 (D) 11

23 3,6,11,18,28,38,51,66
[NTSE Stage -I/Raj.2009]
(A) 18 (B) 28 (C) 38 (D) 51

24. 320, 254, 200, 155, 122, 100,89
[NTSE Stage-I/Raj .2009]
(A) 155 (B) 320 (C) 254 (D) 200

25. 6,8,9,12,14,18,22,26,30
[NTSE Stage -I/Raj.2012]
(A) 12 (B) 22 (C) 26 (D) 30

26. 3,7,9,28,27,84,81,448,243
[NTSE Stage-I/Raj.2012]
(A) 84 (B) 81 (C) 28 (D) 7

27. 190, 94, 46, 22, 10, 3
[NTSE Stage-I/Raj .2012]
(A) 94 (B) 46 (C) 22 (D) 3

28. 0, 5, 15, 50, 128
[NTSE Stage -I/Raj.2012]
(A) 5 (B) 15 (C) 50 (D) 128

29. 9, 63, 5, 35, 1, 8
[NTSE Stage -I/Raj.2012]
(A) 63 (B) 5 (C) 35 (D) 8

30. 89, 78, 86, 80, 85, 82, 83
[NTSE Stage-I/Raj.2013]
(A) 83 (B) 82 (C) 86 (D) 78

31. 1, 1, 3, 9, 6, 36, 10, 100, 16, 225
[NTSE Stage-I/Raj.2013]
(A) 225 (B) 16 (C) 10 (D) 9

32. 444, 300, 200, 136, 87, 84, 80
[NTSE Stage-I/Raj.2013]
(A) 300 (B) 200 (C) 136 (D) 87

33. 8, 15, 31, 61, 123, 247, 491
[NTSE Stage-I/Raj.2013]
(A) 247 (B) 491 (C) 121 (D) 61

34. 3, 6, 24, 30, 63, 72, 122, 132
[NTSE Stage-I/Raj.2013]
(A) 132 (B) 30 (C) 122 (D) 72

Directions (35 – 42) : Find the missing term

35. 121,144, 169, ? ,225,256.
[NTSE Stage-I/Raj.2017]
(A) 196 (B) 296 (C) 220 (D) 222

36. 5, 10.20, ? ,80.
[NTSE Stage-I/Raj.2017]
(A) 35 (B) 40 (C) 45 (D) 50

37. 4, 8, 9, 27, 16, ?, 25, 125.
[NTSE Stage -I/Raj.2017]
(A) 8 (B) 16 (C) 25 (D) 64

38. 2, 3, 5, 8, ?, 17.
[NTSE Stage-I/Raj.2017]
(A) 6 (B) 12 (C) 13 (D) 15

39. 4,9,25,?, 121, 169.
[NTSE Stage-I/Raj .2018]
(A) 36 (B) 49 (C) 64 (D) 81

40. 1,3,7, 13,21,?,43,57.

[NTSE Stage-I/Raj.2018]

(A) 31 (B) 29 (C) 30 (D) 32

41. 5, 3, 10, 8, 17, 15,?, 24

[NTSE Stage-I/Raj .2018]

(A) 25 (B) 23 (C) 26 (D) 27

42. 97, 77, 59, ?, 29, 17.

[NTSE Stage-I/Raj.2018]

(A) 34 (B) 39 (C) 37 (D) 43

Direction (43–50) : In each of the Question a number series is given with one term missing shown by question mark (?). This term is one of the four alternatives given under it. Find the correct alternative.

[NTSE Stage- I/Raj. 2019]

43. 5, 16, 51, 158, ? .

(A) 1452 (B) 483 (C) 481 (D) 1454

44. 198, 194, 185, 169, ?.

(A) 92 (B) 136 (C) 144 (D) 112

45. 11, 29, 55, ? , 131.

(A) 110 (B) 81 (C) 89 (D) 78

46. 589654237, 89654237, 8965423, 965423, ? .

(A) 58965 (B) 65423

(C) 89654 (D) 96542

47. 1, 1, 4, 8, 9, 27, 16, ? .

(A) 32 (B) 64 (C) 81 (D) 256

48. 4, 9, 25, ?, 121, 169, 289, 361.

(A) 49 (B) 64 (C) 81 (D) 87

49. 980, 392, 156.8, ?, 25.088, 10.0352.

(A) 65.04 (B) 60.28

(C) 62.72 (D) 63.85

50. 3, 10, 101, ? .

(A) 10101 (B) 10201

(C) 10202 (D)11012

Space for Notes :

EXERCISE – IV

PREVIOUS YEAR QUESTIONS (NTSE)

Directions (1 – 17) : What comes in place of question mark(s) in the following letter series?

1. DOZ, GRC, ?, ALW, BMX

[NTSE Stage- I/Raj. 2012]

(A) BGL (B) LWH (C) DLT (D) GJM

2. fed, ihg, lkj, ? , rqp

[NTSE Stage- I/Raj. 2012]

(A) npq (B) onm (C) oqp (D) nom

3. ABYZ, ADWZ ?, AHSZ

[NTSE Stage- I/Raj. 2012]

(A) AFUZ (B) AUFZ (C) ZFUA (D) ZUFA

4. VTRP, NLJH, FDBZ, XVTR, ?

[NTSE Stage- I/Raj. 2012]

(A) JLPN (B) LJPN (C) NPLJ (D) PNLJ

5. OBDR, QACT, SZBV, ?, WXZZ I

[NTSE Stage- I/Raj. 2012]

(A) WUWZ (B) YTVB

(C) UYAX (D) ASVD

6. YANWY, DFMBD, IKNGI, NPMLN, ?, XZMVX **[NTSE Stage- I/Raj. 2013]**

(A) RUMSR (B) SUNQS

(C) UWNSU (D) VUMTV

7. PEXKW, RFWMU, TGVOS, VHUQQ, XITSO,?

[NTSE Stage- I/Raj. 2013]

(A) ZJSUM (B) YJSUZ

(C) ZKSVJ (D) JZSTN

8. AYBZC, DWEXF, GUHVI, JSKTL, ?, POQPR

[NTSE Stage- I/Raj. 2013]

(A) MQDRN (B) QMONR

(C) MQNRO (D) NQMOR

9. ZYYZR, ABVUN, ? , BCUTM, XWABT, CDTSL

[NTSE Stage- I/Raj. 2013]

(A) YXZAS (B) ZYABT

(C) XWYZR (D) YXZAB

10. deb, ijg, nol, ?, xyv **[NTSE Stage- I/Raj. 2013]**

(A) rsp (B) stp (C) rsq (D) stq

11. BEG, DGI, FIK, HKM, ?

[NTSE Stage- I/Raj. 2014]

(A) JMO (B) KMO (C) JML (D) JNP

12. KEM, IDL, GCK, ?, CAI

[NTSE Stage- I/Raj. 2014]

(A) ECJ (B) EBK (C) FBJ (D) EBJ

13. JCME, LDOG, NEQT, ?

[NTSE Stage- I/Raj. 2014]

(A) PFSJ (B) PESI (C) PESK (D)PFSK

14. A,F, J,M, ?

[NTSE Stage-I/Raj. 2015]

(A) 0 (B) N (C) Q (D) P

15. BD, HJ, NP, ?, ZB

[NTSE Stage- I/Raj. 2015]

(A) QS (B) TV (C) YC (D) TU

16. FOX, IQV, LST, OUR, ?

[NTSE Stage- I/Raj. 2015]

(A) RPW (B) RWP (C) QVS (D) SXU

17. qpo, nml, ?

[NTSE Stage- I/Raj. 2015]

(A) ghf (B) ijk (C) kji (D) hgi

Directions : (18 – 28) These questions are based on letter series in which some of the letter are missing. The missing letter are given in the proper sequence in one of the alternatives among the four given under each question. Find out the correct alternatives for each question.

18. _ bc _ _ bb _ aabc

(NTSE Stage-I/Raj./ 2009)

(A) acac (B) babc (C) abab (D) aacc

19. _ _ a bb _ bba _ bab _ a _

(NTSE Stage-I/Raj./ 2012)

(A) abaaba (B) aabbaa

(C) bbabbb (D) bbaabb

20. _ ac _ ca _ aca _ a _ a _

(NTSE Stage-I/Raj./ 2012)

(A) cacaca (B) aaaccc

(C) acacac (D) cacccc

21. k _ k k i i i _ m m _ m _ n _ n

(NTSE Stage-II, 2008)

(A) i k n m n (B) i k m n n

(C) i i m m n (D) k l m n n

22. bc _ b _ c _ b _ ccb

(NTSE Stage-I/Raj./ 2009)

(A) cbcb (B) bbcb (C) cbbc (D) bcbc

23. ab _ baa _ cb _ ab _ ba

(NTSE Stage-I/Raj./ 2009)

(A) cacb (B) bacb (C) cbac (D) abcb

24. ab _ acc _ _ da _ bba _

(NTSE Stage-I/Raj./ 2013)

(A) cdabc (B) badaa (C) cdbcd (D) dbacd

25. abb _ _ ab _ b _ bba _ a

(NTSE Stage-I/Raj./ 2013)

(A) bbbab (B) babba (C) abaab (D) bbabb

26. b _ a _ bab _ ab _ a

(NTSE Stage-I/Raj./ 2013)

(A) baba (B) babb (C) abab (D) abba

27. $\alpha\beta\_\alpha\alpha\_\beta\beta\beta\_\alpha\alpha\alpha\alpha\_\beta\beta\beta$

(NTSE Stage-II/2013)

(A) $\alpha\beta\beta\alpha$ (B) $\beta\alpha\beta\alpha$ (C) $\alpha\alpha\alpha\beta$ (D) $\alpha\beta\alpha\beta$

28. ca _ cab _ ab _ _ bc _

(NTSE Stage-I/Raj./2014)

(A) bccaa (B) accab (C) bacaa (D) abaca

Directions (29 –36) : Find the missing term

29. A, D, G, J, ?

[NTSE Stage- I/Raj. 2017]

(A) I (B) M (C) X (D) None

30. LO, JQ, HS, ?

[NTSE Stage- I/Raj. 2017]

(A) FU (B) FQ

(C) EV (D) DW

31. A, C, F, J, O, , ?

[NTSE Stage- I/Raj. 2017]

(A) P (B) T (C) S (D) U

32. ZXV, TRP, NLJ, ?

[NTSE Stage- I/Raj. 2017]

(A) HEF (B) HFD (C) EFH (D) IGE

33. G, K, O, S, ?

[NTSE Stage- I/Raj. 2018]

(A) U (B) W (C) V (D) X

34. DX, HT, KQ, OM, ?

[NTSE Stage- I/Raj. 2018]

(A) SJ (B) RK (C) QJ (D) RJ

35. H, D, A, Y, X,?

[NTSE Stage- I/Raj. 2018]

(A) X (B) W (C) T (D) V

36. KLE, IND, GPC, ?, CTA.

[NTSE Stage- I/Raj. 2018]

(A) DRB (B) BSE (C) ERB (D) ECR

Direction (37–44) : In each of the Question a letter series is given with one term missing shown by question mark (?). This term is one of the four alternatvies given under it. Find the correct alternatives.

[NTSE Stage- I/Raj. 2019]

37. B, D, F, I, L, P, ? .

(A) R (B) S (C) T (D) U

38. GH, JL, NQ, SW, YD, ? .

(A) EJ (B) FJ (C) EL (D) FL

39. Z, U, Q, ? , L.

(A) I (B) K (C) M (D) N

40. AZ, GT, MN, ? , YB.

(A) JH (B) SH (C) SK (D) TS

41. ABD, DGK, HMS, MTB, SBL, ?

(A) XKW (B) ZAB

(C) ZKU (D) ZKW

42. PBA, QDC, RFE, ?

(A) SHG (B) OAB

(C) TJI (D) ULK

43. PERPENDICULAR, ERPENDICULA, RPENDICUL, ?

(A) PENDICULAR (B) PENDIC

(C) ENDIC (D) PENDICU

44. ST, ND, RD, TH,?

(A) TH (B) VW (C) RW (D) ST

Space for Notes :

Answer Key

EXERCISE–I													
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
C	A	C	A	D	D	A	D	B	D	D	C	A	D	D
16	17	18	19	20	21	22	23	24	25					
D	B	D	A	B	B	C	D	D	C					

EXERCISE–II														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
D	D	B	B	C	C	B	A	B	C	C	A	D	D	D
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
C	A	A	D	B	C	C	A	A	A	C	A	B	D	A
31	32													
B	C													

EXERCISE–III														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
D	A	B	D	A	B	C	B	B	A	C	B	B	A	C
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
D	C	B	C	C	B	A	B	D	B	A	D	D	D	C
31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
B	D	A	C	A	B	D	B	B	A	C	D	C	C	C
46	47	48	49	50										
D	B	A	C	C										

EXERCISE–IV														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
B	B	A	D	C	B	A	C	A	D	A	D	D	A	B
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
B	C	A	C	D	D	A	C	B	A	C	B	A	B	A
31	32	33	34	35	36	37	38	39	40	41	42	43	44	
D	B	B	D	A	C	C	D	D	B	D	A	D	A	

SELF PROGRESS ASSESSMENT FRAMEWORK

(CHAPTER : SERIES)

CONTENT	STATUS	DATE OF COMPLETION	SELF SIGNATURE
Theory			
In-Text Examples			
Solved Examples			
Exercise I			
Exercise II			
Exercise III			
Exercise IV			
Short Note-1			
Revision - 1			
Revision - 2			
Revision - 3			
Remark			

NOTES :

1. In the status, put "completed" only when you have thoroughly worked through this particular section.
2. Always remember to put down the date of completion correctly. It will help you in future at the time of revision.

Space for Notes :

NON-VERBAL-SERIES 2

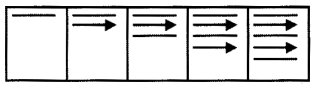
INTRODUCTION

This section deals with the problems based upon the continuation of figures. There are various types of problems on series. However, the fundamental concept for each type is the same. There is a sequence of figures depicting a change step by step. Either one of these figures is out of order and has to be omitted or figure has to be selected from a separate set of figures, which would continue the series.

1.1 FIVE FIGURE SERIES

This type of problems on series consist of five figures numbered 1, 2, 3, 4 and 5 forming the problem set, followed by four other figures numbered A, B, C and D forming the Answer Set. The five consecutive problem figures form a definite sequence and it is required to choose one of the figures from the answer set which will containue the same sequence.

Ex. 1 In the following example find the figure from the answer set (i.e. figs. A, B, C and D) which will continue the series given in the problem set (i.e. figs. 1, 2, 3, 4 and 5).



(1) (2) (3) (4) (5)

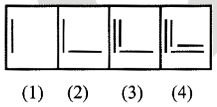
(A)  (B)  (C)  (D) 

Sol. Clearly, arrows and straight lines are added alternately to get subsequent figures. Also all the arrows point towards the right. Hence, the answer is (D).

1.2 FOUR FIGURE SERIES

This type of questions are largely similar to those discussed in Type-1; the only difference being that in this case the series or the sequence is indicated by four problem figures and it is required to select a figure from amongst the answer figure, which would be fifth figure to continue the series.

Ex.2 In the following example find figure from the Answer set (A, B, C and D) which would continue the series indicated by the four figures of the problem set (1, 2, 3 and 4).



(1) (2) (3) (4)

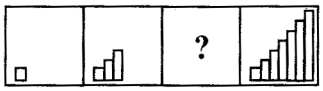
(A)  (B)  (C)  (D) 

Sol. Clearly, vertical and horizontal lines are added alternately and in a set order. To continue this series, fig (C) should follow fig. (4). Hence, the answer is (C).

1.3 CHOOSING THE MISSING FIGURE IN A SERIES

In this type of questions, you are given a set of four figures (labelled 1, 2, 3 and 4) following a certain sequence and hence forming a series. However, the figure at 3 is missing. The candidate is required to choose this figure from the alternatives A, B, C and D.

Ex.3



(1) (2) (3) (4)

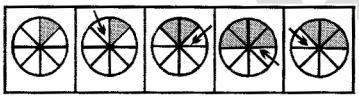
(A)  (B)  (C)  (D) 

Sol. Clearly, two rectangles are added to the figure in each step so as to from stairs. There should be five rectangles in fig. (3) so fig. (A) is the answer. Hence, the answer is (A).

1.4 DETECTING THE INCORRECT ORDER IN A SERIES

The fourth type of questions on series constants of an un-numbered figure followed by four other figures numbered as A, B, C and D. All the five figures together form a series. The un-numbered figure marks the beginning of the series and so its position is fixed. However, she series will be established the earlier of the two figures is the answer.

Ex.4



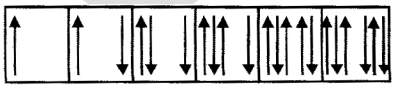
(A) (B) (C) (D)

Sol. Clearly, in one step an arrow occurs adjacent to a shaded portion of the circle and in the subsequent step, that portion also gets shaded and the arrow is displaced on the other side of the shaded portions. This series will be complete if figures (C) and (D) are interchanged. Hence, the answer is (C).

1.5 DETECTING THE WRONG FIGURE IN A SERIES

This type of questions begin with an un-numbered figure followed by four figures numbered from A to D and then again an un-numbered figure on the extreme right. These six figure together form a series which starts at the first (un-numbered) figure and ends at the last (un-numbered) figure. However, one and only one of these figures does not fit into the series. The number of that figure is the answer.

Ex.5



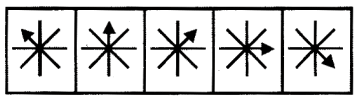
(A) (B) (C) (D)

Sol. In the above set of figures, the arrows are added to the right and left sides alternately. But in the third figure the arrow which was to be added to ther right. Hence, the answer is (C).

SOLVED EXAMPLES

SE. 1

In the following example find the figure from the answer set (i.e. figs. A, B, C and D) which will continue the series given in the problem set (i.e. figs. 1, 2, 3, 4 and 5).



(1) (2) (3) (4) (5)

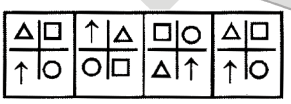
(A)  (B) 

(C)  (D) 

Ans. Here, the arrow rotates one step clockwise in every subsequent figure. Hence, the answer is (B).

SE. 2

In the following example find figure from the Answer set (A, B, C and D) which would continue the series indicated by the four figures of the problem set (1, 2, 3 and 4).



(1) (2) (3) (4)

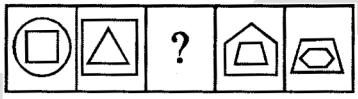
(A)  (B) 

(C)  (D) 

Ans. Clearly in one step, the symbols move one step CW and in the next step, the symbols at the vertically opposite positions interchange positions. Hence, the answer is (A).

SE. 3

In this type of question, you are given a set of four figures (labelled 1, 2, 3 and 4) following a certain sequence and hence forming a series. However, the figure at 3 is missing. The candidate is required to choose this figure from the alternatives A, B, C and D.



(1) (2) (3) (4) (5)

(A)  (B) 

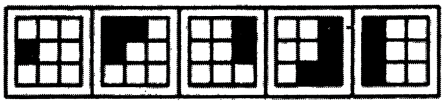
(C)  (D)

Ans. Clearly, the inner small figure become the outer large figure and a new small figure appears inside it in every step. Hence, the answer is (C).

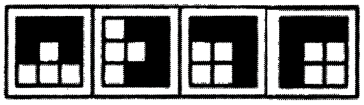
MULTIPLE CHOICE QUESTIONS

Directions (1–35) : Each of the following questions consists of five problem figure. These problem figures form a series. Find out the one figure from the answer figures that will continue the series.

1. Problem figures



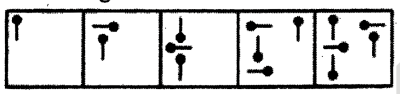
Answer Figures



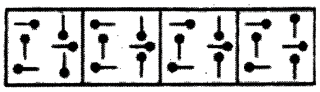
1 2 3 4

(A) 1 (B) 2 (C) 3 (D) 4

2. Problem figures



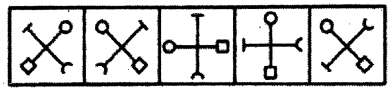
Answer Figures



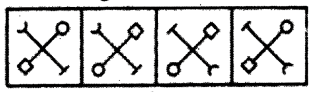
1 2 3 4

(A) 1 (B) 2 (C) 3 (D) 4

3. Problem figures



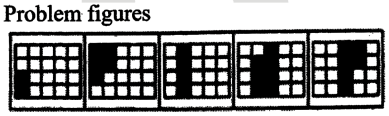
Answer Figures



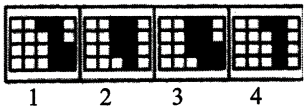
1 2 3 4

(A) 1 (B) 2 (C) 3 (D) 4

4. Problem figures



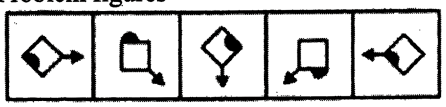
Answer Figures



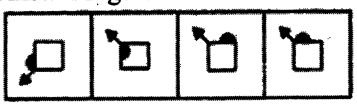
1 2 3 4

(A) 1 (B) 2 (C) 3 (D) 4

5. Problem figures



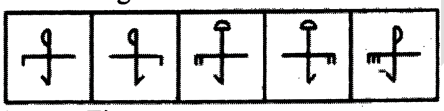
Answer Figures



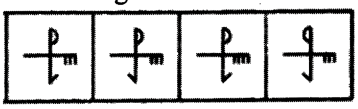
1 2 3 4

(A) 1 (B) 2 (C) 3 (D) 4

6. Problem figures



Answer Figures



1 2 3 4

(A) 1 (B) 2 (C) 3 (D) 4

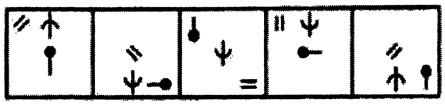
7. Problem figures

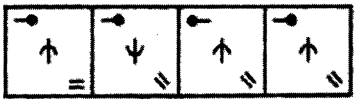
Answer Figures

1 2 3 4

(A) 1 (B) 2 (C) 3 (D) 4

8.

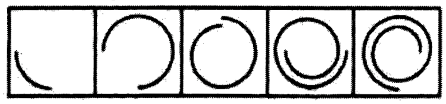




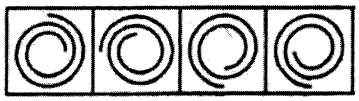
1 2 3 4

(A) 1 (B) 2 (C) 3 (D) 4

9. Problem figures



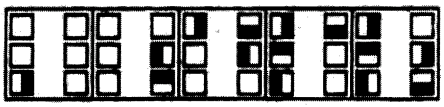
Answer Figures



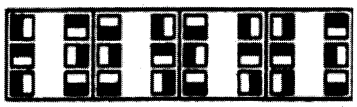
1 2 3 4

(A) 1 (B) 2 (C) 3 (D) 4

10. Problem figures



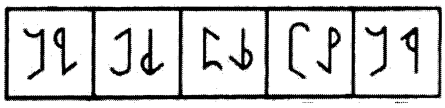
Answer Figures



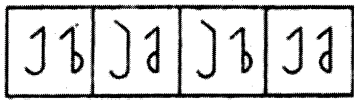
1 2 3 4

(A) 1 (B) 2 (C) 3 (D) 4

11. Problem figures



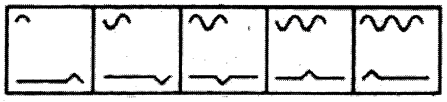
Answer Figures



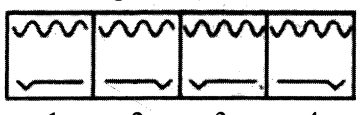
1 2 3 4

(A) 1 (B) 2 (C) 3 (D) 4

12. Problem figures



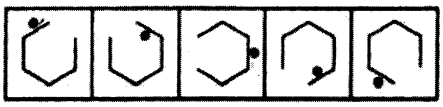
Answer Figures



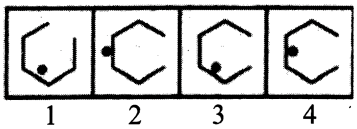
1 2 3 4

(A) 1 (B) 2 (C) 3 (D) 4

13. Problem figures



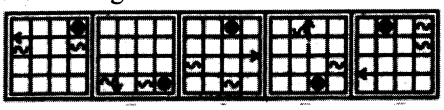
Answer Figures



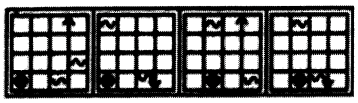
1 2 3 4

(A) 1 (B) 2 (C) 3 (D) 4

14. Problem figures



Answer Figures



1 2 3 4

(A) 1 (B) 2 (C) 3 (D) 4

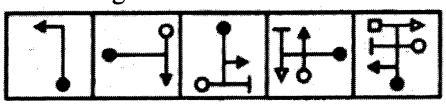
15. Problem figures

Answer Figures

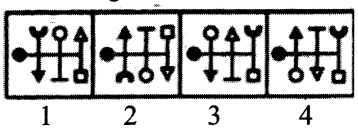
1 2 3 4

(A) 1 (B) 2 (C) 3 (D) 4

16. Problem figures



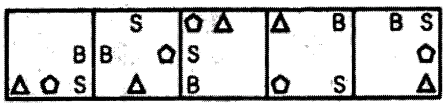
Answer Figures



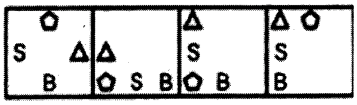
1 2 3 4

(A) 1 (B) 2 (C) 3 (D) 4

17. Problem figures



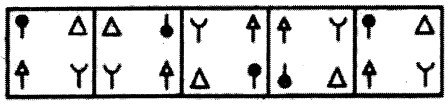
Answer Figures



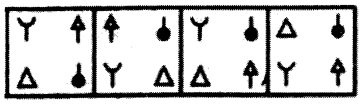
1 2 3 4

(A) 1 (B) 2 (C) 3 (D) 4

18. Problem figures



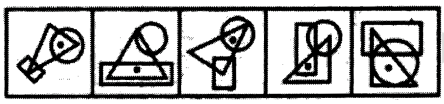
Answer Figures



1 2 3 4

(A) 1 (B) 2 (C) 3 (D) 4

19. Problem figures

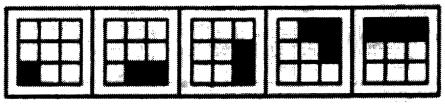


Answer Figures

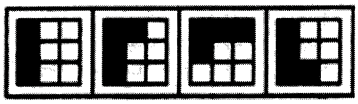
1 2 3 4

(A) 1 (B) 2 (C) 3 (D) 4

20. Problem figures



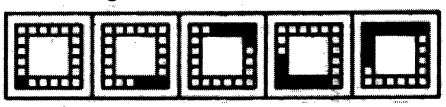
Answer Figures



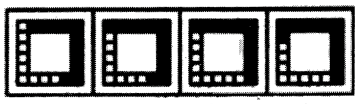
1 2 3 4

(A) 1 (B) 2 (C) 3 (D) 4

21. Problem figures



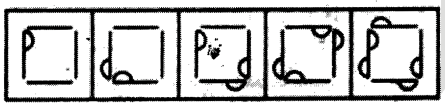
Answer Figures



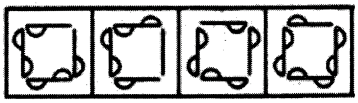
1 2 3 4

(A) 1 (B) 2 (C) 3 (D) 4

22. Problem figures



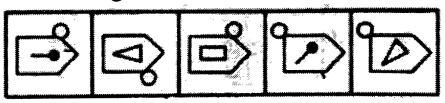
Answer Figures



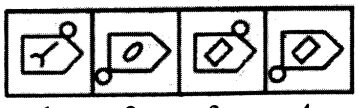
1 2 3 4

(A) 1 (B) 2 (C) 3 (D) 4

23. Problem figures



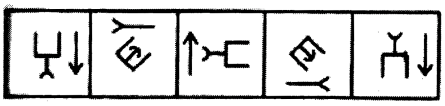
Answer Figures



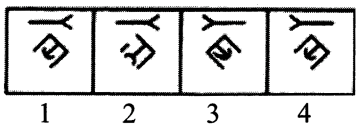
1 2 3 4

(A) 1 (B) 2 (C) 3 (D) 4

24. Problem figures



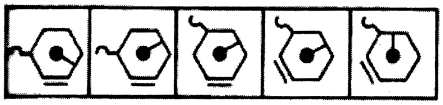
Answer Figures



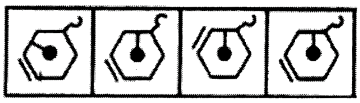
1 2 3 4

(A) 1 (B) 2 (C) 3 (D) 4

25. Problem figures



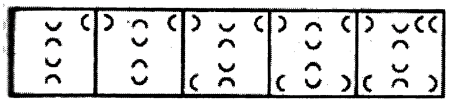
Answer Figures



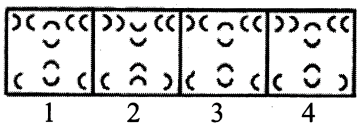
1 2 3 4

(A) 1 (B) 2 (C) 3 (D) 4

26. Problem figures



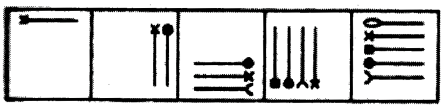
Answer Figures



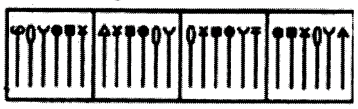
1 2 3 4

(A) 1 (B) 2 (C) 3 (D) 4

27. Problem figures



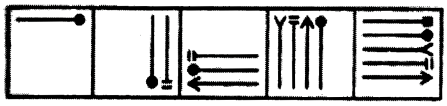
Answer Figures



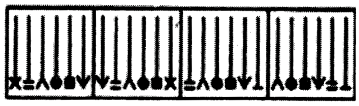
1 2 3 4

(A) 1 (B) 2 (C) 3 (D) 4

28. Problem figures



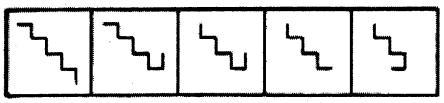
Answer Figures



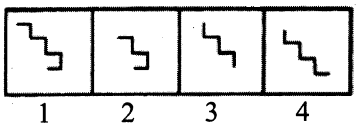
1 2 3 4

(A) 1 (B) 2 (C) 3 (D) 4

29. Problem figures



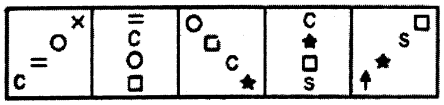
Answer Figures



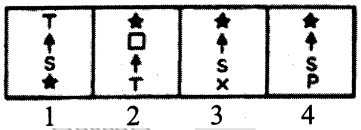
1 2 3 4

(A) 1 (B) 2 (C) 3 (D) 4

30. Problem figures



Answer Figures



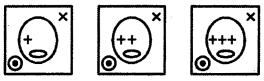
1 2 3 4

(A) 1 (B) 2 (C) 3 (D) 4

PREVIOUS YEAR QUESTION (NTSE)

Directions (1 – 5) : In the following questions, some figures are given in a sequence. Problem figures are arranged in a sequence. One figure from the answer–figures is to be selected such that it can be placed after the series of problem figures.

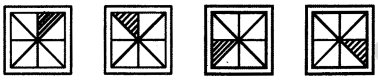
(NTSE Stage-I/Raj./2008)

1. 

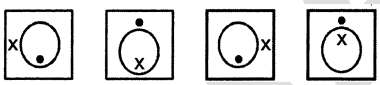
(A)  (B)  (C)  (D) 

2. 

(A)  (B)  (C)  (D) 

3. 

(A)  (B)  (C)  (D) 

4. 

(A)  (B)  (C)  (D) 

5. 

(A)  (B)  (C)  (D) 

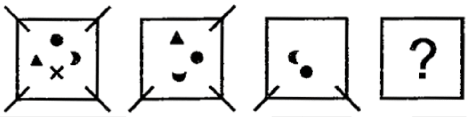
Directions (6– 7) : Study the pattern of figures given in each question to find out the relationship among them. One figure is missing. Choose the missing figure from the alternatives.

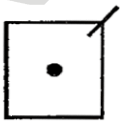
(NTSE Stage-II, 2008)

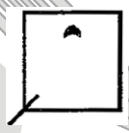
6. 

(A)  (B) 

(C)  (D) 

7. 

(A)  (B) 

(C)  (D) 

Directions (8 – 9) : In the following questions, series of figures are given. Find the correct alternative to continue the series. **(NTSEStage-II, 2008)**

8. 

(A)  (B) 

(C)  (D) 

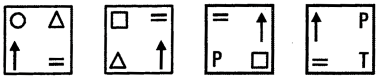
9. 

(A)  (B) 

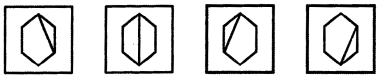
(C)  (D) 

Directions (10–14) : In the following questions, some figures are given in a sequence. There is a sequence according to which the problem figures are arranged. One figure of answer figures is to be selected which can be placed in sequence of problem figures. Find thecorrect option of the selected answer figure.

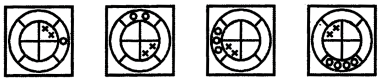
[NTSE Stage-I/Raj./2009]

10. 

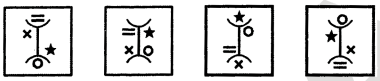
(A)  (B)  (C)  (D) 

11. 

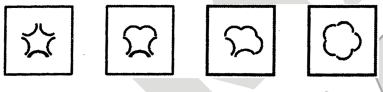
(A)  (B)  (C)  (D) 

12. 

(A)  (B)  (C)  (D) 

13. 

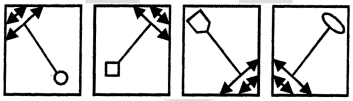
(A)  (B)  (C)  (D) 

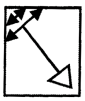
14. 

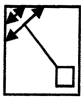
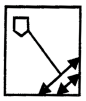
(A)  (B)  (C)  (D) 

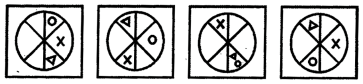
Directions (15–18) : The figures in each of the questions follow a series. Select the figure form the given alternatives which would continue the series.

[NTSE Stage-II, 2009]

15. 

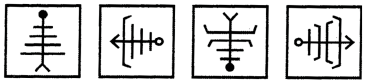
(A)  (B) 

(C)  (D) 

16. 

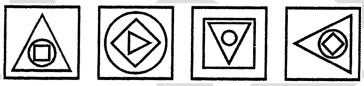
(A)  (B) 

(C)  (D) 

17. 

(A)  (B) 

(C)  (D) 

18. 

(A)  (B)  (C)  (D) 

19. Write the correct choice which would be required to continue with the series.

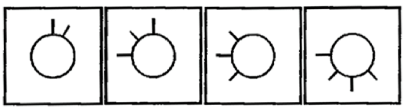
[NTSE Stage-II, 2009]

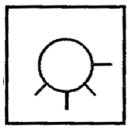
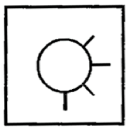
(A)  (B) 

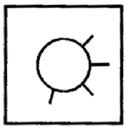
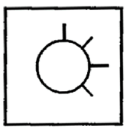
(C)  (D) 

Directions (20–24) : The figures in each of the questions follow a series. Select the figure form the given alternatives which would continue the series.

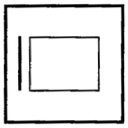
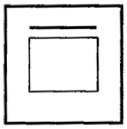
[NTSE Stage-I/Raj./2012]

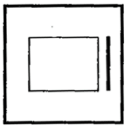
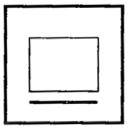
20. 

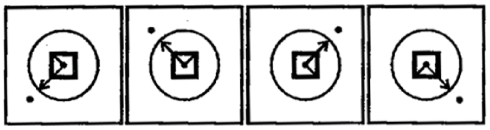
(A)  (B) 

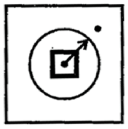
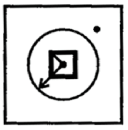
(C)  (D) 

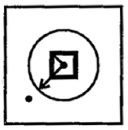
21. 

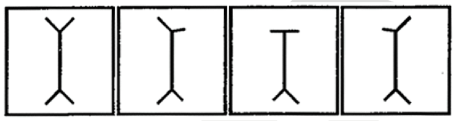
(A)  (B) 

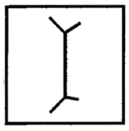
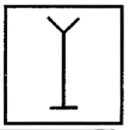
(C)  (D) 

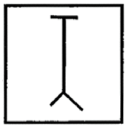
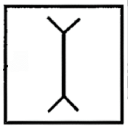
22. 

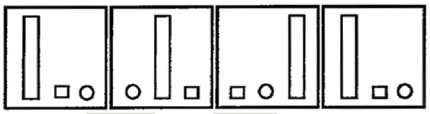
(A)  (B) 

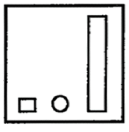
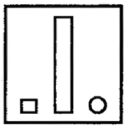
(C)  (D) 

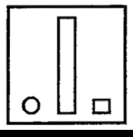
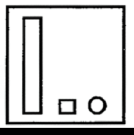
23. 

(A)  (B) 

(C)  (D) 

24. 

(A)  (B) 

(C)  (D) 

Directions (25 – 28) : In the following questions, some figures are given in a sequence. One figure from the Answer figures is to be selected such that it can be placed after the series of Question – figures. Fi nd the correct Serial number of the selected Answer – figures.

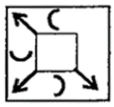
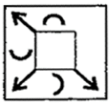
(NTSE Stage-I/Raj./2013)

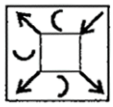
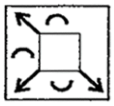
25. 

(A)  (B) 

(C)  (D) 

26. 

(A)  (B) 

(C)  (D) 

27. 

(A)  (B) 

(C)  (D) 

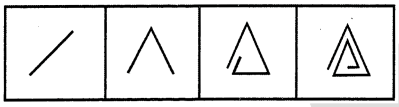
28. 

(A)  (B) 

(C)  (D) 

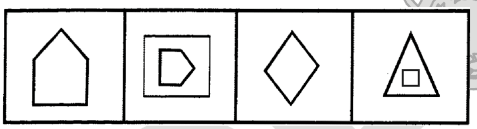
Directions (29–33) : In the following questions, some figures are given in a sequence. There is a sequence according to which the problem – figures are arranged. You have to select one figure from the set of answer – figures which can be placed in sequence after the set fo problem – figures. Find out the correct figure.

(NTSE Stage-I/Raj./2014)

29. 

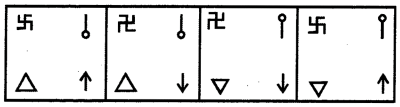
(A)  (B) 

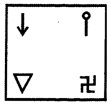
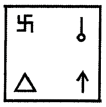
(C)  (D) 

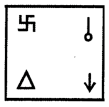
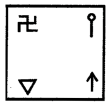
30. 

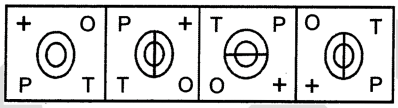
(A)  (B) 

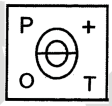
(C)  (D) 

31. 

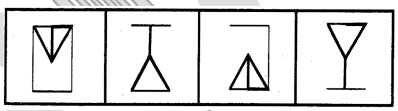
(A)  (B) 

(C)  (D) 

32. 

(A)  (B) 

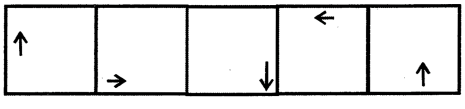
(C)  (D) 

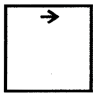
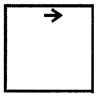
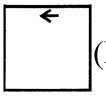
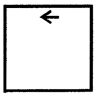
33. 

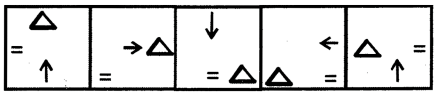
(A)  (B) 

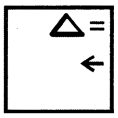
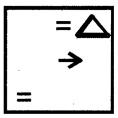
(C)  (D) 

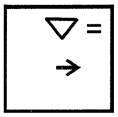
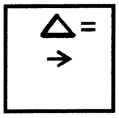
Directions (34–35) : In the following questions, somefigures are given in a sequence.One set contains problem-figures while the other has answer figure. There is a sequence according to which the problem-figures are arranged. You have to select one figure problem-figures. Find the out the corect figure. **[NTSE Stage-I/Raj./2015]**

34. 

(A)  (B)  (C)  (D) 

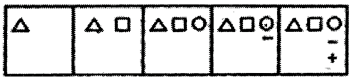
35. 

(A)  (B) 

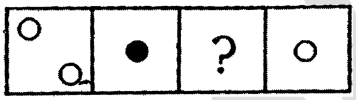
(C)  (D) 

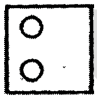
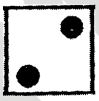
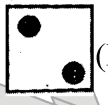
Directions (36–37) : In the following questions, some figures are given in a sequence. There is a sequence according to which the problem figures are arranged. You have to select an answer figure which can be added in sequence in the problem figures. Choose the correct figure.

[NTSE Stage-I/Raj./2016]

36. 

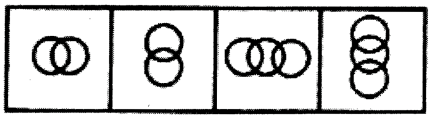
(A)  (B)  (C)  (D) 

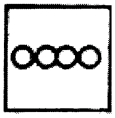
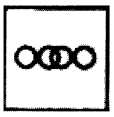
37. 

(A)  (B)  (C)  (D) 

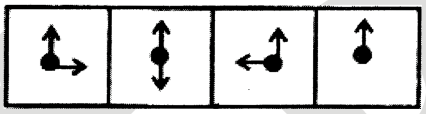
Directions (38–41) : In the following questions, some figures are given in a sequence. There is a sequence according to which the problem-figure are arranged. You have to select an answer-figure which can be added in sequence with the problem figures. Choose the correct figures.

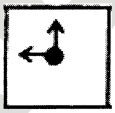
[NTSE Stage-I/Raj.2017]

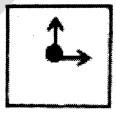
38. 

(A)  (B) 

(C)  (D) 

39. 

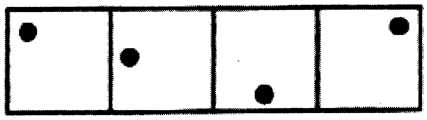
(A)  (B) 

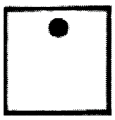
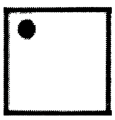
(C)  (D) 

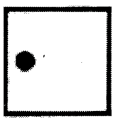
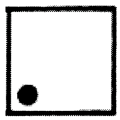
40. 

(A)  (B) 

(C)  (D) 

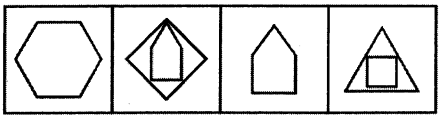
41. 

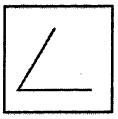
(A)  (B) 

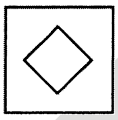
(C)  (D) 

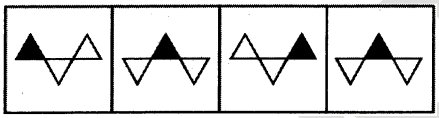
Directions (42–45) : In the following questions, some figures are given in a sequence. There is a sequence according to which the problem-figure are arranged. You have to select an answer-figure which can be added in sequence with the problem figures. Choose the correct figures.

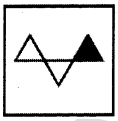
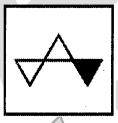
[NTSE Stage-I/Raj.2018]

42. 

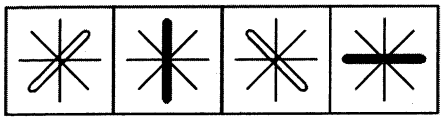
(A)  (B) 

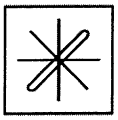
(C)  (D) 

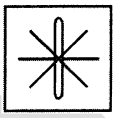
43. 

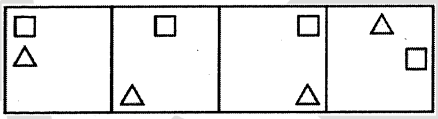
(A)  (B) 

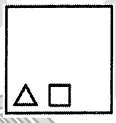
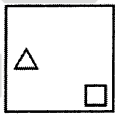
(C)  (D) 

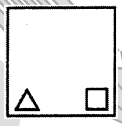
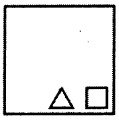
44. 

(A)  (B) 

(C)  (D) 

45. 

(A)  (B) 

(C)  (D) 

Answer Key

EXERCISE–I														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
D	C	C	C	D	B	B	D	B	A	D	A	D	D	C
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
C	A	D	D	B	C	C	C	D	D	D	D	C	B	D

EXERCISE–II														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
D	B	D	A	D	B	C	B	C	C	D	A	B	A	A
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
C	C	B	C	A	B	C	D	C	B	A	D	B	A	B
31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
B	C	C	B	D	B	C	C	D	A	D	D	C	A	D

SELF PROGRESS ASSESSMENT FRAMEWORK

(CHAPTER : SERIES)

CONTENT	STATUS	DATE OF COMPLETION	SELF SIGNATURE
Theory			
In-Text Examples			
Solved Examples			
Exercise I			
Exercise II			
Short Note-1			
Revision - 1			
Revision - 2			
Revision - 3			
Remark			

NOTES :

1. In the status, put "completed" only when you have thoroughly worked through this particular section.
2. Always remember to put down the date of completion correctly. It will help you in future at the time of revision.

Space for Notes :

DIRECTION SENSE TEST

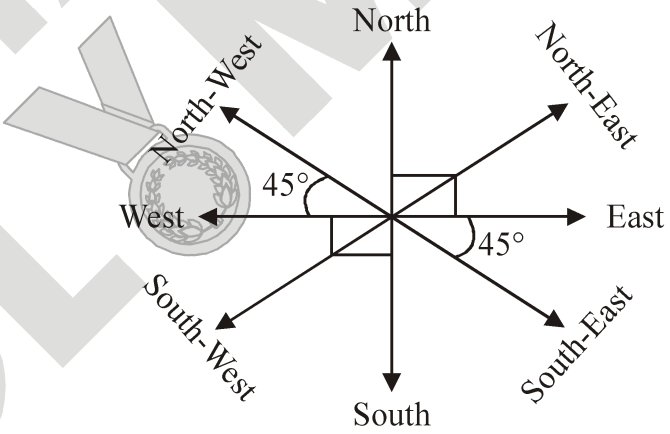
3

INTRODUCTION

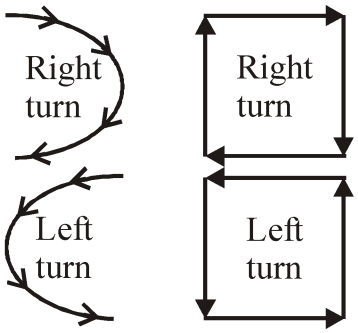
The topic Direction sense test (Distance & Direction) is referred to directly in the syllabus prescribed by NTSE problems related to Distance & Direction is included in the syllabus for Main Examination. Therefore, it is necessary to deal with the said topic.

In this type of questions a successive follow-up of directions and / or distance is formulated and on the basis of given information you are required to as certain the final direction with respect to the starting point or the shortest distance between the starting point and the final point. Sometimes both the final direction and the distance covered are asked. Thus, in this test, the questions consists of a sort of direction and/or distance puzzle. Obviously, such questions are meant to judge the candidate's ability to trace, follow and perceive the direction, described in some what complicated language, correctly. In order to solve such questions correctly you must have the knowledge of directions on the plane of a paper. At the same time, it is necessary to sketch out the directions as per the information provided in the question in proper sequence. An error at any point would alter your answer choice.

The diagram given below shows the four main directions (cardinals) and the four subsidiary directions on a plane of paper :



Generally right and left turns are frequently employed in the questions in order to confuse the candidates. Remember that examiner does possess the uncanny knack and he/she may confuse you by making verbose statements also. But, there is nothing to panic. You may note that on the surface of paper, the direction of right turn is always clockwise and that of left turn is anticlockwise. Thus,



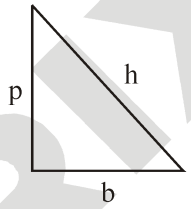
In order to determine the distance travelled or the shortest straight distance between the two given points, the Pythagorus formula

$h^2 = b^2 + p^2$ proves to be helpful.

Here, h = Hypotenuse

p = Perpendicular

b = Base



SOLVED EXAMPLES

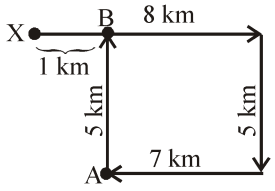
SE. 1

Sohan started from point X and travelled forward 8 km up to point Y, then turned towards right and travelled 5 km up to point Z, then turned right and travelled 7 km up to point A and then turned towards right and travelled 5 km up to B. What is the distance between point B and X ?

(A) 1 km (B) 2 km

(C) 3 km (D) 4 km

Ans.



Hence, the answer is (A).

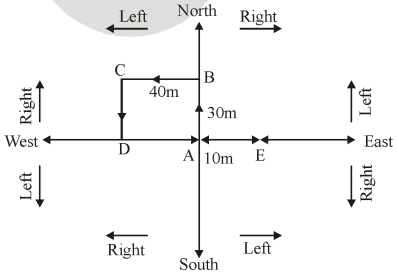
SE. 2

Ankit started walking towards North. After walking 30 m, he turned towards left and walked 40 m. He then turned left and walked 30 m. He again turned left walked 50 m. How far is he from his original position?

(A) 50m (B) 40m

(C) 30m (D) 10 m

Ans.



From fig. the final position of Ankit is E and starting point is A. Therefore, he is only 10 m away from his starting point. Hence, the answer is (D).

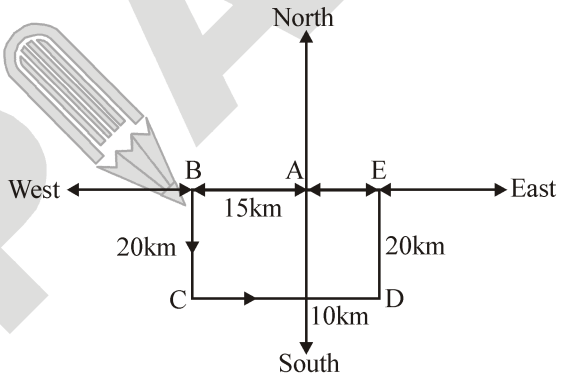
SE. 3

Lakshman went 15 km to the west from his house, then turned left and walked 20 km. He then turned East and walked 25 km and finally turning left covered 20 km. How far is he now from his house?

(A) 15 km (B) 20 km

(C) 25 km (D) 10 km

Ans.



Points A and E show the starting and end position respectively of Lakshman. It is clear that E is 10 km away from A. Hence, the answer is (D)

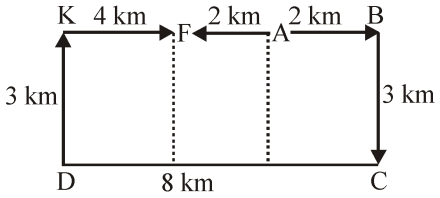
SE. 4

Sheela walks from A to B which is 2 km away, turns right at 90° and walks for 3 km. to point C, turns right at 90° and walks to D which is 8 km. away, turns 90° right and goes 3 km. to point K. Then, once again she turns right 90° and walks 4 km. to point F. How far is it from A to F?

(A) 2 km. (B) 4 km.

(C) 6 km. (D) 8 km.

Ans.



Distance between A and F = 2 km

Hence, the answer is (A).

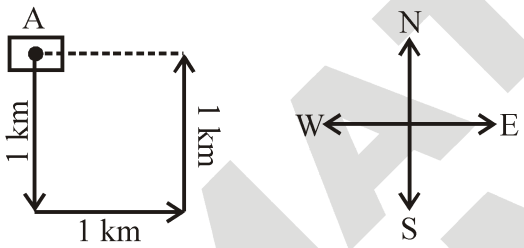
SE. 5

Mohan starts from point A and walks 1 km towards south, turns left and walks 1 km. Then he turns left again and walks 1 km. Now he is facing

(A) East (B) West

(C) North (D) South-West

Ans.



It is clear from the diagram that Mohan is facing towards North.

Hence, the answer is (C).

Space for Notes :

EXERCISE – I

MULTIPLE CHOICE QUESTIONS

1. Radha moves towards South-east a distance of 7 m, then she moves towards West and travels a distance of 14 m. From here, she moves towards North-west a distance of 7 m and finally she moves a distance of 4 m towards East and stood at that point. How far is the starting point from where she stood?
(A) 3m (B) 4 m (C) 10 m (D) 11 m

2. Gopal starts from his house towards West. After walking a distance of 30 metres, he turned towards right and walked 20 metres. He then turned left and moving a distance of 10 metres, turned to his left again and walked 40 metres. He now turns to the left and walks 5 metres. Finally he turns to his left. In which direction is he walking now?
(A) North (B) South
(C) East (D) South-west

3. A rat runs 20 m towards East and turns to right, runs 10 m and turns to right, runs 9 m and again turns to left, runs 5 m and then turns to left, runs 12 m and finally turns to left and runs 6 m. Now, which direction is the rat facing?
(A) East (B) West (C) North (D) South

4. Amit walked 30 metres towards East, took a right turn and walked 40 metres. Then he took a left turn and walked 30 metres. In which direction is he now from the starting point?
(A) North-east (B) East
(C) South-east (D) South

5. Maya starts at point T, walks straight to point U which is 4ft away. She turns left at 90° and walks to W which is 4ft away, turns 90° right and goes 3ft to P, turns 90° right and walks 1 ft to Q, turns left at 90° and goes to V, which is 1ft away and once again turns 90° right and goes to R, 3ft away. What is the distance between T and R?
(A) 4ft (B) 5ft (C) 7ft (D) 8ft

6. Ramakant walks northwards. After a while, he turns to his right and a little further to his left. Finally, after walking a distance of one kilometre, he turns to his left again. In which direction is he moving now?
(A) North (B) South
(C) East (D) West

7. A person starts from a point A and travels 3 km eastwards to B and then turns left and travels thrice that distance to reach C. He again turns left and travels five times the distance he covered between A and B and reaches his destination D. The shortest distance between the starting point and the destination is
(A) 12 km (B) 15 km
(C) 16 km (D) 18 km

8. A man walks 30 metres towards South. Then, turning to his right, he walks 30 metres. Then, turning to his left, he walks 20 metres. Again, he turns to his left and walks 30 metres. How far is he from his initial position ?
(A) 20 metres (B) 30 metres
(C) 60 metres (D) None of these

9. Raj travelled from a point X straight to Y at a distance of 80 metres. He turned right and walked 50 metres, then again turned right and walked 70 metres. Finally, he turned right and walked 50 metres. How far is he from the starting point?
(A) 10 metres (B) 20 metres
(C) 50 metres (D) 70 metres

10. Sanjeev walks 10 metres towards the South. Turning to the left, he walks 20 metres and then moves to his right. After moving a distance of 20 metres, he turns to the right and walks 20 metres. Finally, he turns to the right and moves a distance of 10 metres. How far and in which direction is he from the starting point?
(A) 10 metres North (B) 20 metres South
(C) 20 metres North (D) 10 metres South

11. Laxman went 15 km to the west from his house, then turned left and walked 20 km. He then turned East and walked 25 km and finally turning left covered 20 km. How far was he from his house?
(A) 5 km (B) 10 km
(C) 40 km (D) 80 km

12. A child is looking for his father. He went 90 metres in the East before turning to his right. He went 20 metres before turning to his right again to look for his father at his uncle's place 30 metres from this point. His father was not there. From here he went 100 metres to the North before meeting his father in a street. How far did the son meet his father from the starting point?
(A) 80 metres (B) 100 metres
(C) 140 metres (D) 260 metres

13. A walks 10 metres in front and 10 metres to the right. Then every time turning to his left, he walks 5, 15 and 15 metres respectively. How far is he now from his starting point?
(A) 5 metres (B) 10 metres
(C) 15 metres (D) 20 metres

14. Rasik walks 20 m North. Then he turns right and walks 30 m. Then he turns right and walks 35 m. Then he turns left and walks 15 m. Then he again turns left and walks 15m. In which direction and how many metres away is he from his original position?
(A) 15 metres West (B) 30 metres East
(C) 30 metres West (D) 45 metres East

15. Going 50 m to the South of her house, Radhika turns left and goes another 20 m. Then, turning to the North, she goes 30 m and then starts walking to her house. In which direction is she walking now?
(A) North-west (B) North
(C) South-east (D) East

16. Starting from a point P, Sachin walked 20 metres towards South. He turned left and walked 30 metres. He then turned left and walked 20 metres. He again turned left and walked 40 metres and reached a point Q. How far and in which direction is the point Q from the point P ?
(A) 20 metres West (B) 10 metres East
(C) 10 metres West (D) 10 metres North

17. Kashish goes 30 metres North, then turns right and walks 40 metres, then again turns right and walks 20 metres, then again turns right and walks 40 metres. How many metres is he from his original position?
(A) 0 (B) 10
(C) 20 (D) 40

18. I am facing South. I turn right and walk 20 m. Then I turn right again and walk 10 m. Then I turn left and walk 10 m and then turning right walk 20 m. Then I turn right again and walk 60 m. In which direction am I from the starting point ?
(A) North (B) North-west
(C) East (D) North-east

19. A villager went to meet his uncle in another village situated 5 km away in the North-east direction of his own village. From there he came to meet his father-in-law living in a village situated 4 km in the south of his uncle's village. How far away and in which direction is he now?
(A) 3 km in the North
(B) 3 km in the East
(C) 4 km in the East
(D) 4 km in the West

20. A girl leaves from her home. She first walks 39 metres in North-west direction and then 30 metres in South-west direction. Next, she walks 30 metres in South-east direction. Finally, she turns towards her home. In which direction is she moving?
(A) North-east (B) North-west
(C) South-east (D) South-west

21. Rohit walked 25 metres towards South. Then he turned to his left and walked 20 metres. He then turned to his left and walked 25 metres. He again turned to his right and walked 15 metres. At what distance is he from the starting point and in which direction ?
(A) 35 metres East (B) 35 metres North
(C) 40 metres East (D) 60 metres East

22. A man walks 1 km towards East and then he turns to South and walks 5 km. Again he turns to East and walks 2 km, after this he turns to North and walks 9 km. Now, how far is he from his starting point?
(A) 3 km (B) 4 km
(C) 5 km (D) 7 km

23. From his house, Lokesh went 15 km to the North. Then he turned West and covered 10km. Then, he turned South and covered 5 km. Finally, turning to East, he covered 10 km. In which direction is he from his house ?
(A) East (B) West
(C) North (D) South

24. The door of Aditya's house faces the East. From the back side of his house, he walks straight 50 metres, then turns to the right and walks 50 metres again. Finally, he turns towards left and stops after walking 25 metres. Now, Aditya is in which direction from the starting point?
(A) South-east (B) North-east
(C) South-west (D) North-west

EXERCISE – II

MULTIPLE CHOICE QUESTIONS

1. If South-east becomes North, North-east becomes West and so on, what will West become?
   (A) North-east (B) North-west
   (C) South-east (D) South-west

2. A direction pole was situated on the crossing. Due to an accident the pole turned in such a manner that the pointer, which was showing East, started showing South. One traveller went to the wrong direction thinking it to be West. In what direction actually he was travelling?
   (A) North (B) South
   (C) East (D) West

3. A watch reads 4.30. If the minute hand points East, in which direction will the hour hand point?
   (A) North (B) North-west
   (C) South-east (D) North-east

4. It is 3 o'clock in a watch. If the minute hand points towards the North-east, then the hour hand will point towards the
   (A) South
   (B) South-west
   (C) North-west
   (D) South-east

5. A clock is so placed that at 12 noon its minute hand points towards north-east. In which direction does its hour hand point at 1.30 p.m. ?
   (A) North (B) South
   (C) East (D) West

6. If the above clock is turned through an angle of 135° in an anti-clockwise direction, in which direction will its minute hand point at 8.45 p.m. ?
   (A) North (B) South
   (C) East (D) West

Directions (7 – 10): Read the following information carefully and answer the questions given below it:
(i) Six flats on a floor in two rows facing North and South are allotted to P, Q, R, S, T and U.
(ii) Q gets a North facing flat and is not next to S.
(iii) S and U get diagonally opposite flats.
(iv) R, next to U, gets a South facing flat and T gets a North facing flat.

7. Which of the following combinations get South facing flats?
   (A) QTS (B) UPT
   (C) URP (D) Data inadequate

8. Whose flat is between Q and S?
   (A) T (B) U
   (C) R (D) P

9. If the flats of T and P are interchanged, whose flat will be next to that of U?
   (A) P (B) Q
   (C) R (D) T

10. The flats of which of the other pairs than SU are diagonally opposite to each other?
   (A) QP (B) QR
   (C) PT (D) TS

11. Two buses start from the opposite points of a main road, 150 km apart. The first bus runs for 25 km and takes a right turn and then runs for 15 km. It then turns left and runs for another 25 km and takes the direction back to reach the main road. In the meantime, due to a minor breakdown, the other bus has run only 35 km along the main road. What would be the distance between the two buses at this point?
(A) 65 km (B) 75 km
(C) 80 km (D) 85 km

12. X and Y start moving towards each other from two places 200 m apart. After walking 60 m, Y turns left and goes 20 m, then he turns right and goes 40 m. He then turns right again and comes back to the road on which he had started walking. If X and Y walk with the same speed, what is the distance between them now?
(A) 20 m (B) 30 m
(C) 40 m (D) 50 m

13. If A is to the south of B and C is to the east of B, in which direction is A with respect to C ?
(A) North-east (B) North-west
(C) South-east (D) South-west

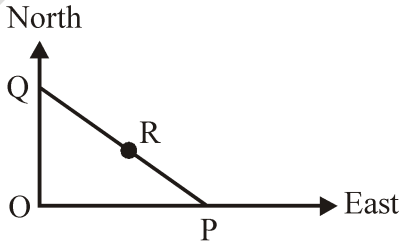
14. A is 40 m South-west of B. C is 40 m South-east of B. Then, C is in which direction of A?
(A) East (B) West
(C) North-east (D) South

15. There are four towns P, Q, R and T. Q is to the South-west of P, R is to the east of Q and South-east of P, and T is to the north of R in line with QP. In which direction of P is T located ?
(A) South-east (B) North
(C) North-east (D) East

16. Of the five villages P, Q, R, S and T situated close to each other, P is to the west of Q, R is to the south of P, T is to the north of Q and S is to the east of T. Then, R is in which direction with respect to S ?
(A) North-west
(B) South-east
(C) South-west
(D) Data inadequate

17. P, Q, R, S, T, U, V, W are sitting around a round table in the same order, for group discussion at equal distances. Their positions are clockwise. If V sits in the north, then what will be the position of S ?
(A) East (B) South-east
(C) South (D) South-west

18. In the given figure, P is 300 km eastward of O and Q is 400 km north of O. R is exactly in the middle of Q and P. The distance between Q and R is



(A) 250km (B) $150\sqrt{2}$ km
(C) 300 km (D) 350 km

19. Ravi wants to go to the university. He starts from his home which is in the East and comes to a crossing. The road to the left ends in a theatre, straight ahead is the hospital. In which direction is the university?
(A) North (B) South
(C) East (D) West

20. Of the six members of a panel sitting in a row, A is to the left of D, but on the right of E. C is on the right of X, but is on the left of B who is to the left of F. Which two members are sitting right in the middle?
(A) A and C (B) C and B
(C) D and B (D) D and C

21. A, B, C and D are playing cards. A and B are partners. D faces towards North. If A faces towards West, then who faces towards South?
(A) B (B) C
(C) D (D) Data inadequate

22. P, Q, R and S are playing a game of carrom. P, R and S, Q are partners. S is to the right of R who is facing west. Then, Q is facing
(A) North (B) South
(C) East (D) West

23. The town of Paranda is located on Green Lake. The town of Akram is west of Paranda. Tokhada is east of Akram but west of Paranda. Kakran is east of Bopri but west of Tokhada and Akram. If they are all in the same district, which town is the farthest west?
(A) Paranda (B) Kakran
(C) Akram (D) Bopri

24. Five boys are standing in a row facing East. Deepak is to the left of Sameer, Tushar and Shailendra. Sameer, Tushar and Shailendra are to the left of Sushil. Shailendra is between Sameer and Tushar. If Tushar is fourth from the left, how far is Sameer from the right?
(A) First (B) Second
(C) Third (D) Fourth

25. Two ladies and two men are playing cards and are seated at North, East, South and West of a table. No lady is facing East. Persons sitting opposite to each other are not of the same sex. One man is facing South. Which directions are the ladies facing?
(A) East and West (B) South and East
(C) North and East (D) North and West

26. The post office is to the east of the school while my house is to the south of the school. The market is to the north of the post office. If the distance of the market from the post office is equal to the distance of my house from the school, in which direction is the market with respect to my school?
(A) North
(B) East
(C) North-east
(D) South-west Directions

Direction (27–29): Study the information given below carefully and answer the questions that follow:
A, B, C, D, E, F, G, H and I are nine houses. C is 2 km east of B. A is 1 km north of B and H is 2 km south of A. G is 1 km west of H while D is 3 km east of G and F is 2 km north of G. I is situated just in middle of B and C while E is just in middle of H and D.

27. Distance between E and G is
(A) 1 km (B) 1.5 km
(C) 2 km (D) 5 km

28. Distance between E and I is

(A) 1 km (B) 2 km

(C) 3 km (D) 4 km

29. Distance between A and F is

(A) 1 km (B) 1.41 km

(C) 2 km (D) 3 km

Directions (30–31): Study the information given below carefully and answer the questions that follow:

On a playing ground, Dinesh, Kunal, Nitin, Atul and Prashant are standing as described below facing the North.

(i) Kunal is 40 metres to the right of Atul.

(ii) Dinesh is 60 metres to the south of Kunal.

(iii)Nitin is 25 metres to the west of Atul.

(iv) Prashant is 90 metres to the north of Dinesh.

30. Who is to the north-east of the person who is to the left of Kunal?

(A) Dinesh (B) Nitin

(C) Atul (D) None of these

31. If a boy walks from Nitin, meets Atul followed by Kunal, Dinesh and then Prashant, how many metres has he walked if he has travelled the straight distance all through?

(A) 155 metres (B) 185 metres

(C) 215 metres (D) 245 metres

Directions (32 – 34): These questions are based on the following information:

Seven villages A, B, C, D, E, F and G are situated as follows:

E is 2 km to the west of B.

F is 2 km to the north of A.

C is 1 km to the west of A.

D is 2 km to the south of G.

G is 2 km to the east of C.

D is exactly in the middle of B and E.

32. A is in the middle of

(A) E and C (B) E and G

(C) F and G (D) G and C

33. Which two villages are the farthest from one another?

(A) D and C (B) F and E

(C) F and B (D) G and E

34. How far is E from F (in km) as the crow flies ?

(A) 4 (B) V20

(C) 5 (D) V26

35. Lokesh's school bus is facing North when it reaches his school. After starting from Lokesh's house, it turns right twice and then left before reaching the school. Which direction was the bus facing when it left the bus stop in front of Lokesh's house ?

(A) North (B) South

(C) East (D) West

36. I start from my home and go 2 km straight. Then, I turn towards my right and go 1 km. I turn again towards my right and go 1 km again. If I am north-west from my house, then in which direction did I go in the beginning?

(A) North (B) South

(C) East (D) West

37. After walking 6 km, I turned right and covered a distance of 2 km, then turned left and covered a distance of 10 km. In the end, I was moving towards the north. From which direction did I start my journey?

(A) North (B) South

(C) East (D) West

38. A postman was returning to the post office which was in front of him to the north. When the post office was 100 metres away from him, he turned to the left and moved 50 metres to deliver the last letter at Shantivilla. He then moved in the same direction for 40 metres, turned to his right and moved 100 metres. How many metres was he away from the post office?

(A) 0 (B) 90

(C) 150 (D) 100

39. A boy rode his bicycle northwards, then turned left and rode one km and again turned left and rode 2 km. He found himself exactly one km west of his starting point. How far did he ride northwards initially?

(A) 1km (B) 2 km

(C) 3 km (D) 5 km

40. If 'South-east' is called 'East', 'North-west' is called 'West', 'South-west' is called 'South' and so on, what will 'North' be called?

(A) East (B) North-east

(C) North-west (D) South

Space for Notes :

EXERCISE – III

MULTIPLE CHOICE QUESTIONS

1. Ramesh starts walking from his house at 4 PM facing towards sun and walks 5 km. Then he turns left and walks 8 km. Again turning to left he walks 13 km and reaches Mohan's house. In which direction Ramesh's house is from Mohan's house ?

(NTSE Stage-I/Raj./2008)

(A) North-West
(B) North-East
(C) South-West
(D) South-East

2. Vinod travelled 6 km South from the starting point D, then turned right and moved 4 km and again turned right and travelled 6 km and turned left and travelled 8 km. Find out how many kilometre he has to cover to reach his starting point D.

(NTSE Stage-II, 2008)

(A) 10 km
(B) 12 km
(C) 14 km
(D) 16 km

3. Suresh moves a distance of 7 km from a place P towards North, then turns left and walks 4 km, again turns towards right and walks 3 km, then again turns right and walks 2 km to reach his destination Q. Which direction is he facing now ?

(NTSE Stage-II, 2008)

(A) West (B) East
(C) North-West (D) South

4. A child goes 50 metre towards South and then turning to his right, he goes 50 metre. Then turning to his left, he goes 30 metre. Again he turns to his left and goes 50 metre. How far is he from his inital position ?

(NTSE Stage-II, 2008)

(A) 30 metre (B) 40 metre
(C) 50 metre (D) 80 metre

5. Ganesh moves 20 metre towards East from his house. Then he turns left 3 times each time covering a distance of 20 metre. Finally he takes 2 successive right turns, each time covering a distance of 20 metres. In which direction is he with respect to his house ?

(NTSE Stage-II, 2009)

(A) North (B) North-East
(C) South- West (D) North-West

6. Ashok is facing North. He turns 45 degrees in the clockwise direction and then turns 90 degrees in the anticlockwise direction. Finally, he turns back. Which direction is he facing now ?

(NTSE Stage-II, 2009)

(A) South-East (B) South-West
(C) North-East (D) North-West

7. Shabnam's school bus picks her up from her house and takes two left turns and one right turn to reach her school. If the bus is facing East, while reaching the school, which direction was the bus facing at her home ?

(NTSE Stage-II, 2009)

(A) North (B) South
(C) East (D) West

8. One morning Ram and Shyam were talking to each other face to face. If Shyam's shadow was exactly to the right of Ram, which direction Shyam was facing ?

(NTSE Stage-II, 2009)

(A) South (B) East

(C) West (D) North

9. Prakesh moves 40 km in the direction of North then he turns to right and moves 50 km. After this he turns to right and moves 30 km. Again he turns to right and moves 50 km. How many kilometers away is he from the starting point ?

(A) 10 (B) 15

(C) 20 (D) None of these

(NTSE Stage-II, 2009)

10. Shalini is standing at the South-East corner of a rectangular field. She starts crossing the field diagonally. After walking half the distance she turns right, walks some distance and turns left. Which direction is Shalini facing now ?

(NTSE Stage-II, 2011)

(A) South-East (B) South-West

(C) North-East (D) North-West

11. One morning after sunrise, Seema was standing facing a pole. The shadow of the pole fell exactly to her right. Which direction was she facing ?

(NTSE Stage-II, 2011)

(A) North (B) South

(C) West (D) East

12. Rahul travels 10 km to the North. He turns to the right and walks 5 km. Then again he turns to his right and moves 10 km forwards. He many km away from starting point is he ?

(NTSE Stage-II, 2011)

(A) 26 km (B) 19 km

(C) 13 km (D) 5 km

13. Ram start from a point P, drives 2 km towards North. He then turns to his left and drives 3 km and after taking another turn to his left the drives 2 km, and finishes at point Q. After the first turn in which direction Ram will be driving ?

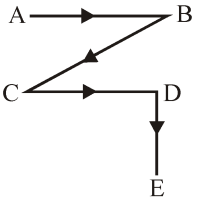
(NTSE Stage-II, 2011)

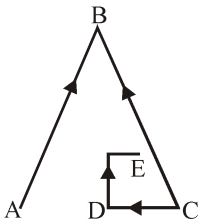
(A) West (B) North

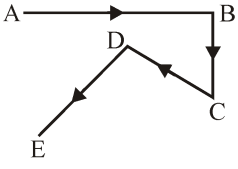
(C) East (D) South

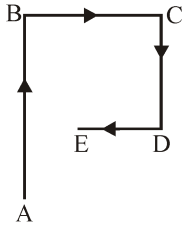
14. Rakesh start from A and walks towards East to B. He turns south and walks to C. Then he turns north-west and walks to D. Finally he turns south-west and comes to E. Which of the answer figures shows the exact path he traced ?

(NTSE Stage-II, 2011)

(A) 

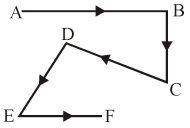
(B) 

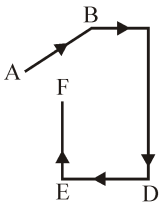
(C) 

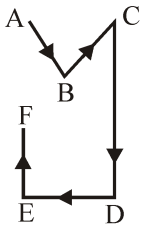
(D) 

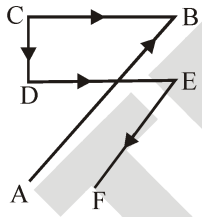
15. Pankaj start from A and walks north-east to B. He turns west and walks to C. Then turns south and walks to D. He then turns east and walks to E. Finally he turns south-west and walks to F. Which of the answer figures exactiy shows the path Pankaj traced ?

(NTSE Stage-II, 2011)

(A) 

(B) 

(C) 

(D) 

16. A sprinter goes off the starting block for 100m run and at that instant the second-hand of a stop-watch had pointed towards North. He touches the finishing line exactly after 12 seconds. In which direction did the seconds hand point when he just crossed the finishing line ?

(NTSE Stage-II, 2013)

(A) 18 North of East (B) 18 East of North

(C) 72 North of East (D) 82 East of North

17. I left home at 3:00pm and retumed at 3:48pm. The clock wa rotated by 45°, so that when I left, the hour-hand of a clock was pointing along the south-east direction. In which direction would the hour-hand point when I returned ?

(NTSE Stage-II, 2013)

(A) 15 East of South (B) 21 East of South

(C) 63 South of East (D) 27 South of East

18. Madhu walks 15 metres towards north, then she turns left at 90 and walk 30 metre, then turns right at 90 and walks 25 metres. How far, she is from the starting point and in which direction ?

(NTSE Stage-II, 2015)

(A) 55 mt., north-east (B) 50 mt., north-west

(C) 60 mt., north (D) 50 mt., west

19. A ship navigating in the India Ocean is hit by a sea storm and drifts as follows :

40 km North

28 km north west

36 km west

52 km south and 29 km south east.

The ship had finally drifted in.....direction from its original position.

(NTSE Stage-II, 2015)

(A) South West (B) South

(C) West (D) South East

20. Ram travels 8 km to south, then moves to right and travels 6 km and at the end he again moves right and travels 8 km. Then the distance of Ram from initial point is.

(NTSE Stage-I, 2016)

(A) 6 km (B) 8 km

(C) 10 km (D) 14 km

21. If North direction is called East and South direction is called West, then what will be called North-East direction ?

(NTSE Stage-I, 2017)

(A) North-East (B) East-South

(C) West-South (D) North-West

22. A,B,C and D are playing carrom. C, A and D, B are partners. D is to the right of C. C is facing west. Then, B is facing which direction ?

(NTSE Stage-I, 2018)

(A) North (B) South

(C) East (D) West

23. If 'South–east' is called 'East', 'North–west' is called 'West', 'South–west' is called 'South', then in the same way, 'North' will be called as

(NTSE Stage-I, 2018)

(A) East (B) North–east

(C) North–west (D) West

Space for Notes :

Answer Key

EXERCISE–I														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
C	A	C	C	D	D	B	D	A	B	B	B	A	D	A
16	17	18	19	20	21	22	23	24						
C	B	D	B	A	A	C	C	D						

EXERCISE–II														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
C	B	D	D	C	B	C	A	C	A	A	C	D	A	C
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
C	D	A	A	D	B	A	D	D	D	C	C	A	A	D
31	32	33	34	35	36	37	38	39	40					
C	D	C	A	D	D	B	B	B	C					

EXERCISE–III														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
A	B	B	D	D	A	B	D	A	D	B	D	A	C	D
16	17	18	19	20	21	22	23							
A	B	B	A	A	B	A	C							

SELF PROGRESS ASSESSMENT FRAMEWORK

(CHAPTER : DIRECTION SENSE TEST)

CONTENT	STATUS	DATE OF COMPLETION	SELF SIGNATURE
Theory			
In-Text Examples			
Solved Examples			
Exercise I			
Exercise II			
Exercise III			
Short Note-1			
Revision - 1			
Revision - 2			
Revision - 3			
Remark			

NOTES :

1. In the status, put "completed" only when you have thoroughly worked through this particular section.
2. Always remember to put down the date of completion correctly. It will help you in future at the time of revision.

Space for Notes :

MIRROR & WATER IMAGE

4

INTRODUCTION

1.1 MIRROR IMAGE

The image of an object, as seen in a mirror, is called its mirror reflection or mirror image.

In such an image, the right side of the object appears on the left side and vice - versa. A mirror- image is therefore said to be laterally inverted and the phenomenon is called **Lateral Inversion.**

MIRROR-IMAGES OF CAPITAL LETTERS

Letters	Mirror Images	Letters	Mirror Images	Letters	Mirror Images
A	A	J	ſ	S	Ƨ
B	ᗺ	K	ꓘ	T	T
C	Ↄ	L	⅃	U	U
D	ᗡ	M	M	V	V
E	Ǝ	N	И	W	W
F	Ⅎ	O	O	X	X
G	Ↄ	P	ꟼ	Y	Y
H	H	Q	Ọ	Z	Z
I	I	R	Я	–	–

Remark: The letters which have their mirror images identical to the letter itself are:

A, H, I, M, O, T, U, V, W, X, Y

Examples: Mirror-images of certain words are given below:

1. FUN : FUN
2. STOP : STOP
3. ZEBRA : ZEBRA
4. GOLKONDA : GOLKONDA
5. XYLOPHONE : XYLOPHONE

MIRROR-IMAGES OF SMALL LETTERS

Letters	Mirror Images	Letters	Mirror Images	Letters	Mirror Images
a	ɒ	j	ᒑ	s	ƨ
b	d	k	ʞ	t	ƚ
c	ɔ	l	l	u	u
d	b	m	m	v	v
e	ɘ	n	n	w	w
f	ʇ	o	o	x	x
g	ϱ	p	q	y	γ
h	ʜ	q	p	z	ƹ
i	i	r	ɿ	–	–

Examples: Mirror-images of certain words are given below:

1. arpit : **tiqɿɒ**
2. blade : **ɘbɒld**
3. determine : **ɘnimɿɘtɘb**

MIRROR-IMAGES OF NUMBERS

Letters	Mirror Images	Letters	Mirror Images	Letters	Mirror Images
1	Ɩ	4	߂	7	Ր
2	ς	5	ट	8	8
3	Ɛ	6	მ	9	ɘ

Examples: Mirror-images of certain combinations of alphabets and numbers are given below:

1. alpha348mz1 : **Ɩƹm8߂Ɛɒʜqlɒ**
2. BMC49JN2317 : **ՐƖƐςИႱɘ߂ƆMᙠ**
3. 15bg82XQh : **ʜϘX28ϱdटƖ**

2. WATER IMAGE

The reflection of an object, as seen in water, is called its water image. It is the inverted image obtained by turning the object upside down.

WATER-IMAGES OF CAPITAL LETTERS

Letters	A	B	C	D	E	F	G	H	I
Water Images	∀	B	C	D	E	Ⅎ	⅁	H	I
Letters	J	K	L	M	N	O	P	Q	R
Water Images	ſ	ꓘ	Γ	W	И	O	Ь	Ò	Я
Letters	S	T	U	V	W	X	Y	Z	–
Water Images	Ƨ	⊥	∩	Λ	M	X	⅄	Z	–

Remark 1 : The letters whose water-images are identical to the letter itself are:

C, D, E, H, I, K, O, X.

Remark 2 : Certain words which have water-images identical to the word itself are:

KICK, KID, CHIDE, HIKE, CODE, CHICK

WATER-IMAGES OF SMALL LETTERS

Letters	a	b	c	d	e	f	g	h	i
Water Images	ɐ	q	c	p	ǝ	ɟ	ƃ	ɥ	ı
Letters	j	k	l	m	n	o	p	q	r
Water Images	ɾ	ʞ	l	ɯ	u	o	d	b	ɹ
Letters	s	t	u	v	w	x	y	z	–
Water Images	s	ʇ	n	ʌ	ʍ	x	ʎ	z	–

WATER-IMAGES OF NUMBERS

Letters	0	1	2	3	4	5	6	7	8	9
Water Images	0	I	Ƨ	Ɛ	ᔭ	Ƨ	9	ㄥ	8	6

EXERCISE – I

MULTIPLE CHOICE QUESTIONS

Directions (1 – 9) : In each of the following questions, choose the correct mirror image from alternatives (A), (B), (C) and (D) of the Word / figure (X).

1. VERBAL

   (A) LABREV (B) LRVEBA

   (C) REVBAL (D) ⅃ABЯƎV

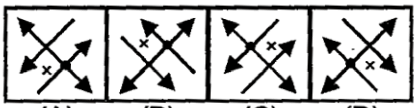
2. TARAIN1014A

   (A) A⊦I0IИIAЯAT (B) A4101NIARAT

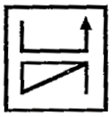
   (C) A410ARTAIN1 (D) ⊥∀ꓤ∀IИ10ᔭ∀

3. 

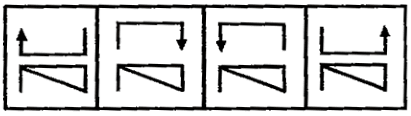
   (X)

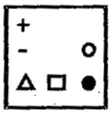
   (A) (B) (C) (D)

4. 

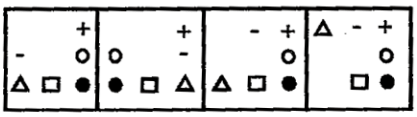
   (X)

   (A) (B) (C) (D)

5. 

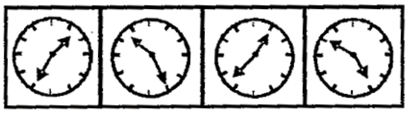
   (X)

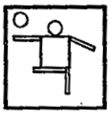
   (A) (B) (C) (D)

6. 

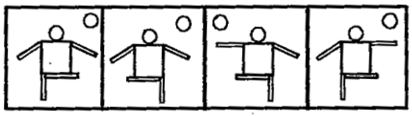
   (X)

   (A) (B) (C) (D)

7. 

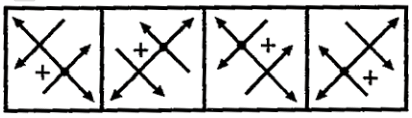
   (X)

   (A) (B) (C) (D)

8. 

   (X)

   (A) (B) (C) (D)

9. What is the mirror image of b3k4s | ?

   (A) sᔭʞƐq (B) b3k4s

   (C) sᔭʞ3d (D) sᔭʞ3b

Directions (10 – 13) : In each of the following questions, you are given a combination of alphabets and\or numbers followed by four alternatives (A), (B), (C) and (D). Choose the alternative which most closely resembles the mirror – image of the given combination.

10. NATIONAL

(A) ⅃AИOITAИ (B) ⅃AИOITAИ
(C) ⅃ANOITAИ (D) LAИOITAИ

11. SUPERVISOR

(A) ЯOƧIVЯƎꟼUƧ (B) ƧՈЬΕЯΛIƧOЯ
(C) ЯOƧIVЯEꟼUƧ (D) ƧՈЬƎЯΛIƧOЯ

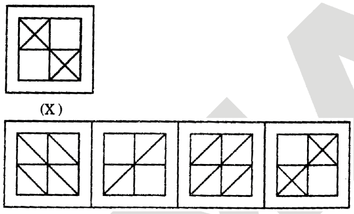
12. JUDGEMENT

(A) TИƎMEGDUᒐ (B) TИƎMEGDUJ
(C) TИƎMƎGDUᒐ (D) ⅃ИƎMƎGDUᒐ

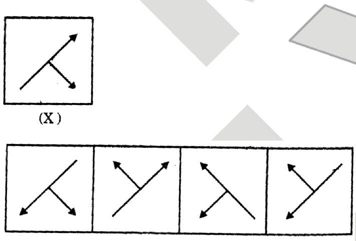
13. QUALITY

(A) ϘՈVΓILλ (B) YTILAUQ
(C) YTI⅃AUϘ (D) YTI⅃AՈϘ

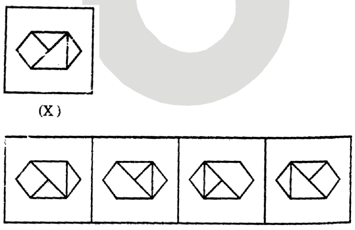
Directions (14 – 20) : In each of the following questions, choose the correct mirror–image of the Fig. (X) from amongst the four alternatives (A), (B), (C) and (D) given along with it.

14. 

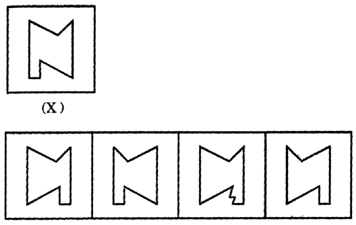
(A) (B) (C) (D)

15. 

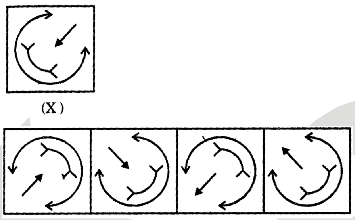
(A) (B) (C) (D)

16. 

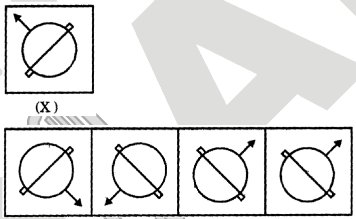
(A) (B) (C) (D)

17. 

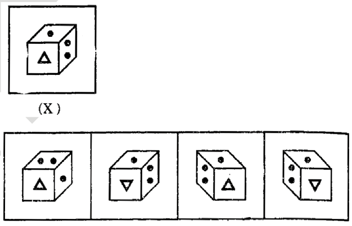
(A) (B) (C) (D)

18. 

(A) (B) (C) (D)

19. 

(A) (B) (C) (D)

20. 

(A) (B) (C) (D)

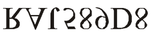
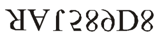
EXERCISE – II

MULTIPLE CHOICE QUESTIONS

Directions (1–11) : In each of the following quetions, choose the correct water–image from alternatives (A), (B), (C) and (D) of the word / figure (X).

1. RAJ589D8

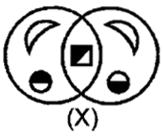
(A)  (B) 

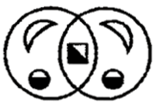
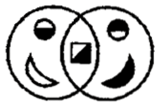
(C)  (D) 

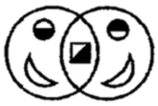
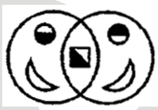
2. monday

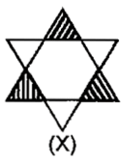
(A) yadnom (B) 

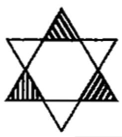
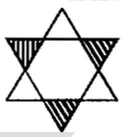
(C)  (D) 

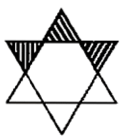
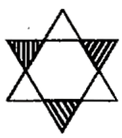
3. 

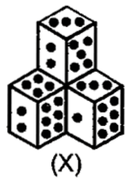
(A)  (B) 

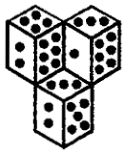
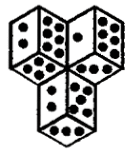
(C)  (D) 

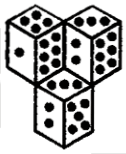
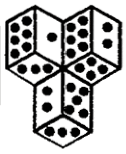
4. 

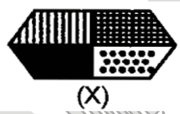
(A)  (B) 

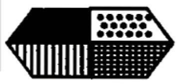
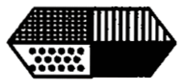
(C)  (D) 

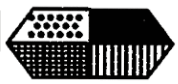
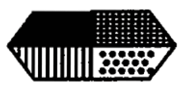
5. 

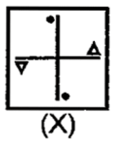
(A)  (B) 

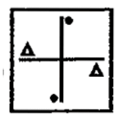
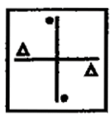
(C)  (D) 

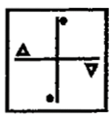
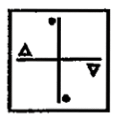
6. 

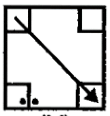
(A)  (B) 

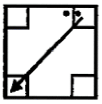
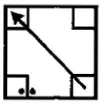
(C)  (D) 

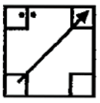
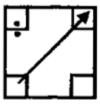
7. 

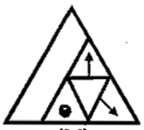
(A)  (B) 

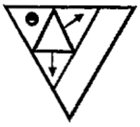
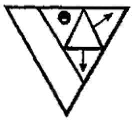
(C)  (D) 

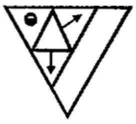
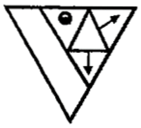
8. 
(X)

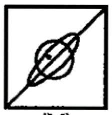
(A)  (B) 

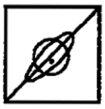
(C)  (D) 

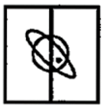
9. 
(X)

(A)  (B) 

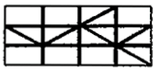
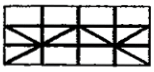
(C)  (D) 

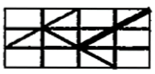
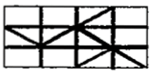
10. 
(X)

(A)  (B) 

(C)  (D) 

11. 
(X)

(A)  (B) 

(C)  (D) 

Directions (12 – 15) : In each of the following questions, you are given a combination of alphabets and/or numbers followed by four alternatives (a), (b), (c) and (d). Choose the alternative which most closely resembles the water–image of the given combination.

12. ACOUSTIC

(A) ∀CO∩S⊥IC (B) ∀CO∩Ƨ⊥IC

(C) ∀ƆO∩S⊥IC (D) ∀CO∩ƧTIC

13. FAMILY

(A) ꟻ∀MIL⅄ (B) YJIMAꟻ

(C) Ⅎ∀MIL⅄ (D) Ⅎ∀MIL⅄

14. NUCLEAR

(A) ꓤ∀ƎꞀƆ∩N (B) ИՈCꓶEꓯꓤ

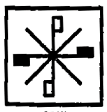
(C) N∩CꞀƎ∀ꓤ (D) ИՈCꞀEꓯꓤ

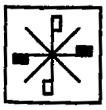
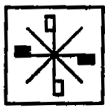
15. D 6 Z 7 F 4

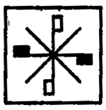
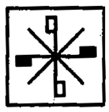
(A) D϶ZᒣℲ4 (B) D6ZᒣℲ4

(C) D϶ZᒣℲ4 (D) ᗡ϶Z7Ⅎ4

Directions (16–21) : In each of the following questions, choose the correct water – image of the Fig. (X) from amongst the four alternatives (a), (b), (c) and (d) given along with it.

16. 
(X)

(A)  (B) 

(C)  (D) 

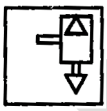
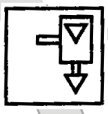
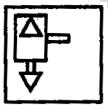
17. 
(X)

(A) 
(B) 
(C) 
(D) 

18. 
(X)

(A) 
(B) 
(C) 
(D) 

19. 
(X)

(A) 
(B) 
(C) 
(D) 

20. 
(X)

(A) 
(B) 
(C) 
(D) 

21. 
(X)

(A) 
(B) 
(C) 
(D) 

EXERCISE – III

PREVIOUS YEAR QUESTION (NTSE)

Directions (1 – 5) : In the following questions you have to visualize the image of the item (Letter/word/ number/figures) in the mirror. The mirror is below the item. Choose the mirror image from the alternatives. **(NTSE Stage-I/Raj./2008)**

1. NTSE

(A) ИꓕƧƎ (B) ИꓕƧE

(C) NꓕSƎ (D) ИꓕSE

2. SIERT

(A) ƧIƎRꓕ (B) SIEʁꓕ

(C) SIƎʁꓕ (D) ƧIEʁꓕ

3. 3609

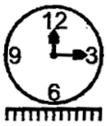
(A)  (B) 

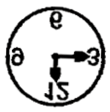
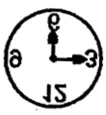
(C)  (D) 

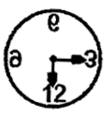
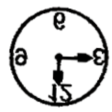
4. 

(A)  (B) 

(C)  (D) 

5. 

(A)  (B) 

(C)  (D) 

Directions (6 – 9) : In the following questions, you have to identify the image of the item (Letter/ word/ Number) in the mirror. The mirror is placed below the item. Choose the true image from the given alternatives.

(NTSE Stage-I/Raj./2009)

6. फसल

(A)  (B) 

(C)  (D) 

7. 45

(A)  (B) 

(C)  (D) 

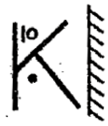
8. GOAL

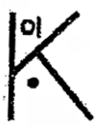
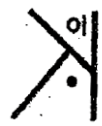
(A)  (B) 

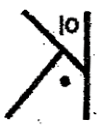
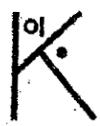
(C)  (D) 

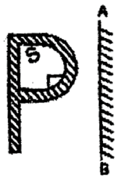
Directions (9 – 10) : Find the correct alternative which is the mirror of the given in each question.

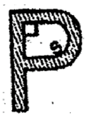
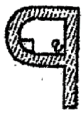
(NTSE Stage-II,2011)

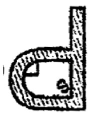
9. 

(A)  (B) 

(C)  (D) 

10. 

(A)  (B) 

(C)  (D) 

Directions (11 – 15) : In the following questions visualize the image of the correct item.

(NTSE Stage-I/Raj./2012)

11. Q U A C K Mirror

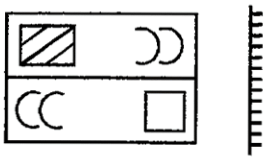
(A) ꓘ C A U Ϙ (B) ꓘ Ɔ A U Ϙ

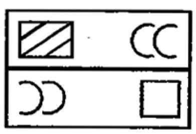
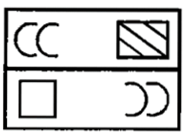
(C) ꓘ Ɔ ∀ U Ϙ (D) ꓘ Ɔ ∀ U Q

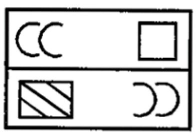
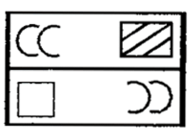
12. R A H U L Mirror

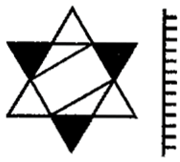
(A) ꓤ ∀ H ∩ ⅂ (B) ꓤ A H ∩ ⅂

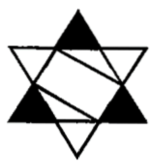
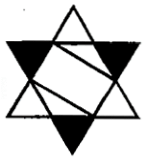
(C) R A H ∩ ⅃ (D) ꓤ ∀ H U ⅂

13.  Mirror

(A)  (B) 

(C)  (D) 

14.  Mirror

(A)  (B) 

(C)  (D) 

15. 5 2 6 9 3 Mirror

(A) 2 5 9 6 3 (B) 5 2 9 6 3

(C) 2 2 6 9 3 (D) 5 2 6 6 3

Directions (16 – 20) : In the following questions, you have to visualize the image of the item (Letter/word/number/figure) in the water. The water source is below the item. Choose the water from the alternatives.

(NTSE Stage-II,2007)

16. JTVDF

(A) JTVDF (B) JTVDF

(C) JTVDF (D) JTVDF

17. CHICK

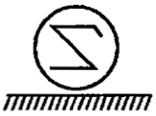
(A) CHICK (B) ꓘƆIHƆ

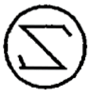
(C) ƆHIƆꓘ (D) CHICꓘ

18. 356274

(A) 475923 (B) 329574

(C) 329574 (D) 329274

19. 

(A)  (B) 

(C)  (D) 

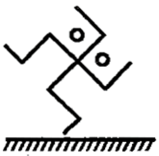
20. REFUND

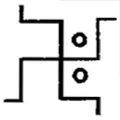
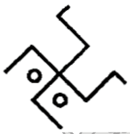
(A) DNՈꟻƎꓤ (B) ꓤƎꟻՈИᗡ

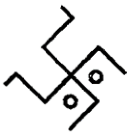
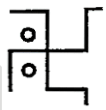
(C) ꓤEꟻՈИᗡ (D) ꓤEꟻՈИᗡ

Directions (21 – 23) : In the following questions, you have to visualize the image of the item (figure, word, letter, number) in water. The water source is below the item. Choose the water image from the alternatives.

(NTSE Stage-II,2008)

21. 

(A)  (B) 

(C)  (D) 

22. Player

(A) ꟼlɐʎǝɹ (B) ɹǝʎɐlꟼ

(C) ꟼlɐʎǝɹ (D) ꟼlɐʎǝɹ

23. TL98dw

(A) ʍq8ꓶꓕ6 (B) ꓕꓶ68qʍ

(C) ꓕꓶ68qʍ (D) ꓕꓶ68dʍ

24. What will be water image of CHICK ?

(NTSE Stage-II,2013)

(A) CHICꓘ

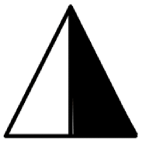
(B) ꓘƆIHC

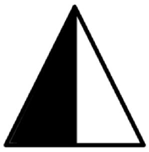
(C) ʞƆIHƆ

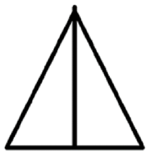
(D) ꓘƆIHƆ

Direction (25 – 27) : In questions 40 to 42 find the correct mirror image of the given figure.

(NTSE -2015-16)

25. 

(A)  (B) 

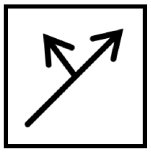
(C)  (D) 

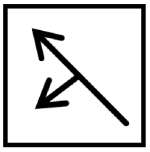
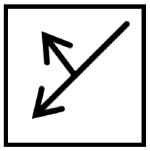
26. D E A R

(A) D E A R (B) R A E D

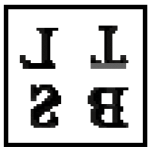
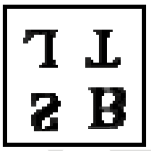
(C) Я A Ǝ ᗡ (D) ᗡ Ǝ A Я

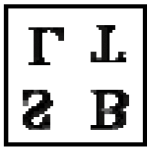
27. 

(A)  (B) 

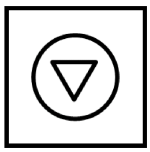
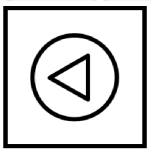
(C)  (D) 

28. The water image of the given figure  is –

(A)  (B) 

(C)  (D) 

29. The water image of the given figure  is

(A)  (B) 

(C)  (D) 

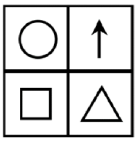
Direction (30 – 31) : In questions 39 and 40 find the correct mirror image of the given figure, when mirror is placed on right side of the figure.

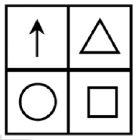
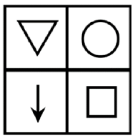
(NTSE Stage – I/Raj./2017-18)

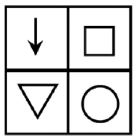
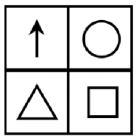
30. STOP

(A) ƨTOd (B) dOTƨ

(C) dTOƨ (D) POTS

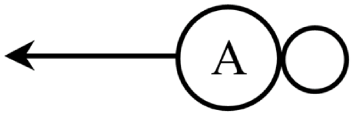
31. 

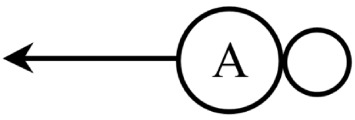
(A)  (B) 

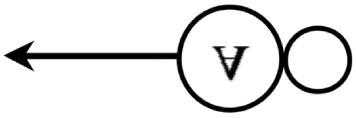
(C)  (D) 

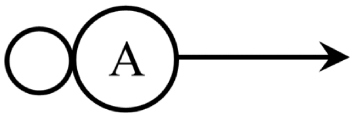
Directions (32 – 33) : In questions 41 and 42 select the correct water image of the given figure.

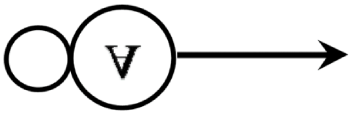
(NTSE Stage – I/ Raj./2017-18)

32. 

(A) 

(B) 

(C) 

(D) 

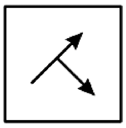
33. X 7 W 4

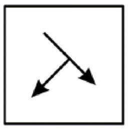
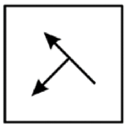
(A) X⅂Wᔨ (B) X7M4

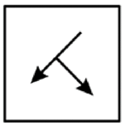
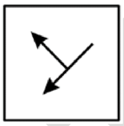
(C) X⅂Mᔨ (D) X⅂Wᔨ

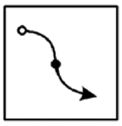
Directions (34 – 37) : Find the correct mirror image of the given figure, when mirror is placed on right side of the figure.

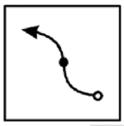
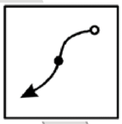
(NTSE Stage – I/Raj./2019-20)

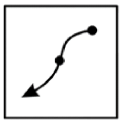
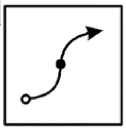
34. 

(A)  (B) 

(C)  (D) 

35. 

(A)  (B) 

(C)  (D) 

36. QUALITY

(A) ϘUALITY (B) YTILAUQ

(C) YTIJAUϘ (D) YTIJAUQ

37. 247596

(A) 695742 (B) 695742

(C) 247569 (D) 695742

Direction (38 – 41) : Find the correct water-image of the given figure.

(NTSE Stage – I/Raj./2019-20)

38. FAMILY

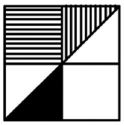
(A) ꟻAMIꓶY (B) ꓞAMIꓶY

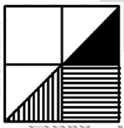
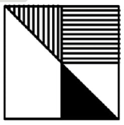
(C) ꓞAMIꓶY (D) ꓞAMIꓶY

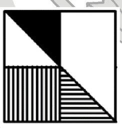
39. NhRqSy

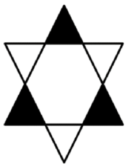
(A) NhRqSy (B) NhRqSy

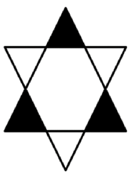
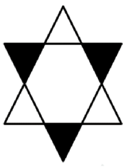
(C) NhRqSy (D) NhRqSy

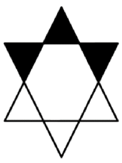
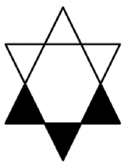
40. 

(A)  (B) 

(C)  (D) 

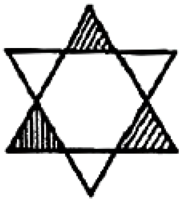
41. 

(A)  (B) 

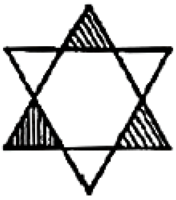
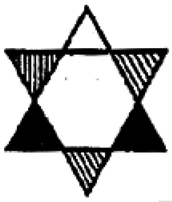
(C)  (D) 

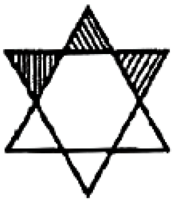
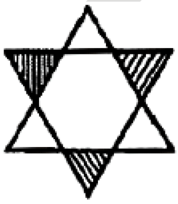
Directions (42 – 43) : Select the correct water image of the figure (X) from amongst the four alternative (A), (B), (C), (D) provided with each figure :

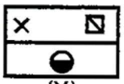
(NTSE-Stage-II, 2018-19)

42. 

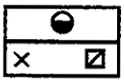
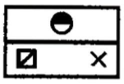
(X)

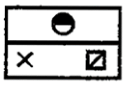
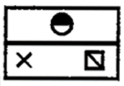
(A)  (B) 

(C)  (D) 

43. 

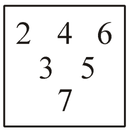
(X)

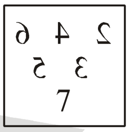
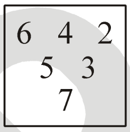
(A)  (B) 

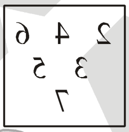
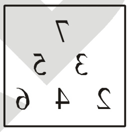
(C)  (D) 

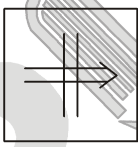
Directions (44–47) : In Question , find the correct mirror image of the given figure, when mirror is placed on right side of the figure.

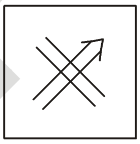
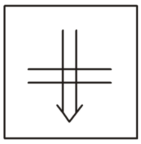
(NTSE-Stage-I/Raj./2019)

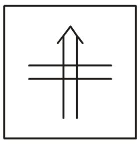
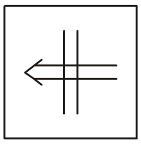
44. 

(A)  (B) 

(C)  (D) 

45. 

(A)  (B) 

(C)  (D) 

46. PRAYER

(A) ꟼЯAYƎЯ (B) ЯƎYAЯꟼ

(C) ЯƎꟼAƎЯ (D) ꟼЯAYƎЯ

47. 12698

(A) 1Ƨ698 (B) 1Ƨ698

(C) 8ɘ6Ƨ1 (D) 12968

Answer Key

EXERCISE–I														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
D	A	B	A	B	B	D	B	B	B	A	C	C	D	C
16	17	18	19	20										
D	D	B	C	C										

EXERCISE–II														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
A	D	D	D	B	A	C	C	B	B	D	B	D	D	C
16	17	18	19	20	21									
B	C	C	A	B	D									

EXERCISE–III														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
B	D	A	B	A	B	A	C	B	C	B	A	B	B	A
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
D	A	D	B	C	C	A	B	A	A	D	C	D	A	B
31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
D	B	A	B	B	C	D	D	A	D	B	D	C	C	D
46	47													
B	C													

SELF PROGRESS ASSESSMENT FRAMEWORK

(CHAPTER : MIRROR & WATER IMAGE)

CONTENT	STATUS	DATE OF COMPLETION	SELF SIGNATURE
Theory			
In-Text Examples			
Solved Examples			
Exercise I			
Exercise II			
Exercise III			
Short Note-1			
Revision - 1			
Revision - 2			
Revision - 3			
Remark			

NOTES :

1. In the status, put "completed" only when you have thoroughly worked through this particular section.
2. Always remember to put down the date of completion correctly. It will help you in future at the time of revision.

Space for Notes :

NUMBER, RANKING & ORDERING TEST

5

INTRODUCTION

1.1 NUMBER QUIBBLE

In these type of questions, generally a set, group or series of numerals is given and the candidate is required to find out how many times a numeral satisfying the conditions, specified in the question occurs.

SE.1 Consider the series given below made up of numbers from 0 to 9. How many 5s are there which are followed by a 7 ?

2 5 7 8 5 9 6 3 3 5 7 5 2 0 4 3 6 9 5 7 3 5 7 5 7 5 1 5 5

(A) 5 (B) 3 (C) 7 (D) 4

Sol. In the given question there are many 5s that are given, but we have to count only those 5s which are followed by a 7. The 5s that have been underlined are the ones which are followed by a 7.

2 5 7 8 5 9 6 3 3 5 7 5 2 0 4 3 6 9 5 7 3 5 7 5 7 5 1 5 5

Hence in the given series the number of 5s which are followed by 7 is '5'. Hence, the answer is (A).

SE.2 If 3 is subtracted from the middle digit of each of the following numbers and then the positions of the digits are reversed, which of the following will be the last digit of the middle number after they are arranged in descending order ?

589 362 554 371 442

(A) 1 (B) 2 (C) 3 (D) 4

Sol. On subtracting 3 from the middle digits, the numbers becomes.

559 332 524 341 412

Now, on reversing the positions of digits, we have :

955 333 425 143 214

Arranging these numbers in descending order, we have :

955 425 233 214 143

The middle number is 233 and its last digit is 3. Hence, the answer is (C).

1.2 RANKING TEST

In these type of questions, generally the ranks of a person both from the top and from the bottom are mentioned and the total number of persons is asked. However, sometimes this question is put in the form of a puzzle of interchanging seats by two persons.

- **Some Useful Information**

1. Position of person from upward = [Total number of persons – position of person from down] + 1
2. Position of person from downward = [Total number of persons – position of person from up] + 1
3. Position of person from right= [Total number of persons – position of person from left] + 1
4. Position of person from left = [Total number of persons – position of person from right] + 1
5. Total number of persons = [Position of person from upward/right + position of person from downward/ left] – 1

SE.3 In a row of trees, a lemon tree is eight from the either end of the row. How many lemon trees are there in total in the row ?

(A) 12 (B) 18 (C) 15 (D) 16

Sol. Total number of trees in the row = 8 + 8 – 1 = 15. Hence, the answer is (C).

SE.4 In a row of girls, Mridula is 18^{th} from the right and Sanjana is 18^{th} from the left. If both of them exchange their position, Sanjana becomes 25^{th} from the left, how many girls are there in the row ?

(A) 40 (B) 41 (C) 42 (D) 35

Sol. Sanjana's new position is 25^{th} from left. But it is the same as Mridula's earlier position which is 18^{th} from the right. Then the total number of girls are = (rank from left + rank from right) – 1 = (18 + 25) – 1 = 43 – 1 = 42. Hence, the answer is (C).

SE.5 In a Class Vidhya ranks 7^{th} from the top, Divya is 7 ranks ahead of taruma and 3 ranks behind vibhya Sushma who is 4^{th} from the bottom, is 32 ranks behind Taruna. How many students are there in the class ?

(A) 52 (B) 49 (C) 50 (D) None of these

Sol. Vidhya's rank 7th from the top. Divya is 3rd rank behind Vidhya. So, Divya's rank will be 10th from the top. Vidhya is 7th ranks ahead of Taruna so, Taruna's ranks will be 17th from the top. Sushma is 32 ranks behind Taruna so, Sushma's rank from the top will be 49th and 4th from the bottom. Hence, total number of students = (49 + 4) – 1= 52. Hence, the answer is (A).

1.3 ORDERING TEST

In such type of questions, clues are given regarding comparisons among a set of persons or things with respect to their qualities. The candidate is required to analyses the whole information, form a proper ascending/descending sequence and then answer the given questions accordingly.

SE.6 A is shorter than B but much taller than E. C is the tallest and D is shorter than A and taller than E. Which one is the shortest ?

(A) A (B) E (C) B (D) D

Sol. According to the given statement. E < D < A < B < C. Hence, the answer is (B).

Direction (7 – 10) : Read following information carefully and answer the questions given below it :

(i) P, Q, R, S and T are five friends. (ii) Q is elder to T.

(iii) R is younger to P. (iv) P is younger to T.

(v) S is elder to P.

SE.7 Who among the following is the eldest ?

(A) P (B) Q (C) S (D) Data inadequate

SE.8 Who among the following is the youngest ?

(A) P (B) R (C) T (D) Data inadequate

Sol. **(9 – 10) :** Thus, sequence of their age becomes

Q > T > S > P > R or Q > S > T > P > R or S > Q > T > P > R

9. According to a given statement there are three are three sequences, as follows :

Q > T > S > P > R or Q > S > T > P > R or S > Q > T > P > R. Hence, the answer is (D).

10. Clearly, R is the youngest. Hence, the answer is (B).

EXERCISE – I

MULTIPLE CHOICE QUESTIONS

Direction (1 – 5) : Read the following information and answer the questions given below it :

Alka is older than Mala. Gopal is older than Mala but younger than Alka. Kapil is younger than Ram and Mala. Mala is older than Ram.

1. Whose age is between Gopal and Ram ?
   (A) Mala (B) Kapil
   (C) Alka (D) None of these
2. Whose age is between Mala and Kapil ?
   (A) Gopal (B) Ram
   (C) Alka (D) None of these
3. Whose age is exactly in the middle of all the five ?
   (A) Mala (B) Gopal (C) Ram (D) Alka
4. Who is the eldest ?
   (A) Alka (B) Mala (C) Kapil (D) Gopal
5. Who is the youngest ?
   (A) Mala (B) Ram (C) Alka (D) Kapil

Direction (6 – 8) : Study the following five numbers and answer the questions given below :

517 325 639 841 792

6. What will be the first digit of the second highest number after the positions of only the second and the third digits within each number are interchanged?
   (A) 2 (B) 7 (C) 8 (D) 9
7. What will be the last digit of the third number from top when they are arranged in descending order after reversing the positions of the digits within each number ?
   (A) 2 (B) 3 (C) 5 (D) 7
8. What will be the middle digit of the second lowest number after the positions of only the first and the second digits within each number are interchanged?
   (A) 2 (B) 3 (C) 5 (D) 7
9. How many 5s are there in the following number sequence which are immediately preceded by 7 and immediately following 6 ?
   7 5 5 9 4 5 7 6 4 5 9 8 7 5 6 7 6 4 3 2 5 6 7 8
   (A) One (B) Two
   (C) Three (D) Four
10. How many 6s are there in the following number series, each of which is immediately preceded by 1 or 5 and immediately followed by 3 or 9 ?
    2 6 3 7 5 6 4 2 9 6 1 3 4 1 6 3 9 1 5 6 9 2 3 1 6 5 4 3 2 1 9 6 7 1 6 3
    (A) None (B) One (C) Two (D) Three
11. How many 7s immediately preceded by 6 but not immediately followed by 4 are there in the following series ?
    7 4 2 7 6 4 3 6 7 5 3 5 7 8 4 3 7 6 7 2 4 0 6 7 4 3
    (A) One (B) Two
    (C) Four (D) Six
12. Rajan is sixth from the left end and Vinay is tenth from the right end in a row of boys. If there are eight boys between Rajan and Vinay, how many boys are there in the row ?
    (A) 23 (B) 24 (C) 25 (D) 26
13. In a row of forty children, P is thirteenth from the left end and Q is ninth from the right end. How many children are there between P and R if R is fourth to the left of Q ?
    (A) 12 (B) 13 (C) 14 (D) 15

14. In a group of six children, Q is taller than P but not as tall as L. M is taller than N and O, but not as tall as P. Who is the shortest among them ?
(A) N (B) O
(C) M (D) Data inadequate

15. R earns more than H but not as much as T, M earns more than R. Who earns least among them ?
(A) H (B) R
(C) T (D) M

16. In a queue I am the last person while my friend is seventh from the front. If the person exactly between me and my friend is on the 23rd position from the front, what is my position in the queue ?
(A) 37 (B) 36 (C) 40 (D) 39

17. Sam ranked ninth from the top and thirty-eighth from the bottom in a class. How many students are there in the class?
(A) 45 (B) 46 (C) 47 (D) 48

18. A class of boys stands in a single line. One boy is nineteenth in order from both the ends. How many boys are there in the class?
(A) 27 (B) 37 (C) 38 (D) 39

19. If Atul finds that he is twelth from the right in a line of boys and fourth from the left, how many boys should be added to the line such that there are 28 boys in the line?
(A) 12 (B) 13 (C) 14 (D) 20

20. In a row of boys, Jeevan is seventh from the start and eleventh from the end. In another row of boys, Vikas is tenth from the start and twelth from the end. How many boys are there in the rows together?
(A) 36 (B) 37
(C) 39 (D) None of these

21. Five boys took part in a race, Raj finished before Mohit but behind Gaurav, Ashish finished before Sachin but behind Mohit. Who won the race?
(A) Raj (B) Gaurav
(C) Mohit (D) Ashish

22. If you are eleventh in a queue starting from either end, how many persons in the queue?
(A) 11 (B) 20
(C) 21 (D) 22

23. Saran is eighteenth from the right end in a row of 50 boys. What is his position from the left end?
(A) 32 (B) 35 (C) 33 (D) 34

24. In a class of 90, where girls are twice that of boys, Shridar ranked fourteenth from the top, if there are 10 girls ahead of Shridar, how many boys are after him in rank?
(A) 23 (B) 26 (C) 25 (D) 22

25. Sita ranks nineteenth in a class of 68 students. What is her rank from last?
(A) 50 (B) 51 (C) 49 (D) 48

EXERCISE – II

MULTIPLE CHOICE QUESTIONS

1. How many odd numbers are in the following number series, which does not contains just after it an odd number, but contains an even number just before it?

3 5 8 1 4 9 7 6 1 5 9 2 3 4 8 5 2

[NTSE Stage-I/Raj./2007]

(A) 2 (B) 3 (C) 4 (D) 5

2. If all the even numbers in between numbers from 32 to 51 are arranged in a row then number at fifth position from right, will be –

[NTSE Stage-I/Raj./2007]

(A) 36 (B) 40 (C) 42 (D) 48

3. How many A are in the given letter series which does not has B just before it but has C just after it ?

D A C B A C D A C B C A C B A C B A D C

[NTSE Stage-I/Raj./2007]

(A) 3 (B) 4 (C) 5 (D) 6

4. How many 9's are there which come after 6 or multiple of 3 ?

6 9 9 9 6 9 7 9 6 9 7 9 5 9 2 9 8 9 6 9 6 9 9 9 9 7 9 8 9 6 9 7 8

[NTSE Stage-II, 2007]

(A) 7 (B) 9 (C) 11 (D) 6

5. Shyama ranked 12th from the top and 28th from the bottom among those children who passed the examination. Eight children failed in the examination while five children did not appear in the examination. How many children were there in the class ?

[NTSE Stage-II, 2007]

(A) 50 (B) 51 (C) 52 (D) 53

6. If you write all the numbers from 201 to 250, then how many times will you write the numeral 2 ?

[NTSE Stage-II, 2007]

(A) 70 (B) 65 (C) 25 (D) 80

7. How many c's are there in between two consonants in the following series ?

c a b c d c d c e c f c o c i c j c k c c k

[NTSE Stage-II, 2007]

(A) 4 (B) 5 (C) 6 (D) 11

8. How many times '+' come before '÷' and after '×'?

+ ÷ – × ∩ U × – ÷ + + × + ÷ – + ÷ ∩ U ÷ × + ÷ ∩ U + × ÷ – U × + ÷ ÷ × U ÷ × – ÷ U × + ÷ ∩ – + × ÷ × + ÷ ∩ × + ÷

[NTSE Stage-II, 2007]

(A) 6 (B) 5 (C) 4 (D) 7

9. There are five friends A, B, C, D and E. A is shorter than B but taller then E, C is tallest, D is little shorter then B and little taller than A. If they are standing in the order of their heights who will be in the middle ?

[NTSE Stage-I/Raj./ 2008]

(A) D (B) C (C) A (D) B

10. In the following series how many 4's are preceded by 5 but not following by 2 or 3.

5 4 5 4 7 6 5 4 2 3 8 5 4 1 1 5 4 6 3 6 4 2

[NTSE Stage-I/Raj./ 2008]

(A) 2 (B) 4 (C) 3 (D) 5

11. In a class the rank of Sohan is sixteen from the top and fortynine from the bottom. The total number of students in the class are –

[NTSE Stage-I/Raj./ 2008]

(A) 64 (B) 65 (C) 66 (D) 67

12. In the following series how many times 7, 8, 9 appear together when 7 being in the middle ?

7 2 8 7 9 2 1 7 8 9 1 6 7 4 2 1 7 9 7 8 2 8 9 7 2

[NTSE Stage-I/Raj./ 2009]

(A) 1 (B) 2 (C) 3 (D) 4

Direction (13–15) : Study the following number line and answer the questions that follow.

2 5 9 1 7 2 5 1 9 7 3 9 5 2 4 6 8 1 9 7 5 2 7 3 1 9 7 8 5 2 6 5 4 1 9 7 8 2 0 1 0 9 7 8 5 1 9 7 3 5 1 6 9 7 2 1 7 3 7 9 5 1

[NTSE Stage-II, 2009]

13. How many times is number '3' preceded by number '7' and not followed by an even number ?

(A) 6 (B) 5 (C) 4 (D) 3

14. How many times is number 5 followed by 1 or 2, but not preceded by 8 ?

(A) 4 (B) 5 (C) 6 (D) 7

15. How many times is number 9 preceded by 1 and succeeded by 7 which is not followed by 5 ?

(A) 3 (B) 4 (C) 5 (D) 6

16. Three persons A, B and C are standing in a queue. There are 5 persons in between A and B and eight persons between B and C.If there are 3 persons ahead of C and 21 persons behind A, what would be the minimum number of persons in the queue ?

[NTSE Stage-II,2009]

(A) 27 (B) 28 (C) 40 (D) 41

17. In a queue, Ramesh is the 7th from the back, Suresh is standing 6th from the front and only Shyam is standing in between the two. Find the minimum number of boys standing in the queue ?

[NTSE Stage-II,2011]

(A) 8 (B) 10 (C) 12 (D) 14

18. In a queue of 10 persons, A is standing on 7th from front and B is standing 6th from back. 3 persons entered the queue disrupting the positions of A and B. Find the pair of numbers indicating minimum possible disruption in their position from the front ?

[NTSE Stage-II,2011]

(A) 6, 10 (B) 6, 9

(C) 7, 10 (D) 7, 9

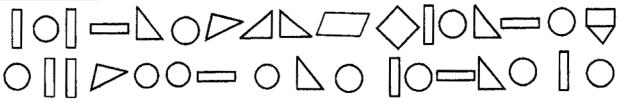
19. In the following how many times is rectangle preceded by a circle but following by a triangle?

[NTSE Stage-II,2011]

(A) 1 (C) 3 (B) 2 (D) 4

20. Which figure has been used most of the times?

[NTSE Stage-II,2011]



(A)  (C)  (B)  (D)

21. How many 6's are there in the following sequence which are followed by 3 and preceded by 8?

9 4 8 6 3 2 7 1 8 6 8 9 8 1 3 6 8 9 7 8 6 3 1 3 6 8 4 3 2 3 5

[NTSE Stage-I / Raj./2012]

(A) 2 (B) 3 (C) 4 (D) 5

22. In a dairy, there are 60 cows and buffalos. The number of cows is twice that of buffalos. Buffalo X ranked seventeenth in terms of milk delivered. If there are 9 cows ahead of Buffalo X, how many buffalos are after in rank in terms of milk delivered?

[NTSE Stage-II,2013]

(A) 10 (B) 11 (C) 12 (D) 13

23. Amongst five friends, Lata, Alka, Rani, Asha and Sadhana. Lata is older than only three of her friends. Alka is younger to Asha and Lata. Rani is older than only Sadhana. Who amongst them is the eldest?

[NTSE Stage-II,2013]

(A) Asha (B) Lata

(C) Alka (D) Sadhana

24. If the following numbers are written in ascending order, the sum of the digits of middle number will be

810, 912, 910, 809, 781, 673, 573

[NTSE Stage-I / Raj./2014]

(A) 9 (B) 12 (C) 17 (D) 13

25. How many 3s are there in the following figure series which are just preceded by 6 but not immediately followed by 7?

3 2 3 7 4 3 5 6 3 7 4 6 3 8 9 6 3 5 1 8 3 7 2 4 2 8 6 3 9 5

[NTSE Stage-I / Raj./2014]

(A) 1 (B) 2 (C) 3 (D) 4

26. If the following numbers are arranged in ascending order, then the multiplication of digits of the mid-number is -

719, 609, 735, 689, 834, 937, 600, 798, 610

[NTSE Stage-I/Raj. 2015]

(A) 96 (B) 9 (C) 17 (D) 63

27. If P > Q, Q > R and R > S, then P...?... S.

[NTSE Stage-I/Raj. 2015]

(A) P > S (B) P = S

(C) P < S (D) P ≥ S

28. Urmila has 23rd rank from the right and 15th rank from the left. Then, how many persons are there in the row ?

[NTSE Stage-I/Raj. 2015]

(A) 37 (B) 38

(C) 9 (D) 8

29. How many 5s are there in the following sequence which are immediately followed by 3 but not immediately preceded by 7?

4 3 6 5 7 5 3 6 4 5 7 3 5 7 3 5 3

[NTSE Stage-I/Raj. 2017]

(A) 0 (B) 1

(C) 2 (D) 3

30. How many pairs of successive numbers have a difference of 2 in the following sequence ?

6, 4, 1, 2, 2, 8, 7, 4, 2, 7, 5, 3, 8, 6, 2, 1, 7, 0, 4, 1, 3, 2, 8, 6

[NTSE Stage-I/Raj. 2018]

(A) 4 (B) 5

(C) 6 (D) 7

Answer Key

EXERCISE–I														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
A	B	A	A	D	B	B	B	A	D	B	B	C	D	A
16	17	18	19	20	21	22	23	24	25					
D	B	B	B	D	B	C	C	B	A					

EXERCISE–II														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
B	C	A	C	C	B	B	A	A	B	A	B	C	B	B
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
B	B	B	A	A	A	C	A	C	C	D	A	A	B	D

SELF PROGRESS ASSESSMENT FRAMEWORK

(CHAPTER : NUMBER, RANKING & ORDERING TEST)

CONTENT	STATUS	DATE OF COMPLETION	SELF SIGNATURE
Theory			
In-Text Examples			
Solved Examples			
Exercise I			
Exercise II			
Short Note-1			
Revision - 1			
Revision - 2			
Revision - 3			
Remark			

NOTES :

1. In the status, put "completed" only when you have thoroughly worked through this particular section.
2. Always remember to put down the date of completion correctly. It will help you in future at the time of revision.

Space for Notes :

MATHEMATICAL OPERATIONS

6

INTRODUCTION

This section deals with questions on simple mathematical operations. Here, the four fundamental operations : addition, subtraction, multiplication and division and also statements such as 'less than', 'greater than', 'equal to', 'not equal to' etc. are represented by symbols, different from the usual ones. The questions involving these operations are set using artificial symbols. The candidate has to substitute the real signs and solve the question accordingly, to get the answer.

While attempting to solve a mathematical expression, proceed according to the rule BODMAS.

B Brackets - removal of brackets

O Of

D Division

M Multiplication

A Addition

S Subtraction

TYPE – I : PROBLEM SOLVING BY SUBSTITUTION

In this type, you are provided with substitutes for various mathematical symbols, followed by a question involving calculation of an expression or choosing the correct / incorrect equation. The candidate is required to put in the real signs in the given equation and then solve the question as required.

Ex.1 If '+' means'divided by' , '–' means 'multiplied by', '×' means 'minus' and '÷' means 'plus', which of the following will be the value of the expression $16 \div 8 - 4 + 2 \times 4$?

(A) 16 (B) 28 (C)32 (D) 44

Sol. Using the proper signs in the given expression, we get:

$= 16 \div 8 - 4 + 2 \times 4$

$= 16 + 16 - 4$

$= 32 - 4 = 28.$

Hence, the answer is (B).

TYPE – II : INTERCHANGE OF SIGNS AND NUMBERS

Ex.2 If the given interchanges namely : signs + and ÷ and numbers 2 and 4 are made in signs and numbers, which one of the following four equations would be correct ?

(A) 2 + 4 ÷ 3 = 3 (B) 4 + 2 ÷ 6 = 1.5 (C) 4 ÷ 2 + 3 = 4 (D) 2 + 4 ÷ 6 = 8

Sol. Interchanging + and ÷ and 2 and 4, we get:

(A) 4 ÷ 2 + 3 = 3 or 5 = 3, which is false. (B) 2 ÷ 4 + 6 = 1.5 or 6.5 = 1.5, which is false.

(C) $2 + 4 \div 3 = 2$ or $\frac{10}{3} = 2$, which is false (D) 4 ÷ 2 + 6 = 8 or 8 = 8, which is true.

Hence, the answer is (D).

TYPE – III : DERIVING THE APPROPRIATE CONCLUSION

In these type of questions, certain relations between different sets of elements is given using either the real symbols or substituted symbols. You have to analyses the given statements and then decide which of the relations given as alternatives follows from those given in the statements.

Ex.3 If A + B > C + D and B + C > A + D, then it is definite that

(A) D > B (B) C > D (C) A > D (D) B > D

Sol. Given: A + B > C + D ..... (i)

and B + C > A + D .....(ii)

Adding (i) and (ii), we get;

(A + B) + (B + C) > (C + D) + (A + D)

$\Rightarrow$ A + 2B + C > C + 2D + A $\Rightarrow$ 2B > 2D $\Rightarrow$ B > D.

Hence, the answer is (D).

Ex.4 In the following questions, the symbols @ © % ★ and $ are used with time following meanings as illustrated below:

'P @ Q' means 'P is either greater than or equal to Q';

'P © Q' means 'P is either smaller than or equal to Q';

'P % Q' means 'P is greater than Q';

'P ★ Q' means 'P is smaller than Q';

'P $ Q' means 'P is neither greater than nor smaller than Q'.

Now, in each of the following questions, assuming the given statements to be true, find which of the two conclusions I and II given below them is/are definitely true ?

Give answer (A) if only conclusion I is true ; (B) if only conclusion II is true, (C) if either conclusion I or II is true; (D) if neither I nor II is true; and (E) if both conclusions I and II are true.

1. Statement : M @ R, R % T, T $ K
   Conclusions : I. K ★ M II. T ★ M
2. Statements : H % J, B © J, B @ F
   Conclusions : I. F $ J II. J % F
3. Statement : D $ M, M % W, W @ R
   Conclusions : I. R ★ D II. W © D
4. Statement : A © N, N ★ V, V $ J
   Conclusions : I. J @ N II. A © V
5. Statements : K ★ T, T @ B, B © M
   Conclusions : I. M % T II. K © B
6. Statement : B @ H, H ★ M, M $ N
   Conclusions : I. B @ N II. N % H
7. Statement : W © R, J @ R, J ★ K
   Conclusions : I. J @ W II. K % R

Sol. Clearly, we have:

(i) $P @ Q \Rightarrow P \geq Q$ (ii) $P @ Q \Rightarrow P \leq Q$

(iii) $P \% Q \Rightarrow P > Q$ (iv) $P ★ Q \Rightarrow P < Q$

(v) $P \$ Q \Rightarrow P \not> Q$ and $P \not< Q \Rightarrow P = Q$

1. Given statements : $M \geq R, R > T, T = K$.

(I) Relation between K and M:

$K = T, T < R, R \leq M \Rightarrow K < R \leq M$

$\Rightarrow K < M$ i.e. K ★ M.

(II) Relation between T and M.

$T < R, R \leq M \Rightarrow T < R \leq M$

$\Rightarrow T < M$ i.e. T ★ M.

so, both I and II are true. Hence, the answer is (E).

2. Given statements : $H > J, B \leq J, B \geq F$.

Relation between F and J:

$B \geq F, B \leq J \Rightarrow F \leq B \leq J \Rightarrow F \leq J$ $\Rightarrow F < J$ or $F = J$

$\Rightarrow J > F$ or $F = J$ i.e. J % F or F $ J.

So, either I or II is true. Hence, the answer is (C).

3. Given statements : D = M, M > W, W ≥ R.

(I) Relation between R and D :

$R \le W, W < M, M = D$

$\Rightarrow R \le W < M = D \Rightarrow R < D$ i.e. R ★ D.

(II) Relation between W and D:

$W < M, M = D \Rightarrow W < M = D$

$\Rightarrow W < D$ i.e. W ★ D.

so, only I is true while II is not. Hence, the answer is (A).

4. Given statement : $A \le N, N < V, V = J$

(I) Relation between J and N:

$J = V, V > N \Rightarrow J > N$ i.e. J % N.

(II) Relation between A and V :

$A \le N, N < V \Rightarrow A < V$ i.e. A ★ V.

So, neither I nor II is true. Hence, the answer is (D).

5. Given statements : $K < T, T \ge B, B \le M$.

(I) Relation between M and T:

$M \ge B, B \le T \Rightarrow$ no definite conclusion.

(II) Relation between K and B:

$K < T, T \ge B$ no definite conclusion.

So, neither I nor II is true. Hence, the answer is (D).

6. Given statements : $B \ge H, H < M, M = N$.

(I) Relation between B and N:

$B \ge H, H < M, M = N$

$\Rightarrow B \ge H < M = N \Rightarrow$ no definite conclusion.

(II) Relation between N and H :

$N = M, M > H \Rightarrow N > H$ i.e. N % H.

So, only II is true. Hence, the answer is (B).

7. Given statement : $W \le R, J \ge R, J < K$.

(I) Relation between J and W:

$J \ge R, R \ge W \Rightarrow J \ge R \ge W \quad \Rightarrow J \ge W$ i.e. J @ W.

(II) Relation between K and R:

$K > J, J \ge R \Rightarrow K > J \ge R \quad \Rightarrow K > R$ i.e. K % R

So, both I and II are true. Hence, the answer is (E).

PROBLEM SOLVING BY SUBSTITUTION

SE. 1

If + means ÷, – means ×; ÷ means + and × means –, then $36 \times 12 + 4 \div 6 + 2 - 3 = ?$

(A) 2 (B) 18

(C) 42 (D) $6\frac{1}{2}$

Ans. Using the proper signs, we get :

$36 - 12 \div 4 + 6 \div 2 \times 3$

$= 36 - 3 + 3 \times 3$

$= 36 - 3 + 9 = 45 - 3 = 42.$

Hence, the answer is (C).

SE. 2

If A means 'plus', B means 'minus', C means 'divided by' and D means 'multiplied by', then

18 A 12 C 6 D 2 B 5 = ?

(A) 15 (B) 25

(C) 27 (D) None of these.

Ans. Using the proper signs, we get :

Given expression $= 18 + 12 \div 6 \times 2 - 5$

$= 18 + 2 \times 2 - 5 = 18 + 4 - 5 = 22 - 5 = 17$

Hence, the answer is (D).

SE. 3

If × stands for –, ÷ stands for +, + stands for ÷ and – stands for ×, which one of the following equation is correct?

(A) $15 - 5 \div 5 \times 20 + 10 = 6$

(B) $8 \div 10 - 3 + 5 \times 6 = 8$

(C) $6 \times 2 + 3 \div 12 - 3 = 15$

(D) $3 \div 27 - 5 \times 10 + 3 = 10$

Ans. Using the proper signs, we get :

Expression in (A) $= 15 \times 5 + 5 - 20 \div 10$

$= 15 \times 5 + 5 - 2 = 75 + 5 - 2 = 78$

Expression in (B) $= 8 + 10 \times 3 \div 5 - 6$

$= 8 + 10 \times \frac{3}{5} - 6 = 8 + 6 - 6 = 8$

Expression in (C) $= 6 - 2 \div 3 + 12 \times 3$

$= 6 - \frac{2}{3} + 36 = 42 - \frac{2}{3} = \frac{124}{3}$

Expression in (D) $= 3 + 27 \times 5 - 10 \div 3$

$= 3 + 27 \times 5 - \frac{10}{3} = 3 + 135 - \frac{10}{3} = \frac{104}{3}$

Hence, the answer is (B)

SE. 4

It is being given that > denotes +, < denotes –, + denotes ÷, – denotes =, = denotes 'less than' and × denotes 'greater than', find which of the following is a correct statement.

(A) $3 + 2 > 4 = 9 + 3 < 2$

(B) $3 > 2 > 4 = 18 + 3 < 1$

(C) $3 > 2 < 4 \times 8 + 4 < 2$

(D) $3 + 2 < 4 \times 9 + 3 < 3$

Ans. Using proper notations, we have :

(A) $3 \div 2 + 4 < 9 \div 3 - 2$ or $\frac{11}{2} < 1$, which is not true.

(B) $3 + 2 + 4 < 18 \div 3 - 1$ or $9 < 5$, which is not true.

(C) $3 + 2 - 4 > 8 \div 4 - 2$ or $1 > 0$, which is true.

(D) $3 \div 2 - 4 > 9 \div 3 - 3$ or $\frac{5}{2} > 0$, which is not true.

Hence, the answer is (C).

INTERCHANGE OF SIGNS AND NUMBERS

SE. 5

Which one of the four interchanges in signs and numbers would make the given equation $3 + 5 - 2 = 4$ correct ?

(A) + and –, 2 and 3 (B) + and –, 2 and 5

(C) + and –, 3 and 5 (D) None of these.

Ans. By making the interchanges given in (C), we get the equation as $5 - 3 + 2 = 4$ or, $4 = 4$, which is true.

Hence, the answer is (C).

SE. 6

Given interchanges : signs – and ÷ and numbers 4 and 8 are made in signs and numbers, which one of the following four equations would be correct ?

(A) $6 - 8 \div 4 = -1$ (B) $8 - 6 \div 4 = 1$

(C) $4 \div 8 - 2 = 6$ (D) $4 - 8 \div 6 = 2$

Ans. On interchanging – and ÷ and 4 and 8 in (C), we get the equation as: $8 - 4 \div 2 = 6$

or $8 - 2 = 6$ or $6 = 6$, which is true.

Hence, the answer is (C).

SE. 7

Given interchanges : Signs + and × and numbers 4 and 5 are made in signs and numbers, which one of the following four equations would be correct ?

(A) $5 \times 4 + 20 = 40$

(B) $5 \times 4 + 20 = 85$

(C) $5 \times 4 + 20 = 104$

(D) $5 \times 4 + 20 = 95$

Ans. On interchanging + and × and 4 and 5 in (C), we get the equation as : $4 + 5 \times 20 = 104$ or, $104 = 104$, which is true.,

Hence, the answer is (C).

SE. 8

Which of the following two signs need to be interchanged to make the given equation correct?

$10 + 10 \div 10 - 10 \times 10 = 10$

(A) + and – (B) + and ÷

(C) + and × (D) ÷ and +

Ans. On interchanging + and x in (C), we get the equation as :

$10 \times 10 \div 10 - 10 + 10 = 10$

or $10 \times 1 - 10 + 10 = 10$

or $10 = 10$, which is true.

Hence, the answer is (C).

SE. 9

Which of the following two signs need to be interchanged to make the given equation correct ?

$2 \times 3 + 6 - 12 \div 4 = 17$

(A) × and + (B) + and –

(C) + and ÷ (D) – and ÷

Ans. On interchanging × and +, we get:

Given expression $= 2 + 3 \times 6 - 12 \div 4$

$= 2 + 3 \times 6 - 3$

$= 2 + 18 - 3 = 17$

Hence, the answer is (A).

DERIVING THE APPROPRIATE CONCLUSION

SE. 10

It being given that × denotes 'greater than', ϕ denotes 'equal' to', < denotes 'not less than', ⊥ denotes 'not equal to', Δ denotes 'less than' and + denotes 'not greater than', choose. the correct statement from the following:

If $a \times b \Delta c$, it follow that

(A) $a \phi c \Delta b$ (B) $b < a \times c$

(C) $a < b + c$ (D) $c + b < a$

(E) $b < a \phi c$

Ans. Using the usual notations, we have :

(A) : The statement is $a > b < c$

$\Rightarrow a = c < b$, which is false. $[\because c > b]$

(B) : The statement is $a > b < c$

$\Rightarrow b \not< a > c$, which is false. $[\because b < a]$

(C) : The statement is $a > b < c$

$\Rightarrow a \not< b \not> c$, which is true.

(D) : The statement is $a > b < c$

$\Rightarrow c \not> b \not< c$, which is false. $[\because b < a]$

(E) : The statement is $a > b < c$

$\Rightarrow b \not< a = c$, which is false. $[\because b < a]$

Hence, the statement (C) is true. Hence, the answer is (C).

SE. 11

USE. the following information :

$X \cup Y$ means divide X by Y

$X \uparrow Y$ means multiply X by Y

$X \# Y$ means subtract Y from X

$X \cap Y$ means add Y to X

One-fifth of one-tenth of two-third of a number X is given by :

(A) $X \uparrow (1 \cup 5) \uparrow (1 \cup 10) \uparrow (2 \cup 3)$

(B) $X (1 \uparrow 5) \uparrow (1 \uparrow 10) \uparrow (2 \cap 3)$

(C) $X (1 \uparrow 5) \uparrow (1 \uparrow 10) \uparrow (2 \uparrow 3)$

(D) can't be determined

Ans. $X \uparrow (1 \cup 5)\ (1 \cup 10)\ (2 \cup 3)$

$$= X \times \frac{1}{5} \times \frac{1}{10} \times \frac{2}{3}$$

Hence, the answer is (A).

SE. 12

What is the value of A if each letter represents a different digit ?

$$\begin{array}{r} A\,3\,B \\ \times\ B \\ \hline 2\,1\,7\,B \end{array}$$

(A) 3 (B) 4

(C) 5 (D) 7

Ans. In the following question the value of A and B are 4 and 5 respectively.

$$\begin{array}{r} 4\,3\,5 \\ \times\ 5 \\ \hline 2\,1\,7\,5 \end{array}$$

Hence, the answer is (B).

SE. 13

If $4 \# 2 @ 3 = 6$, $18 \# 6 @ 4 = 12$, then what will be the value to $24 \# 3 @ 7$?

(A) 21 (B) 27 (C) 72 (D) 56

Ans. Here, sign # implies division and sign @ implies multiplication $4 \div 2 \times 3 = 6$, $18 \div 6 \times 4 = 12$.

Therefore, $24 \div 3 \times 7 = 56$.

Hence, the answer is (D).

SE. 14

In the following question some numbers are given in the shape of figures

⬭ ÷ □ = 2, ⬭ ÷ Δ = 5,

□ + Δ = 7, Δ × 0 = 18

What is the value of 0 ?

(A) 9 (B) 6

(C) 3 (D) 2

Ans. Clearly, the numbers are given in the shape of figures are as follow ⬭ =10, □ = 5,

Δ = 2, 0 = 9. So,10 ÷ 5 = 2,

5 + 2 = 7, 2 × 9 = 18 hence the value of 0 is 9.

Hence, the answer is (A).

EXERCISE – I

MULTIPLE CHOICE QUESTIONS

1. If + means ÷, ÷ means –, – means ×, × means +, then $12 + 6 \div 3 - 2 \times 8 = ?$

(A) –2 (B) 2

(C) 4 (D) 8

2. If + means –, – means ×, ÷ means + and × means ÷ , then $15 - 3 + 10 \times 5 \div 5 = ?$

(A) 5 (B) 22

(C) 48 (D) 52

3. If × means ÷, – means ×, ÷ means + and + means – , then $(3 - 5 \div 19) \times 8 + 6 = ?$

(A) –1 (B) 2

(C) 4 (D) 8

4. If × means +, + means ÷, – means × and ÷ means – , then $8 \times 7 - 8 + 40 \div 2 = ?$

(A) 1 (B) $7\frac{2}{5}$

(C) $8\frac{3}{5}$ (D) 44

5. If × means –, + means ÷, – means × and – means +, then $15 - 2 \div 900 + 90 \times 100 = ?$

(A) 190 (B) 180

(C) 90 (D) None of these

6. If ¸ means +, – means ÷, × means – and + means ×, then $\frac{(36 \times 4) - 8 \times 4}{4 + 8 \times 2 + 16 \div 1} = ?$

(A) 0 (B) 8

(C) 12 (D) 16

7. If P means 'division', T means 'addition', M means 'subtraction' and D means 'multiplication', then what will be the value of the expression

12M 12D 28P 7T 15?

(A) –30 (B) –21

(C) 15 (D) 45

8. If P means ×, R means +, T means ¸ and S means – then 18 T 3 P 9 S 8 R 1 = ?

(A) $-1\frac{1}{3}$ (B) $\frac{2}{3}$

(C) 46 (D) None of these

9. If P denotes 'multiplied by', t denotes 'subtracted from', M denotes 'added to' and B denotes 'divided by', then 28 B 7 P 8 T 6 M 4 = ?

(A) $-\frac{3}{2}$ (B) 30

(C) 32 (D) None

10. If 'when' means 'x' 'you' means '÷' 'come' means '–' and 'will' means '+', then what will be the value of "8 when 12 will 15 you 2 come 10" ?

(A) 45 (B) 94

(C) 96 (D) 112

11. If '+' stands for 'division', '÷' stands for 'multiplication', 'x'stands for 'subtraction' and '–' stands for 'addition', which one of the following is correct ?

(A) $18 \div 6 \times 7 + 5 - 2 = 22$

(B) $18 \times 6 + 7 \div 5 - 2 = 16$

(C) $18 \div 6 - 7 + 5 \times 2 = 20$

(D) $18 + 6 \div 7 \times 5 - 2 = 18$

12. If '–'for 'division', '+' for 'multiplication', '÷' for 'subtraction' and '×' for 'addition', which one of the following equations is correct ?

(A) $6 + 20 - 12 \div 7 - 1 = 38$

(B) $6 - 20 \div 12 \times 7 + 1 = 57$

(C) $6 + 20 - 12 \div 7 \times 1 = 62$

(D) $6 \div 20 \times 12 + 7 + 1 = 70$

13. If → stands for 'addition', ← stands for 'subtraction', T stands for 'divisin', ↓ stands for 'multiplication', ↗ stands for 'equal to', then which of the following alternatives is correct ?

(A) 7 ← 43 ↑ 6 ↓ 1 ↗ 4

(B) 3 ↓ 6 ↑ 2 → 3 ← 6 ↗ 5

(C) 5 → 7 ← 3 ↑ 2 ↗ 4

(D) 2 ↓ 5 ← 6 → 2 ↗ 6

14. If – means ÷, + means –, ÷ means –, × means +, then which of the following equations is correct ?

(A) 52 ÷ 4 + 5 × 8 – 2 = 36

(B) 43 × 7 ÷ 5 + 4 – 8 = 25

(C) 36 × 4 – 12 + 5 ÷ 3 = 420

(D) 36 – 12 × 6 ÷ 3 + 4 = 60

15. If P denots +, Q denotes –, R denotes × and S denotes ÷, which of the following statements is correct ?

(A) 36 R 4 S 8 Q 7 P 4 = 10

(B) 16 R 12 P 49 S 7 Q 9 = 200

(C) 32 S 8 R 9 = 160 Q 12 R 12

(D) 8 R 8 P 8 S 8 Q 8 = 57

Directions (16 – 17) : In each of the following questions, if the given interchanges are made in signg and numbers, which one of four equatins would be correct?

16. Given interchanges : Signs + and – and numbers 4 and 8

(A) 4 ÷ 8 – 12 = 16 (B) 4 – 8 + 12 = 0

(C) 8 ÷ 4 – 12 = 24 (D) 8 – 4 ÷ 12 = 8

17. Given interchanges : Signs – and × numbers 3 and 6

(A) 6 – 3 × 2 = 9 (B) 3 – 6 × 8 = 10

(C) 6 × 3 – 4 = 15 (D) 3 × 6 – 4 = 33

Directions (18–20) : In each of the following questions, the given equation becomes correct due to the interchange of two signs. One of the four alternatives under it specifies the interchange of of signs in the equations which when made will make the equation correct. Find the correct alternative.

18. 9 + 5 ÷ 4 × 3 – 6 = 12.

(A) + and × (B) ÷ and ×

(C) ÷ and – (D) + and –

19. 12 ÷ 2 – 6 × 3 + 8 = 16.

(A) ÷ and – (B) + and ÷

(C) + and × (D) ÷ and ×

20. 10 + 10 ÷ 10 – 10 × 10 = 10.

(A) + and – (B) – and +

(C) + and × (D) ÷ and +

Directions (21–24) : In each of the following questions, the two expressions on either side of the sign (=) will have the same value if two terms on either side or on the same side are interchanged. The correct terms to be interchanged have bee given as one of the four alternatives under the expressions. Find the correct alternative in each case.

21. 5 + 3 × 6 – 4 ÷ 2 = 4 × 3 – 10 ÷ 2 + 7

(A) 4, 7 (B) 5, 7

(C) 6, 4 (D) 6, 10

22. 7 × 2 – 3 + 8 ÷ 4 = 5 + 6 × 2 – 24 ÷ 3

(A) 2, 6 (B) 6, 5

(C) 3, 24 (D) 7, 6

23. 15 + 3 × 4 – 8÷ 2 = 8 × 5 + 16 ÷ 2 – 1

(A) 3, 5 (B) 15, 5

(C) 15, 16 (D) 3, 1

24. 6 × 3 + 8 ÷ 2 – 1 = 9 – 8 ÷ 4 + 5 × 2

(A) 3, 4 (B) 3, 5

(C) 6, 9 (D) 9, 5

Directions (25 – 26) : In each of the following questions, which one of the four interchanges in signs and numbers would make the given equation correct ?

25. $6 \times 4 + 2 = 16$
(A) + and ×, 2 and 4 (B) + and ×, 2 and 6
(C) + and ×, 4 and 6 (D) None of these

26. $(3 \div 4) + 2 = 2$
(A) + and ÷, 2 and 3
(B) + and ÷, 2 and 4
(C) + and ÷, 3 and 4
(D) No interchange, 3 and 4

27. By applying which of the following meanings of arithmetical signs, will the value of $700 - 10 \div \frac{1}{2} \times 35 + 70$ be zero ?
(A) × means ÷, + means ×, ÷ means +, – means –
(B) × means ÷, + means –, ÷ means ×, – means +
(C) × means +, + means –, ÷ means ×, – means ÷
(D) × means ÷, + means –, ÷ means ×, – means +

28. If A > B, B > C and C > D, then which of the following conclusions is definitely wrong ?
(A) A > D (B) A > C
(C) D > A (D) E > D

29. If A + D = B + C, A + E = C + D, 2C < A + E and 2A > B + D, then
(A) A > B > C > D > E (B) B > A > D > C > E
(C) D > B > C > A > E (D) B > C > D > E > A

30. If A + B > C + D, B + E = 2C and C + D > B + E, it necessarily follows that
(A) A + B > 2E (B) A + B > 2C
(C) A > C (D) A + B > 2D

31. If A + E = B + D, A + B > C + E, A + D = 2B, C + E > B + D, then
(A) A > B > C > D > E
(B) C > B > D > A > E
(C) C > B > A > E > D
(D) C > A > B > D > E

32. If A + B = 2C and C + D = 2A, then
(A) A + C = B + D (B) A + C = 2D
(C) A + D = B + C (D) A + C = 2B

33. If A + D > C + E, C + D = 2B and B + E > C + D, it necessarily follows that
(A) B + D > C + E (B) A + B > 2D
(C) A + D > C + E (D) A + D > B + C

Directions (34 – 36) : It being given that : Δ denotes 'equal to'; □ denotes 'ot equal to '; + denotes 'greater than'; – denotes 'less than'; × denotes 'not greater than'; ÷ denotes 'not less than'. Choose the correct statement in each of the following questions :

34. a + b + c does not imply
(A) b – a + c (B) c – b – a
(C) c – a + b (D) b – a – c

35. a + b – c does not imply
(A) c + b – a (B) a – b + c
(C) b □ a □ c (D) None of these

36. a □ b □ c implies
(A) a + b + c (B) a – b – c
(C) a ÷ b ÷ c (D) None of these

Directions (37 – 38) : In the following questions, Δ means 'is greater than',% means 'is lesser than', □ means 'is equal to', = means 'is not equal to', + means 'is a little more than', × means 'is a little less than'. Choose the correct alternative in each of the following questions.

37. If c % b and b × a, then
(A) a Δ C (B) c □ a
(C) b □ C (D) c Δ a

38. If ac + bc, then
(A) a □ C (B) b Δ c
(C) c Δ b (D) b % a

39. If ac % bd and ab Δ cd, then
(A) b □ C (B) b Δ a
(C) a % c (D) Can't say

EXERCISE – II

Directions (1 – 5) : In the following questions some letter stands for arithmetic sign as indicated below. The remaning letters have their serial number in the Alphabets. Decode the letter into number and sign to decide correct altenative–

A = ×, E = –, O = ÷, U = +

(NTSE Stage-I/Raj./2007)

1. TEF

(A) 14 (B) 12 (C) 16 (D) 18

2. SETUH

(A) 5 (B) 6 (C) 7 (D) 8

3. GULAB

(A) 26 (B) 28 (C) 31 (D) 38

4. NACED

(A) 32 (B) 36 (C) 39 (D) 38

5. RUFOBEG

(A) 14 (B) 16 (C) 12 (D) 18

Directions (6 –10) : In the following questions some numbers are given in the shape of figures. Finding the values of the figures given the correct answer of the questions.

(NTSE Stage-I/Raj./2008)

□ – △ = 1 ◯ ÷ △ = 2

◯ + △ = 3 □ – ◯ = 4

6. □ = ?

(A) 0 (B) 3 (C) 4 (D) 6

7. ◯ + △ = ?

(A) 5 (B) 7 (C) 8 (D) 9

8. □ × ◯ = ?

(A) 0 (B) 3 (C) 8 (D) 6

9. □ × ◯ ÷ △ = ?

(A) 3 (B) 6 (C) 8 (D) 24

10. ◯ + □ – △ = ?

(A) 3 (B) 4

(C) 5 (D) 7

11. Given that ACT ÷ AT = 11, find out which of the following numbers dose not stand for CAT to fulfil the above equation

(NTSE Stage-II/2011)

(A) 246 (B) 615 (C) 624 (D) 835

12. Given the following subtraction problem, find out which of the following number does not stand for CART.

(NTSE Stage-II/2011)

C A R

A R T

2 2 2

(A) 6420 (B) 7531

(C) 8420 (D) 9753

13. If '–' means 'multiplied by', '×' means 'plus', '+' means 'divided by' and ÷ means 'minus' than

14 – 10 × 4 ÷ 16 + 8 = ?

(NTSE Stage-II/2011)

(A) 142 (B) 134

(C) 6 (D) 5

14. If '+' means 'multiplied by', '–' means 'divided by', '×' means 'plus' and '÷' means 'minus' than

(18 + 10 × 20) – 8 ÷ 6 = ?

(NTSE Stage-II/2011)

(A) 92 (B) 35

(C) 19 (D) 26

15. If '+' means 'divided by', '–' means 'multiplied', '×' means 'plus' and '÷' means 'minus' than $(280 + 10 \times 20) - 8 \div 6 = ?$

(NTSE Stage-II/2011)

(A) 378 (B) 258

(C) 70 (D) 64

Directions (16 – 18) : The following questions are based on the given matrix. The value of each letter is the product of its row and column number e.g. the value of Z' is $3 \times 4 = 12$.

Columns

Row	0	1	2	3	4
0	B	O	J	C	P
1	E	N	H	I	D
2	G	R	A	M	V
3	F	S	T	L	Z
4	W	X	Y	U	K

Answer the following questions.

(NTSE Stage-II/2011)

16. Find the letters which make the least total among the alternatives.

(A) DKA (B) FHY (C) ODX (D) VTM

17. What is the total of GREAT ?

(A) 8 (B) 10 (C) 12 (D) 14

18. Find the letters which make the highest total among the alternatives.

(A) PLOT (B) PLAN (C) PLAY (D) PLUS

Directions (19 – 22) : In the following questions some relations are written by particular indicators as show below –

× = Greater than □ = Not less than

÷ = Not equal to ∅ = Equal to

+ = Not greater than △ = Less than

Find out the correct answer for each question.

(NTSE Stage-I/Raj./2012)

19. If x △ y ÷ z it is not possible –

(A) x ÷ y ∅ z (B) x + y × z

(C) x ÷ y × z (D) x △ y □ z

20. If x □ y □ z it is possible –

(A) x ∅ y ÷ z (B) x ÷ y + z

(C) x + y □ z (D) x + y △ z

21. If x ∅ y × z, it is possible –

(A) x × y △ z (B) x ∅ y + z

(C) x ∅ y □ z (D) x △ y ÷ z

22. If x ÷ y △ z, it is not possible –

(A) x × y + z (B) x ÷ y × z

(C) x □ y ÷ z (D) x + y + z

Directions (23 – 25) : In the following questions some relations are written by particular indicators as shown below –

(NTSE Stage-I/Raj./2013)

O = Greater than

+ = Equal to

△ = Not equal to

∅ = Not greater than

× = Not less than

□ = Less than

Find out the correct answer for each question.

23. If p △ q O r, it is possible that –

(A) p × q × r (B) p × q □ r

(C) p □ q ∅ r (D) p ∅ q ∅ r

24. If p □ q △ r, it is not possible that –

(A) p △ q ∅ r (B) p □ q △ r

(C) p ∅ q □ r (D) p + q × r

25. If p × q ∅ r, it is not possible that –

(A) p △ q □ r (B) p × q + r

(C) p △ q O r (D) p O q + r

26. If 27 * 3 = 243 5 * 4 = 80

(NTSE Stage-I/Raj./2013)

Then what is the value of 3 * 7 ?

(A) 84 (B) 147

(C) 63 (D) 23

27. In this multiplication question the five letters represent five different digits. What are the actual figures ? There is no zero.

(NTSE Stage-II/2013)

SEAM
T
MEATS

(A) M = 3, E = 9, A = 7, T = 4, S = 8

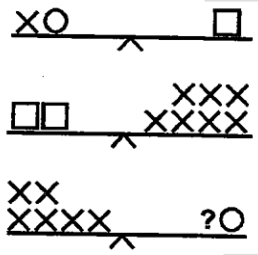
(B) M = 3, E = 9, A = 7, T = 8, S = 4

(C) M = 4, E = 3, A = 9, T = 7, S = 8

(D) M = 4, E = 9, A = 3, T = 7, S = 8

28. Which symbol replaces the '?' Figure below represent a balance.

(NTSE Stage-II/2013)



(A) X (B) O (C) □ (D) □ O

29. If 23 * 52 = 48, then 43 * 35 = ?

(NTSE Stage-I/Raj./2014)

(A) 78 (B) 98 (C) 96 (D) 69

30. If 54/32 = 4, 36/42 = 3, 92/22 = 7 then what is 28/33 = ?

(NTSE Stage-II/2015)

(A) 5 (B) 6 (C) 4 (D) 9

31. If '<' means '–', '>' means '+', '=' means '×' and '$' means '÷', then what will be the value of 27 > 81 $ 9 < 6 ?

(NTSE Stage-I/Raj. 2018)

(A) 6 (B) 36 (C) 30 (D) 54

32. If 20 * 3 = 180 and 4 * 5 = 100, then what is the value of 7 * 7 ?

(NTSE Stage-I/Raj. 2018)

(A) 21 (B) 49 (C) 343 (D) 7

33. How many numbers from 1 to 50 are there which are prime ?

(NTSE Stage-I/Raj. 2019)

(A) 10 (B) 20 (C) 15 (D) 18

34. If A > B, B > C and C > D, then which of the following conclusions is definitely wrong ?

(NTSE Stage-I/Raj. 2019)

(A) A > C (B) A > D

(C) B > D (D) D > A

Answer Key

EXERCISE–I														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
C	C	B	B	D	A	B	D	B	B	D	D	D	A	D
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
B	B	C	B	C	C	D	A	D	C	A	C	C	B	B
31	32	33	34	35	36	37	38	39						
D	A	D	D	B	D	A	D	D						

EXERCISE–II														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
A	C	C	D	A	C	D	A	C	D	A	C	A	C	A
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
D	A	C	A	C	A	C	C	D	A	B	C	B	A	D
31	32	33	34											
C	B	C	D											

SELF PROGRESS ASSESSMENT FRAMEWORK

(CHAPTER : MATHEMATICAL OPERATIONS)

CONTENT	STATUS	DATE OF COMPLETION	SELF SIGNATURE
Theory			
In-Text Examples			
Solved Examples			
Exercise I			
Exercise II			
Short Note-1			
Revision - 1			
Revision - 2			
Revision - 3			
Remark			

NOTES :

1. In the status, put "completed" only when you have thoroughly worked through this particular section.
2. Always remember to put down the date of completion correctly. It will help you in future at the time of revision.

Space for Notes :

PAPER CUTTING & FOLDING

7

INTRODUCTION

1.1 PAPER FOLDING

The problems on paper folding involve the process of selecting a figure which would most nearly match the pattern that would be formed when a transparent sheet carrying designs on either side of a dotted line is folded along this line. The figure has to be selected from a set of four alternatives (answer or response figures).

Ex. 1 In the following questions problems, a square transparent sheet with a pattern is given. Figure out from amongst four alternatives as to how the pattern would appear when the transparent sheet is folded at the dotted line.

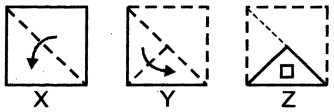
(A)  (B)  (C)  (D) 

Sol. Clearly, the lower half of the square sheet has been folded over the upper half. Hence, the bent line in the lower half will be inverted over the other half so that a 'V' shaped figure is formed. Hence, the answer is (B).

1.2 PAPER CUTTING

The problems on paper cutting contain a set of three figures showing the manner in which a piece of paper has been folded. In each of the first two figures, a dotted line together with an arrow on it has been given indicating the line along which the paper is to be folded and the direction of the fold respectively. In the third figure, there are marks showing the position and nature of the cut made in the folded sheet. The candidate has to select one of the figures from the set of four answer figures A, B, C and D, that would most nearly match the pattern when the paper is unfolded. It will be interested to see that the designs of the cut will appear on each fold made in the paper.

Ex. 2 Consider the following three figures, marked X, Y, Z showing one fold in X, another in Y and cut in Z. From amongst the answer figures A, B, C and D, select the one, showing the unfolded position of Z.



(A)  (B)  (C)  (D) 

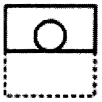
Sol. In figure X, the upper triangular half of the paper has been folded over the lower half. In figure Y, the paper is refolded to a quarter triangle. In figure Z, a square has been punched in the folded paper. Clearly, the square will appear in each of the triangular quarters of the paper. Thus, when the paper in unfolded, four squares will appear symmetrically over it and it will resemble figure. Hence, the answer is (C).

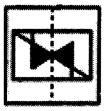
MULTIPLE CHOICE QUESTIONS

Directions (1–7) : A square transparent sheet with a pattern is given in figure. Find out from amongst the alternatives as to how the pattern would appear when the transparent sheet is folded at the dotted line.

1. 

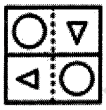
(A)  (B) 

(C)  (D) 

2. 

(A)  (B) 

(C)  (D) 

3. 

(A)  (B) 

(C)  (D) 

4. 

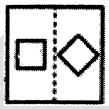
(A)  (B) 

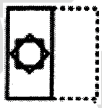
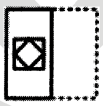
(C)  (D) 

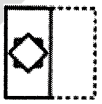
5. 

(A)  (B) 

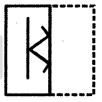
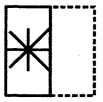
(C)  (D) 

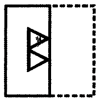
6. 

(A)  (B) 

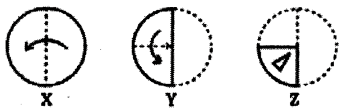
(C)  (D) 

7. 

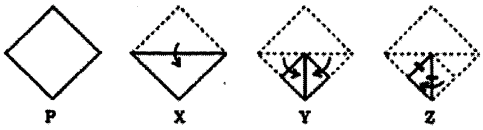
(A)  (B) 

(C)  (D) 

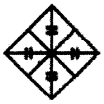
Directions (8–22) : A sheet has been folded in the manner as shown in X, Y and Z respectively and punched. You have to choose from the alternatives how it will look when unfolded.

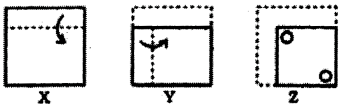
8. 

(A)  (B)  (C)  (D) 

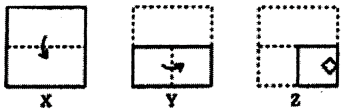
9. 

(A)  (B) 

(C)  (D) 

10. 

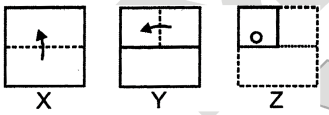
(A)  (B)  (C)  (D) 

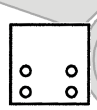
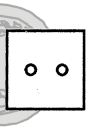
11. 

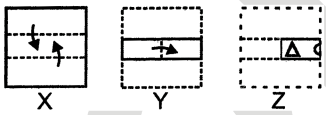
(A)  (B)  (C)  (D) 

12. 

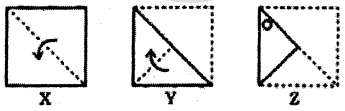
(A)  (B)  (C)  (D) 

13. 

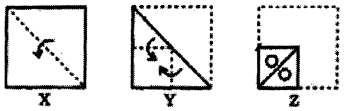
(A)  (B)  (C)  (D) 

14. 

(A)  (B)  (C)  (D) 

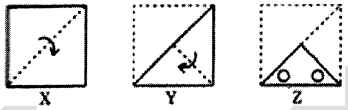
15. 

(A)  (B)  (C)  (D) 

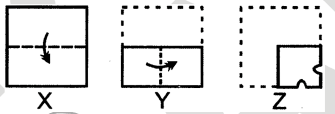
16. 

(A)  B) 

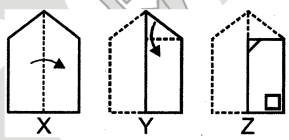
(C)  (D) 

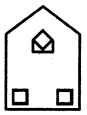
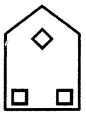
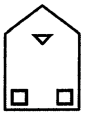
17. 

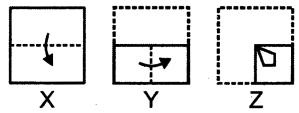
(A)  (B)  (C)  (D) 

18. 

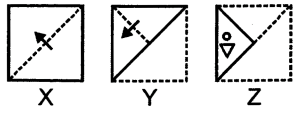
(A)  (B)  (C)  (D) 

19. 

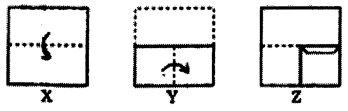
(A)  (B)  (C)  (D) 

20. 

(A)  (B)  (C)  (D) 

21. 

(A)  (B)  (C)  (D) 

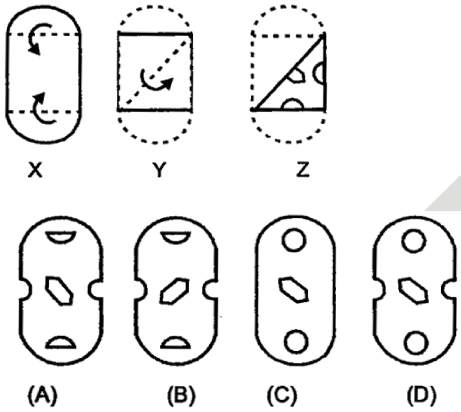
22. 

(A)  (B)  (C)  (D) 

Directions (23 – 24) : The following questions are related to paper cutting. The questions that follow contain a set of three figures X, Y and Z, showing a sequence of folding of a piece of paper. Fig. (Z) shown the manner in which the folded paper has been cut. These three figures are followed by four answer figures A, B, C and D (IInd set) from which you have to choose a figure which would most closely resemble the unfolded from of fig. (Z).

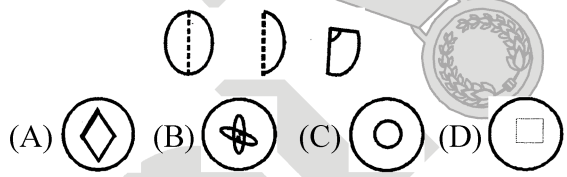
(NTSE Stage-I/Raj./2013)

23.



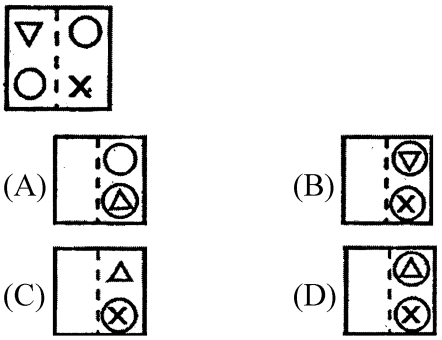
24. In the following question three figures showing a sequence of folding a paper are given. Which could resemble the figure when the third figure is unfolded?

[NTSE Stage-I/Raj./2015]

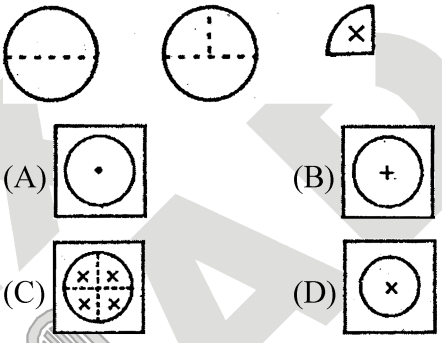


Direction (25–26): In the following questions, figures showing a sequence of folding a paper are given. Which could resemble the figure in the given alternatives. **[NTSE Stage-I/Raj./2016]**

25.



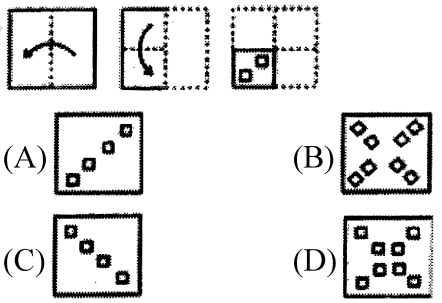
26.



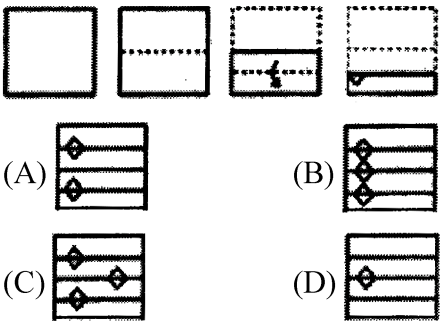
Directions (27–28) : In the following questions, figures showing a sequence of folding and cutting a paper are given. Which could resemble the figure in the answer-figure ?

[NTSE Stage-I/Raj./2017]

27.

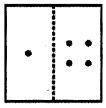


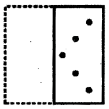
28.

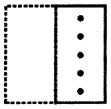


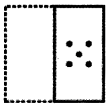
Directions (29–30) : A square transparent sheet with a pattern is folded along the dotted line. Which of the following answer figure is formed after folding the transparent sheet ?

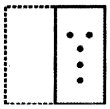
[NTSE Stage-I/Raj./2018]

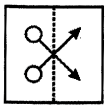
29. 

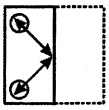
(A) 

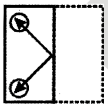
(B) 

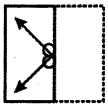
(C) 

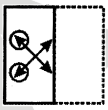
(D) 

30. 

(A) 

(B) 

(C) 

(D) 

Space for Notes :

Answer Key

EXERCISE–I														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
D	C	C	C	B	A	A	D	B	C	B	B	B	D	A
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
D	A	A	C	D	D	B	D	C	B	C	D	A	C	B

SELF PROGRESS ASSESSMENT FRAMEWORK

(CHAPTER : PAPER CUTTING & FOLDING)

CONTENT	STATUS	DATE OF COMPLETION	SELF SIGNATURE
Theory			
In-Text Examples			
Solved Examples			
Exercise I			
Short Note-1			
Revision - 1			
Revision - 2			
Revision - 3			
Remark			

NOTES :

1. In the status, put "completed" only when you have thoroughly worked through this particular section.
2. Always remember to put down the date of completion correctly. It will help you in future at the time of revision.

Space for Notes :