Date: 17/11/2019

Test Booklet Code

D

KERALA

Aakash
Medical | IIT-JEE | Foundations
(Divisions of Aakash Educational Services Limited)

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Answers & Solutions

for

NTSE (Stage-I) 2019-20

INSTRUCTIONS TO CANDIDATES

Read the following instructions carefully before you open the question booklet.

1. Use blue/black ballpoint pen only. There is no negative marking.
2. Part I : MAT : 1 - 100 questions

   Part II : SAT : 1 - 100 questions
3. This test booklet contains 200 questions of one mark each. All the questions are compulsory.
4. Answer each question by darkening the one correct alternative among the four choices on the OMR SHEET with blue/black ballpoint pen.

   Example:

	Q. No.	Alternatives
Correct way :	1	① ② ● ④
	Q. No.	Alternatives
Wrong way :	1	⊗ ② ③ ④

   Student must darkening the right oval only after ensuring correct answer on OMR Sheet.
5. Students are not allowed to scratch / alter / change out an answer once marked on OMR Sheet, by using white fluid / eraser / blade / tearing / wearing or in any other form.
6. Separate sheet has been provided for rough work in this test booklet.
7. Please handover the OMR Sheet to the invigilator before leaving the Examination Hall.
8. Darken completely the ovals of your answer on OMR Sheet in the time limit allotted for that particular paper.
9. Your OMR Sheet will be evaluated through electronic scanning process. Incomplete and incorrect entries may render your OMR Sheet invalid.
10. Use of electronic gadgets, calculator, mobile etc., is strictly prohibited.

PART-I : MENTAL ABILITY TEST (MAT)

Questions 1 to 5 :

In these questions each word is represented by numerals. Using the same code find the word denoting a group of numerals or write a given word using the numerals, as the case may be.

1. If 324156 denotes FOREST, then STORE will be coded as

   (1) 56241 (2) 65241

   (3) 56214 (4) 56412

Answer (1)

Sol. F O R E S T

3 2 4 1 5 6

$\Rightarrow$ STORE = 56241

2. If 2413564 denotes STARLET, then LATER will be coded as

   (1) 51436 (2) 41563

   (3) 54163 (4) 51463

Answer (4)

Sol. S T A R L E T

2 4 1 3 5 6 4

L A T E R

5 1 4 6 3

3. If 3554123 denotes ELLIPSE, what does 214552 denote?

   (1) PEELS (2) SPILLS

   (3) SLIPS (4) LISPS

Answer (2)

Sol. ELLIPSE

3554123

$\Rightarrow$ 2 1 4 5 5 2

S P I L L S

4. If FEVER is written 21314 and LOWER is written 76514, how is FLOWER written in the code?

   (1) 367514 (2) 376514

   (3) 267514 (4) 276514

Answer (4)

Sol. F E V E R

2 1 3 1 4

L O W E R

7 6 5 1 4

F L O W E R

2 7 6 5 1 4

5. If 6713458 denotes PROBLEM and 827345 denotes MARBLE, how is PROBABLE written?

   (1) 67133245 (2) 67123345

   (3) 67132345 (4) 67132354

Answer (3)

Sol. P R O B L E M

6 7 1 3 4 5 8

M A R B L E

8 2 7 3 4 5

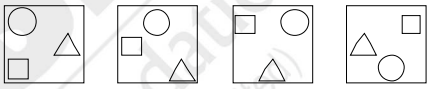
P R O B A B L E

6 7 1 3 2 3 4 5

Questions 6 to 9 :

In these questions one of the figures does not follow the pattern in the other three figures.

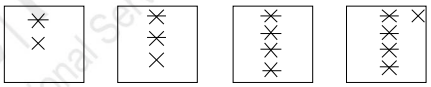
Choose the **odd** figure in each question.

6. 

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

Answer (4)

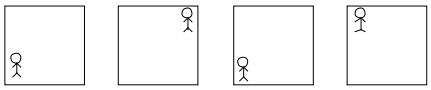
Sol. Every shape rotates 45° clockwise first, again 45° clockwise and then 90° clockwise

7. 

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

Answer (3)

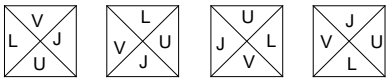
Sol. Self explanatory

8. 

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

Answer (1)

Sol. Self explanatory

9. 

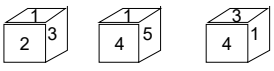
   (1) (2) (3) (4)

Answer (4)

Sol. 45° clockwise order V and U does not obey in option 4

Questions 10 to 12:

These questions are based on the three positions of a die shown in the figure. The faces are numbered 1 to 6.



10. Which number is opposite 4?

    (1) 1 (2) 2

    (3) 3 (4) 6

Answer (2)

11. Which number is opposite 5?

(1) 3 (2) 2

(3) 4 (4) 6

Answer (1)

12. Which number is opposite 1?

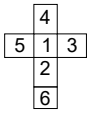
(1) 3 (2) 4

(3) 5 (4) 6

Answer (4)

Solutions for 10 to 12 :

Sol.



4 opposite to 2

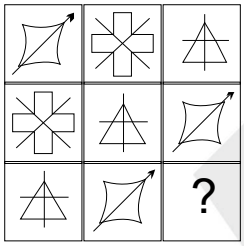
1 opposite to 6

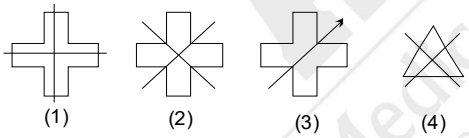
5 opposite to 3

Questions 13 to 16 :

Each of the items 13 to 16 consists of a square of 9 cells in three rows and three columns. The designs in each row or column follow the same rule. Choose the correct answer from among the given alternatives to suit the cell indicated by the question mark.

13.

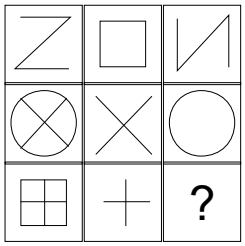


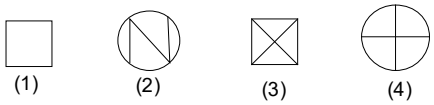


Answer (2)

Sol. Self explanatory

14.

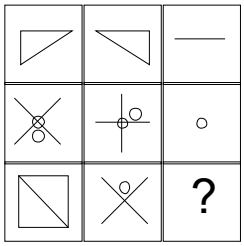


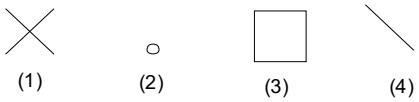


Answer (1)

Sol. (1 × 2) is subtracted from (1 × 1) to give (1 × 3)

15.

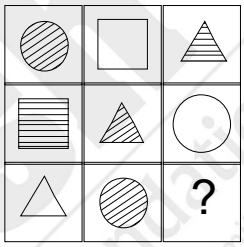




Answer (4)

Sol. Common element in (1×1) and (1×2) gives (1×3)

16.



Answer (3)

Sol. Missing shape is square.

Missing texture is cross lines.

17. If Friday is the first day of a leap year, what day would be the last day of the same year ?

(1) Friday (2) Saturday

(3) Thursday (4) Sunday

Answer (2)

Sol. In a leap year, if Jan 1 is n^{th} day, then Dec 31 $\rightarrow$ $(n + 1)^{th}$ day

$\frac{366}{7} = 2$ odd days

18. If 343 =100 and 121 =16, then 250 is

(1) 25 (2) 49

(3) 125 (4) 64

Answer (2)

Sol. $343 = 3 + 4 + 3 = (10)^2 = 100$

$121 = 1 + 2 + 1 = (4)^2 = 16$

$250 = 2 + 5 + 0 = (7)^2 = 49$

19. If in the word SCRAMBLE, all the consonants are replaced by the preceding letter and all the vowels are replaced by the succeeding letter, which letter will be the third from the left?

(1) S (2) Q

(3) B (4) L

Answer (2)

Sol. SCRAMBLE = RBQBLAKF

20. If CAT is represented by FDW, then RAIN is represented by

(1) UDLQ (2) UDMQ

(3) TDLQ (4) TDQL

Answer (1)

Sol. C A T R A I N

3 1 20 18 1 9 14

+3 +3 +3 +3 +3 +3 +3

6 4 23 21 4 12 17

F D W U D L Q

21. If blue means green

Green means white;

White means yellow;

Yellow means black and

Black means red,

Then what is the colour of milk

(1) White (2) Yellow

(3) Black (4) Green

Answer (2)

Sol. White means yellow

22. If 16 is related to 125, then the number related to 49 is

(1) 64 (2) 343

(3) 1024 (4) 512

Answer (4)

Sol. $\sqrt{16} = 4$ $4 + 1 = 5$ $5^3 = 125$

$\sqrt{49} = 7$ $7 + 1 = 8$ $8^3 = 512$

23. If doctor =18; engineer =24, principal =27, then teacher = ?

(1) 17 (2) 20

(3) 21 (4) 22

Answer (3)

Sol. n(doctor) = 6 $6\times3 = 18$

n(engineer) = 8 $8\times3 = 24$

n(principal) = 9 $9\times3 = 27$

n(teacher)=7 $7\times3 = 21$

24. How many such pairs of letters are there in the word NIGHT; each of which has as many letters between them as in the English alphabet?

(1) 4 (2) 3

(3) 2 (4) 1

Answer (4)

Sol. N I G H T

14 9 7 8 20

25. If 'bag' is called 'box',

'box' is called 'pen' and

'pen' is called 'umbrella',

then what will a child write with?

(1) Bag (2) Box

(3) Pen (4) Umbrella

Answer (4)

Sol. Pen is called Umbrella

26. If ONE is represented by 781234 and TWO is represented by 134657, then THREE is represented by:

(1) 256814 (2) 256823

(3) 256923 (4) 256914

Answer (4)

Sol. Three – Difference between pair of digits

27. If the digits of the number 5679482 are arranged in ascending order, how many digits will remain in the same position?

(1) 1 (2) 2

(3) 3 (4) 4

Answer (1)

Sol. $\frac{5}{2}\frac{6}{4}\frac{7}{5}\frac{9}{6}\frac{4}{7}\boxed{\frac{8}{8}}\frac{2}{9}$

Questions 28 to 29 :

Number problems are given in the following questions. Read the problem and answer the questions.

28. How many numbers from 11 to 50 are there which are exactly divisible by 7 but not by 3?

(1) 2 (2) 4

(3) 5 (4) 6

Answer (2)

Sol. 14,28,35,49

29. The sum of odd numbers between 20 and 30 is :

(1) 125 (2) 120

(3) 140 (4) 145

Answer (1)

Sol. 21+23+25+27+29=125

Questions 30 to 34 :

What is the next number in the series?

30. 1,2,10,37,101,?

(1) 139 (2) 175

(3) 226 (4) 253

Answer (3)

Sol. $0^2+1,1^2+1,3^2+1,6^2+1,10^2+1,15^2+1$

31. 27,64,125,216,?

(1) 256 (2) 343

(3) 512 (4) 729

Answer (2)

Sol. $3^3,4^3,5^3,6^3,7^3$

32. 7,8,12,21,37,?

(1) 62 (2) 63

(3) 64 (4) 65

Answer (1)

Sol. $7+1^2,8+2^2,12+3^2,21+4^2,37+5^2$

33. 128,64,16,2,?

(1) $\frac{1}{8}$ (2) $\frac{1}{16}$

(3) $\frac{1}{32}$ (4) $\frac{1}{64}$

Answer (1)

Sol. 128/2,64/4,16/8,2/16

34. 6,11,20,37,?

(1) 66 (2) 68

(3) 70 (4) 73

Answer (3)

Sol. 6x2-1,11x2-2,20x2-3,37x2-4

35. If the letters of the word PRINCE are rearranged as they appear in the English alphabet, the position of how many letters will remain unaffected by the rearrangement?

(1) 1 (2) 2

(3) 3 (4) 4

Answer (2)

Sol. $\frac{P}{C}\frac{R}{E}\boxed{\frac{I}{I}\frac{N}{N}}\frac{C}{P}\frac{E}{R}$

36. Abhishek's rank is 23rd from the top and 27th from the bottom in his class. How many students are there in the class?

(1) 48 (2) 49

(3) 50 (4) 51

Answer (2)

Sol. No. of students = 23 + 27 – 1 = 49

37. In a row of children facing North, Ravi is twelfth from the left end. Rohit is twelfth from the right end and fourth to the right of Ravi. How many children are there in the row?

(1) 27 (2) 25

(3) 24 (4) 26

Answer (1)

Sol. Number of children = 12+3+12 = 27

Questions 38 to 41 :

Find the odd one out from the given alternatives.

38. (1) Rhombus (2) Rectangle

(3) Square (4) Trapezium

Answer (4)

Sol. Trapezium, because rest all are parallelogram

39. (1) Tree (2) Leaf

(3) Flower (4) Fruit

Answer (1)

Sol. Leaf, flower, fruit grow on tree

40. (1) Sweet (2) Sour

(3) Bitter (4) Hot

Answer (4)

Sol. Sweet, sour, bitter are taste but hot is feeling

41. (1) Table (2) Chair

(3) Cupboard (4) Computer

Answer (4)

Sol. Computer is an electronic device

Questions 42 to 44 :

There is some relationship between the two terms in the question. Find the correct alternative where the same relationship exists between the terms.

42. MORE : ROME

(1) LION : OILN (2) BEAR : REAB

(3) LIAR : AIRL (4) RANK : NAKR

Answer (1)

Sol. 1st letter interchange with 3rd letter

43. OFTEN : FOTNE

(1) FIRST : IFRST (2) BREAD : BREDA

(3) PLANT : LPBTN (4) BRAND : RBADN

Answer (4)

Sol. First two and last 2 letters are interchanged

44. DART : ARDT

(1) PARK : ARKP

(2) DENT : ENTD

(3) BARK : ARBK

(4) DIRT : RIDT

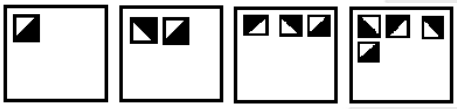
Answer (3)

Sol. $\overset{\curvearrowleft\curvearrowleft}{DART} : \overset{\curvearrowleft\curvearrowleft}{BARK}$
$ARDT \quad\quad ARBK$

Questions 45 to 49 :

In each of these questions, the four problem figures in each row make a series. Find out the one which would come next in the series from among the answer figures given.

45. Problem Figures:



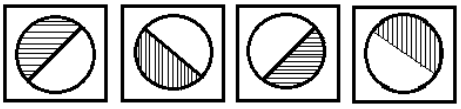
(1)  (2) 

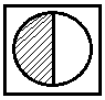
(3)  (4) 

Answer (3)

Sol. Shift the square to right and fill the empty place by rotating previous square by 90° anticlockwise

46. Problem Figures :



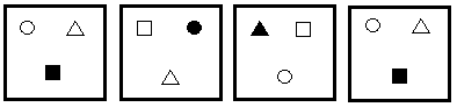
(1)  (2) 

(3)  (4) 

Answer (1)

Sol. Rotate circle in anti-clockwise direction by 90°

47. Problem Figures :



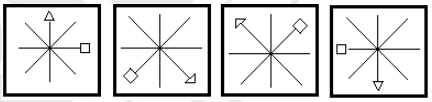
(1)  (2) 

(3)  (4) 

Answer (4)

Sol. Rotate the shape inside the square in clockwise direction and each adjacent figure should have same shape coloured.

48. Problem Figures :



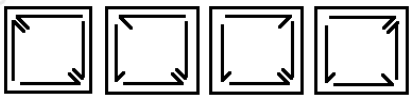
(1)  (2) 

(3)  (4) 

Answer (2)

Sol. Arrow rotation: 135°,180°,225°,270°

49. Problem Figures :



(1)  (2) 

(3)  (4) 

Answer (2)

Sol. Arrows are inverted by 180°, direction- clockwise

50. If A$B means 'A is greater than B' and A#B means 'A is less than B', what does A$B#C mean?

(1) A is greater than B and C

(2) C is less than A and B

(3) A and C are greater than B

(4) A and C are less than B

Answer (3)

Sol. A>B<C

51. A is older than B, C is younger than B and D. D is not as old as A. Who among A, B, C, D is the oldest?

(1) A (2) B

(3) C (4) D

Answer (1)

Sol. A>B

B,D>C A>D

Answer is (1).

52. In a certain code DEAL is written $35@ and SOLE is written #7@3. How is SOLD written in the code ?

(1) #@37 (2) #$@3

(3) #@7$ (4) #7@$

Answer (4)

Sol. DEAL - $35@

SOLE - #7@3

SOLD - #7@$

53. If the order of the letters in the English alphabet is reversed, Which letter will be fifth to the right of the tenth letter from the right ?

(1) E (2) F

(3) G (4) H

Answer (1)

Sol. Z.... J_5 .... E_5 ...B A

54. A, B, C, D are sitting around a circle and facing the centre. D is to the immediate left of C. A is between B and C. What is the position of B ?

(1) to the immediate right of C

(2) to the immediate left of A

(3) between A and C

(4) to the immediate left of D

Answer (4)

55. If all the letters of the word QUESTION are rearranged in alphabetical order and substituted by the letter immediately following it in the English alphabet, what will be the new arrangement of letters ?

(1) FJOPRUVT (2) FJOPRTUV

(3) FJOPRUTV (4) FJOPRTVU

Answer (2)

Sol. E I N O Q S T U

F J O P R T U V

56. How many 3's are there in the following sequence, immediately preceded by a 3 and immediately followed by a 3 ?

33836333338833388333336838633

(1) 5 (2) 6

(3) 7 (4) 8

Answer (2)

57. If J=30 and T=60, then L=?

(1) 36 (2) 45

(3) 51 (4) 54

Answer (1)

Sol. J-30 $= 10 \times 3$

T=60 $= 20 \times 3$

L=12 $= 12 \times 3 = 36$

58. Which of the following words comes last when arranged in dictionary order ?

(1) Success (2) Succeed

(3) Successively (4) Successfully

Answer (3)

59. A man walks 10 kilometres due North. Then he turns right and walks 12 kilometres. Again he turns right and walks 5 Kilometres. How far is he from the starting point ?

(1) 13 Kilometres (2) 15 Kilometres

(3) 17 Kilometres (4) 18 kilometres

Answer (1)

60. Which word cannot be formed from the letters of the word EXAMINER ?

(1) EXAMINE (2) REMAIN

(3) MANIA (4) MINOR

Answer (4)

Questions 61 to 63 :

These questions are based on letter series. In each of these letter series some letters are missing.

Choose the correct alternative from the given choices.

61. a _a c b b a c a _b b a c a _b b a_ a c b b

(1) c c c c (2) a b a b

(3) b a b a (4) a c a c

Answer (1)

62. x x y_ y z x x y z y_ x _y z y z _x y z y z

(1) x x y y (2) z z x x

(3) y y x x (4) x z y z

Answer (2)

63. m n _ m n m m _ m m n m m n m _ n m m n m m _ m

(1) m m m n (2) n n n n

(3) m n m n (4) n m n m

Answer (3)

64. In a music band all except 4 are singers, all except 4 are guitarists and all except 4 are violinists. How many are in the band ?

(1) 4 (2) 6

(3) 8 (4) 12

Answer (2)

Sol. Total number of people =x

S=x-4 Total

G=x-4 3x-12=x

V=x-4 2x=12

X=6

Questions 65 to 69 :

Out of 30 students in a class, 4 Play cricket and hockey, 5 play cricket and football and 10 play hockey and football. 4 play cricket only, 8 play hockey only and 5 play football only. Each Student plays one or more of the three games.

65. How many students do not play cricket ?

(1) 18 (2) 20

(3) 22 (4) 25

Answer (2)

66. How many students play exactly two games ?

(1) 7 (2) 8

(3) 9 (4) 10

Answer (4)

67. How many students play all the three games ?

(1) 1 (2) 2

(3) 3 (4) 4

Answer (3)

68. How many students play hockey nor football ?

(1) 2 (2) 4

(3) 5 (4) 7

Answer (2)

69. How many students play cricket and hockey but not football ?

(1) 1 (2) 2

(3) 3 (4) 4

Answer (1)

Questions 70 to 79 :

In each of these questions, the numbers in the figures follow a certain pattern. There is a number missing marked by ?. Find out the missing number from among the four alternatives.

70.

2	3	5
30		?
23	17	12

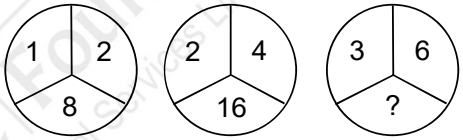
(1) 6 (2) 7

(3) 8 (4) 10

Answer (3)

Sol. 2,3,5_12,17,23,30

71.

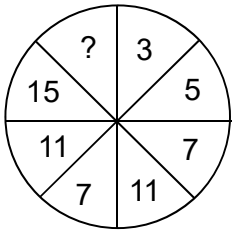


(1) 12 (2) 18

(3) 24 (4) 30

Answer (3)

72.

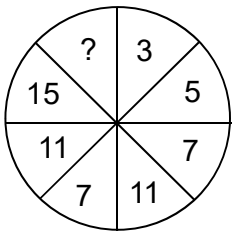


(1) 21 (2) 22

(3) 23 (4) 24

Answer (1)

Sol.

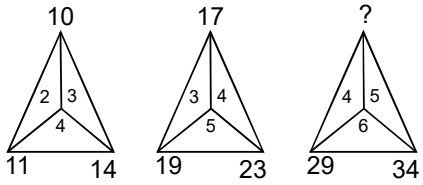


3 + 4 = 7

5 + 6 =11

7 + 8 =15

11 + 10 =21

73. 

(1) 25 (2) 26

(3) 27 (4) 28

Answer (2)

Sol. $14=4\times3+2$ $6\times4+5=29$

$10=2\times3+4$ $6\times5+4=34$

$11=2\times4+3$ $4\times5+6=26$

74.

28	?	14
35	42	49

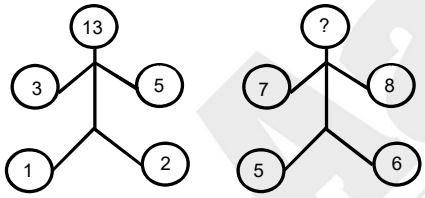
(1) 20 (2) 21

(3) 22 (4) 23

Answer (2)

Sol.

7×4	7×3	7×2
28	?	14
35	42	49
7×5	7×6	7×7

75. 

(1) 20 (2) 22

(3) 24 (4) 26

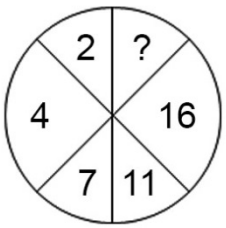
Answer (4)

Sol. $5\times3-2\times1$

$15-2=13$

$7\times8-30=26$

$7\times8-30=26$

76. 

(1) 22 (2) 23

(3) 24 (4) 25

Answer (1)

Sol. 2+2 = 4

4+3 = 7

7+4=11

11+5=16

16+6=22

77.

8	16	48
7	?	42

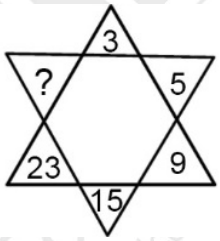
(1) 11 (2) 12

(3) 13 (4) 14

Answer (4)

Sol. 8 x 2 = 16 8 x 6 = 48

7 x 2 = 14 7 x 6 = 42

78. 

(1) 30 (2) 31

(3) 32 (4) 33

Answer (4)

Sol. 3+2 = 5

5+4=9

9+6=15

15+8 = 23

23+10 = 33

79.

4	16	36
64	100	?

(1) 121 (2) 144

(3) 169 (4) 196

Answer (2)

Sol. $2^2=4$

$4^2=16$

$6^2=36$

$8^2=64$

$10^2=100$

$12^2=144$

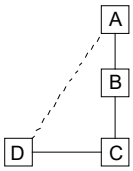
80. A is to the North of B and C is to the South of B. C is also East of D. In which direction is D with respect to A?

(1) South-West (2) South-East

(3) North-West (4) North-East

Answer (1)

Sol.



D is South-West of A.

81. How many meaningful four lettered English words can be formed with the letters EOSR using each letter only once in each word?

(1) 0 (2) 1

(3) 2 (4) 4

Answer (4)

Sol. ROSE

SORE (Pain)

EROS (God of Love in Greek mythology)

ROES (Eggs or Spawn of fish)

82. If the first day of a non-leap year falls on Tuesday, then the 15th August of the same year falls on :

(1) Tuesday (2) Thursday

(3) Friday (4) Saturday

Answer (2)

Sol. Month code

0 3 3 6 1 4 6 2 5 0 3 5

August code 2

Jan 1st $\rightarrow$ Tuesday + 2

Aug 1st $\rightarrow$ Thursday

Questions 83 to 86 :

Four groups of letters are given in each of these questions. Out of these, one differs from the others. Find that group of letters.

83. SUY, EJO, OQU, ACE

(1) SUY (2) EJO

(3) OQU (4) ACE

Answer (1)

Sol. S U Y $\rightarrow$ only one vowel.

E J O $\rightarrow$ 2 vowels

O Q U $\rightarrow$ 2 vowels

A C E $\rightarrow$ 2 vowels

84. BF, JN, PT, WZ

(1) BF (2) JN

(3) PT (4) WZ

Answer (4)

Sol. B C D E F

3 skip

J K L M N

3 skip

P Q R S T

3 skip

W X Y Z

2 skip

85. YXZ, EFD, LMK, UVT

(1) YXZ (2) EFD

(3) LMK (4) UVT

Answer (1)

Sol. In alphabetical order,

$\overset{2}{Y}\ \overset{1}{X}\ \overset{3}{Z}$

$\overset{2}{E}\ \overset{3}{F}\ \overset{1}{D}$

$\overset{2}{L}\ \overset{3}{M}\ \overset{1}{K}$

$\overset{2}{U}\ \overset{3}{V}\ \overset{1}{T}$

86. ABZ, PQO, GHF, LMN

(1) ABZ (2) PQO

(3) GHF (4) LMN

Answer (4)

A B Z $\rightarrow$ before A

Sol. $\downarrow$

after A

P Q O $\rightarrow$ before P

$\downarrow$

after P

G H F $\rightarrow$ before G

$\downarrow$

after G

L M N $\rightarrow$ after L

$\downarrow$

after L

Questions 87 to 90 :

A solid cube of side 3 centimetres is painted red on the top and bottom faces. The remaining faces are painted blue. It is then cut into 27 small cubes.

87. How many small cubes will have only on face painted blue?

(1) 4 (2) 6

(3) 8 (4) 10

Answer (1)

Sol. In that four faces coloured blue, every face has only one face painted blue one cube each.

i.e total 4 x 1 = 4 cubes

88. How many small cubes will have one face red and one face blue?

(1) 6 (2) 8

(3) 10 (4) 12

Answer (2)

Sol. Number of cubes having once face red and one face blue = 8 x 1 = 8

One cube each in all the edges of red coloured face.

89. How many small cubes will have two faces blue and one face red?

(1) 8 (2) 10

(3) 12 (4) 16

Answer (1)

Sol. 8 corner cubes have 3 faces painted. i.e two faces blue and one face is red.

90. How many small cubes will have no face painted?

(1) 1 (2) 2

(3) 3 (4) 4

Answer (1)

Sol. We know, No face painted cubes = $(n-2)^3$

Where n^3 is the total number of small cubes.

Here n = 3.

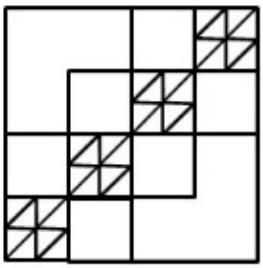
Total number of cubes, no face painted

$= (3-2)^3$

$= 1$

Questions 91 & 92 :

These questions are based on the following figure



91. The number of triangles in the figure is :

(1) 38 (2) 48

(3) 44 (4) 40

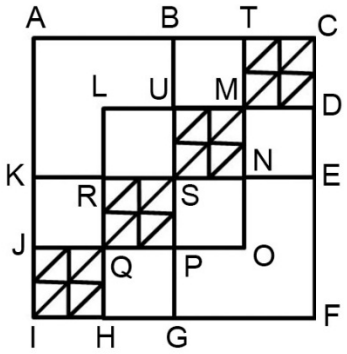
Answer (2)

Sol.

In this figure, total 10 triangles are there.

Question figure contains four diagram like this.

Total triangles in the figure = 4 x 10 = 40



Addition to that, the below mentioned triangles are also present in the figure.

ΔISK , ΔISG , ΔQML , ΔQMO , ΔSBC , ΔSEC

ΔICA , ΔICF

So total triangles = 40 + 8 = 48

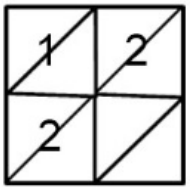
92. The number of squares in the figure is :

(1) 28 (2) 30

(3) 32 (4) 34

Answer (4)

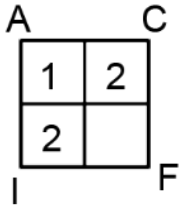
Sol.



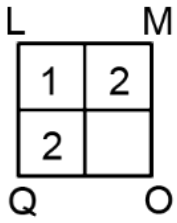
In this figure, number of square = $2^2 + 1^2 = 5$

Question figure contains 4 diagrams like this.

$\therefore$ Number of square = 4 x 5 = 20



In this figure, number of square = $2^2 + 1^2 = 5$



In this figure, number of square = $2^2 + 1^2 = 5$

Addition to that, 4 squares are also there.

i.e, KRQJ, QPGH, MNED, BTMU.

$\therefore$ Total number of square = 20 + 5+5+4 = 34

Questions 93 to 95 :

There is some relationship between the two terms (letters) to the left of the sign : : . The same relationship exists between the two terms to the right of the sign. One of the two terms on the right is missing. Find the missing term.

93. COMB : XLNY : : MIRROR : ?

(1) NRIILI (2) NIRRLR

(3) NRQQPQ (4) NJSSPS

Answer (1)

Sol. Starting from A as 1 forward code is given below

$\overset{3\ 15\ 13\ 2}{\text{COMB}}$

Starting from Z as 1, reverse code is given

$\overset{23\ 12\ 14\ 25}{\text{XLNY}}$

like that, starting from A as 1 forward code is

$\overset{13\ 9\ 18\ 18\ 15\ 18}{\text{MIRROR}}$

Starting from Z as 1, Corresponding revers code is $\overset{14\ 8\ 9\ 9\ 12\ 9}{\text{NRIILI}}$

94. INDORE : JOEPSF : : BHOPAL : ?

(1) AGNOZK (2) CPIQMB

(3) ANGOZK (4) CIPQBM

Answer (4)

Sol. Every letter jump by 1

$I \rightarrow J$

$N \rightarrow O$ like that all letters are re-arranged.

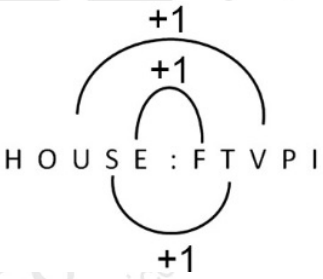
95. HOUSE : FTVPI : : CHAIR : ?

(1) SBJID (2) SJBID

(3) DJBIS (4) DIBJS

Answer (2)

Sol.



Questions 96 & 97 :

Choose the correct alternative from those given, in which the letter pair on the left bears the same relationship to the letter pair on the right as in the question.

96. CX : FU

(1) DW : GV (2) HS : JQ

(3) IR : KQ (4) LO : EW

Answer (2)

97. IO : OU

(1) GM : PV

(2) AG : KP

(3) IM : RV

(4) FK : QV

Answer (1)

Sol. $\overset{6}{\overbrace{9\ 15}}$ $\overset{6}{\overbrace{15\ 21}}$

I O : O U

$\overset{6}{\overbrace{7\ 13}}$ $\overset{6}{\overbrace{16\ 22}}$

G M : P V

Questions 98 to 100 :

In the questions there exist some relationship between the terms to the left of the sign : : as between the terms to the right. Identify the missing term from the given options.

98. Strong : Weak : : Broad : ?

(1) Long (2) Tall

(3) Narrow (4) Short

Answer (3)

99. Mars : Planet : : Pumpkin : ?

(1) Garden (2) Vegetable

(3) Soup (4) Plant

Answer (2)

100. Garden : Gardener : : Agriculture : ?

(1) Farm (2) Farmer

(3) Plant (4) Farm produce

Answer (2)

❑ ❑ ❑

PART-II : SCHOLASTIC APTITUDE TEST (SAT)

1. The head of the Second Backward Classes Commission in India was:
   (1) B.P. Mandal (2) B.R. Ambedkar
   (3) Jagjivan Ram (4) Kanshi Ram

Answer (1)

2. 'Right to Property' in India is a:
   (1) Fundamental Right
   (2) Moral Right
   (3) Political Right
   (4) Constitutional Right

Answer (4)

3. Indian Railways Service comes under:
   (1) Central Services (2) State Services
   (3) All India Services (4) Private Services

Answer (1)

4. Who was the founder leader of Socialist party of Chile ?
   (1) Pinochet (2) Allende
   (3) Michelle Bachelet (4) Andrzej Duda

Answer (2)

5. Name the first Lokpal of India :
   (1) Rajiv Mehrishi
   (2) Vinod Rai
   (3) Pinaki Chandra Ghose
   (4) Sunil Arora

Answer (3)

6. The non-permanent members of Security Council of UNO are elected for:
   (1) Three years (2) Four years
   (3) Five years (4) Two years

Answer (4)

7. The first Administrative Reforms Commission of India was Chaired by,
   (1) Sardar Patel (2) K. Hanumanthaiah
   (3) Veerappa Moily (4) V. Ramachandran

Answer (2)

8. Among the following which is **not** Power- Sharing in a democratic Society?
   (1) Accommodation of various group interests
   (2) Public Participation in governance
   (3) Empowerment of the backward sections of society
   (4) Patronage to the power of majority

Answer (4)

9. Choose the false pair from the following statements, about globalization:
   (a) Globalization benefitted the small scale producers, largely
   (b) Increased market competition
   (c) Increased the quality of products
   (d) Strengthened job security
   (1) (a) and (b) (2) (b) and (c)
   (3) (c) and (d) (4) (a) and (d)

Answer (4)

10. The Nutritional Level of Adults is measured by using:
   (1) The Calorie intake of food
   (2) Body Mass Index
   (3) Height and weight of a person
   (4) All the above

Answer (4)

11. The Nature of employment in the agriculture sector in India can be characterised as:
   (1) Under employed
   (2) Seasonally employed
   (3) Disguisedly employed
   (4) All the above

Answer (4)

12. Assume that you are born and continuously studying in Bihar. If so, how much of your classmates are not in your class, at present?
   (1) 1/3rd (2) 2/3rd
   (3) 1/5th (4) 1/2

Answer (1)

13. The average income of Maharashtra is much more than that of Kerala. But Kerala's social indices are much above than Maharashtra. This is reasoned on the fact that:
   (1) The NSDP (Net State Domestic Product) of Kerala is higher
   (2) Foreign remittance is higher in Kerala
   (3) Private goods are cheaper in Kerala
   (4) Collective goods are cheaper in Kerala

Answer (2)

14. Two countries having identical average income and the same can be reasoned on:
    (1) Economic growth rates of these two countries are the same
    (2) The size of the population is the same
    (3) Growth of population is at the same rate
    (4) None of the above

Answer (2)

15. One major factor that stimulated the process of Globalization has been:
    (1) The integration of the trade among the countries of the world
    (2) The removal of trade barriers
    (3) The rapid development of information and communication technology
    (4) The Foreign Direct Investment flows

Answer (3)

16. Debt trap is a case in which:
    (1) The amount of repayment is more than the income
    (2) The cost of borrowal is higher
    (3) The amount of borrowed money is huge
    (4) There is crop failure due to heavy natural calamity

Answer (1)

17. Examine the given statements in the context of Sustainable Development:
    (a) Development without damaging the environment
    (b) Development in the present without compromising the needs of the future generations.
    (c) Development without considering the environment
    (1) (a) is correct, (b) and (c) are wrong
    (2) (a) and (c) are correct, (b) is wrong
    (3) (a) and (b) are correct, (c) is wrong
    (4) (c) alone is correct

Answer (3)

18. What is the normal time interval between two Neap tides at a particular place?
    (1) 14 days (2) 28 days
    (3) 7 days (4) 24 hours

Answer (1)

19. 5^{th} June is observed as:
    (1) Earth Day
    (2) Environment Day
    (3) Ozone Day
    (4) Watershed Day

Answer (2)

20. The Core of the Earth is mainly composed of:
    (1) Silicon and Alumina
    (2) Silicon and Magnesium
    (3) Nickel and iron
    (4) Mixed metals and Silicates

Answer (3)

21. Where do the Mid-Oceanic Ridges form?
    (1) Convergent margins
    (2) Divergent margins
    (3) Transform margins
    (4) Shear margins

Answer (2)

22. In the Southern Hemisphere Westerlies blow from:
    (1) South East (2) North East
    (3) North West (4) South West

Answer (3)

23. What is the Normal Lapse Rate of Temperature in the Troposphere?
    (1) 1^oC/km (2) 1^oC/metre
    (3) 1^oC/6.4 km (4) 1^oC/165 metre

Answer (4)

24. Moraines are:
    (1) Erosional features by wind
    (2) Erosional features by Glaciers
    (3) Deposits by Glaciers
    (4) Deposits by Sea waves

Answer (3)

25. Identify the correct statement regarding Kuroshio current:
    (1) Warm Current in Pacific Ocean
    (2) Cold current in Pacific Ocean
    (3) Warm Current in Atlantic Ocean
    (4) Cold Current in Indian Ocean

Answer (1)

26. Categorize the following Towns based on their basic function:

(a) Jamshedpur (b) New Delhi
(c) Allahabad (d) Mhow

(1) (a) Administrative
(b) Defence
(c) Cultural
(d) Industrial

(2) (a) Industrial
(b) Cultural
(c) Defence
(d) Administrative

(3) (a) Administrative
(b) Industrial
(c) Defence
(d) Cultural

(4) (a) Industrial
(b) Administrative
(c) Cultural
(d) Defence

Answer (4)

27. The terms Khadar and Bangar are related to:

(1) Black soil (2) Alluvial soil
(3) Red soil (4) Laterite soil

Answer (2)

28. To travel from Kanyakumari to Kolkata along the East coast, we need to cross the major East flowing rivers. Identify the correct order of rivers that we have to cross:

(1) Godavari, Mahanadi, Kaveri, Krishna
(2) Mahanadi, Godavari, Krishna, Kaveri
(3) Kaveri, Krishna, Godavari, Mahanadi
(4) Krishna, Kaveri, Mahanadi, Godavari

Answer (3)

29. How many trusted volunteers of Mahatma Gandhi accompanied his famous Salt Satyagraha?

(1) 72 (2) 78
(3) 240 (4) 120

Answer (2)

30. Before 1789, the Estates General was last summoned in:

(1) 1714 (2) 1784
(3) 1614 (4) 1689

Answer (3)

31. Consider the following statements and identify the correct response from the options given below:

Statement-I : Majority of the people in Mughal Society were farmers

Statement-II : There were two types of farmers called Khud-Kashta and Pahi-Kashta.

(1) Statement-I is true and statement-II is false
(2) Statement-I is false and statement-II is true
(3) Both the statements are true but statement-II is not the correct explanation of statement-I
(4) Both the statements are true and statement-II is the correct explanation of statement-I

Answer (3)

32. Which among the following is wrongly related?

(1) The Vienna Congress - Australia
(2) The Weimar Republic - Germany
(3) Five year Plans – Soviet Union
(4) The Great Economic Depression – United States of America

Answer (1)

33. The Palestine Liberation Organization (PLO) was founded by:

(1) Yasser Arafat
(2) Arthur Balfour
(3) Hitler
(4) Gamal Abdel Nasser

Answer (1)

34. The 'Munda Rebellion' is an example of:

(1) 'Peasant Rebellion'
(2) 'Rebellion of Sepoy's'
(3) 'Rebellion of Weavers'
(4) 'Tribal Rebellion'

Answer (4)

35. Name the author of the book 'Sevasadan':

(1) Rabindranath Tagore
(2) Bankim Chandra Chatterjee
(3) Dinabandhu Mitra
(4) Premchand

Answer (4)

36. Identify the territory in India which was under the control of France:

(1) Goa (2) Bombay
(3) Mahe (4) Diu

Answer (3)

37. Which among the following is the correct pair?

(1) Cordova - England

(2) Bologna - France

(3) Constantinople - Turkey

(4) Al – Azhar – Spain

Answer (3)

38. The names of certain social reformers and the related movements are given below. Match them correctly:

	Movements		**Reformers**
(a)	Prarthana Samaj	(i)	Annie Besant
(b)	Satya Shodak Samaj	(ii)	Veresalingam
(c)	Hitakarini Samaj	(iii)	Atamaram Panduranga
(d)	Theosophical society	(iv)	Jyotiba Phule

(a) (b) (c) (d)

(1) (iii) (iv) (i) (ii)

(2) (iii) (iv) (ii) (i)

(3) (ii) (iv) (i) (iii)

(4) (ii) (iii) (iv) (i)

Answer (2)

39. Some events related to India's national movement are given below. Identify the correct chronological order of them.

(a) Visit of Cripps' Mission

(b) Formation of Swaraj Party

(c) Gandhi-Irwin Pact

(d) Second Round Table Conference

(1) (b), (d), (c), (a) (2) (b), (c), (d), (a)

(3) (b), (a), (d), (c) (4) (b), (a), (c), (d)

Answer (2)

40. Name the leader of the 'Revolt of 1857' at Arrah in Bihar:

(1) Kunwar Singh

(2) Nana Saheb

(3) Maulavi Ahmadullah

(4) Shah Mal

Answer (1)

41. The point on the line passing through (1,2) and (11,8) is :

(1) (5, –1) (2) (–4, 2)

(3) (–4, 0) (4) (6, 5)

Answer (4)

Sol. Let p(x,y)

$$\frac{y-2}{x-1}=\frac{y-8}{x-11}=\frac{8-2}{11-1}$$

$$\Rightarrow 3x-5y+7=0$$

42. What is the average of the cubes of first five counting numbers?

(1) 35 (2) 55

(3) 65 (4) 45

Answer (4)

Sol. Average = $\frac{(\frac{n(n+1)}{2})^2}{n}$

put n =5

43. What is the area of the largest triangle that can be inscribed in a circle of radius one unit?

(1) $\frac{3\sqrt{3}}{4}$ sq.unit (2) $\frac{\sqrt{3}}{4}$ sq.unit

(3) $\frac{\sqrt{3}}{2}$ sq.unit (4) $3\sqrt{3}$ sq.unit

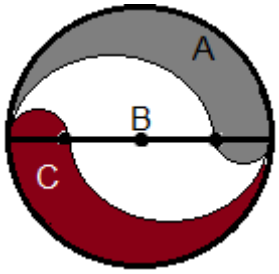
Answer (1)

Sol. The largest which can be inscribed in a circle

Is equilateral triangle

Area of largest triangle = $\frac{3\sqrt{3}}{4}r^2$

44. A circle of radius 3 units is divided into 3 regions using two semicircles of radius 1 unit and 2 units as shown in the figure. What is the ratio of area of the region marked A,B and C?



(1) 1:1:1 (2) 2:1:2

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

Answer (1)

Sol. Area of region A = area of region C = $\pi(9-4+1)=6\pi$

Area of region C=$2(4-1)\pi=6\pi$

Ratio = 1:1:1

45. $2^{122}+4^{62}+8^{42}+4^{64}$ is divisible by the number :

(1) 3 (2) 11

(3) 7 (4) 17

Answer (4)

Sol. $2^{122}+2^{124}+2^{126}+2^{128}=2^{122}(1+4+16+64)=2^{122}x85$

46. A shopkeeper marked 10% excess on an article. Due to decrease in demand he reduced the price by 10%. He will get :

(1) 1% loss (2) 1% gain

(3) 1.5% loss (4) 1.5% gain

Answer (1)

Sol. Let the original price be 100

Increased price = 110

Reduced price = 110-11=99

47. How many 5 digit prime numbers are there in the numbers formed using the digits 1,2,3,4,5 without repetition?

(1) 0

(2) 23

(3) 120

(4) 1

Answer (1)

Sol. Sum of digits is always divisible by 3

48. If A can run 48 metres while B runs 42 meters, then in a race of 1 km, A beats B by :

(1) 140 metres

(2) 110 metres

(3) 100 metres

(4) 125 metres

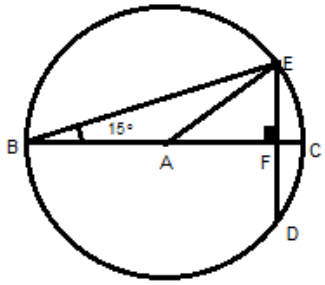
Answer (4)

Sol. When A runs 48 meters

$$1000 \text{ meters divide into} = \frac{1000}{48} = \frac{125}{6} \text{ parts}$$

$$\text{A beats B by } \frac{125}{6} \times 6 = 125 \text{ m}$$

49. The figure shows a circle of radius one unit with centre A and $\angle ABE = 15^o$. Find the length of AF.



(1) $\sqrt{3}$ unit (2) $\frac{\sqrt{3}}{2}$ unit

(3) $\frac{1}{2}$ unit (4) $\frac{1}{\sqrt{3}}$ unit

Answer (2)

Sol. AF = r cos $30^\circ = r.\frac{\sqrt{3}}{2}=\frac{\sqrt{3}}{2}$

50. There are 8 stations on a railway line. What is the number of different journey tickets that are required by the authorities?

(1) 60 (2) 56

(3) 52 (4) 54

Answer (2)

Sol. ${}^8P_2 = 8x7=56$

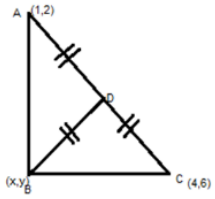
51. If the end points of the hypotenuse of a right triangle are (1,2) and (4,6), then the third vertex of the triangle is :

(1) (2,6) (2) (-4,2)

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

Answer (3)

Sol.



D = (5/2,4)

AD = BD

$AD^2 = BD^2$

$(5/2-1)^2+(4-2)^2=(x-5/2)^2+(y-4)^2$

52. If each side of a cube is decreased by 10%, then its surface area is decreased by :

(1) 81% (2) 19%

(3) 20% (4) 80%

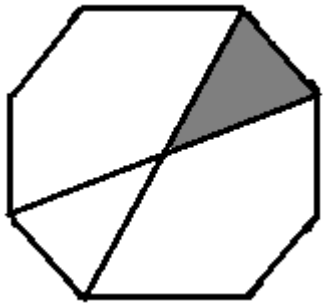
Answer (2)

Sol. Let side=10

% decrease in Surface Area

$$= \frac{6x10^2 - 6x9^2}{6x10^2} x100\% = 19\%$$

53. The figure shows a regular octagon. Which of the following is the ratio of angles of shaded triangle?



(1) 1:3:3 (2) 1:2:2

(3) 2:3:3 (4) 3:4:4

Answer (3)

Sol. Ratio= $45:\frac{135}{2}:\frac{135}{2}=2:3:3$

54. The last day of 2019 is :

(1) Friday (2) Wednesday

(3) Monday (4) Tuesday

Answer (4)

Sol. Tuesday

55. What is the value of

$$\frac{1}{1\times4}+\frac{1}{4\times7}+\frac{1}{7\times10}+.....+\frac{1}{16\times19}?$$

(1) $\frac{9}{19}$ (2) $\frac{6}{19}$

(3) $\frac{4}{19}$ (4) $\frac{8}{19}$

Answer (2)

Sol. $\frac{1}{3}\left[\frac{4-1}{1\times4}+\frac{7-4}{7\times4}+...+\frac{19-16}{19\times16}\right]$

$$=\frac{1}{3}\left(1-\frac{1}{9}\right)=\frac{6}{19}$$

56. If a tap can empty a tank in 40 minutes, then how long it will take to empty the full tank when the diameter of the tap is doubled?

(1) 20 minutes (2) 30 minutes

(3) 10 minutes (4) 15 minutes

Answer (3)

Sol. $\pi r^2 h$ can empty in 40 min.

$\Rightarrow \pi(2r)^2 h = 4\pi r^2 h$ can empty in 10 min.

57. Which is the least perfect square exactly divisible by 8,9,12,15?

(1) 3600 (2) 1600

(3) 14400 (4) 7200

Answer (1)

Sol. LCM (8,9,12,15)=2^3x3^2x5

Least no. = $2^4x3^2x5^2=3600$

58. In an arithmetic sequence, if 17 is the 3rd term, -25 is the 17th term, then which term is -1?

(1) 9 (2) 10

(3) 11 (4) 12

Answer (1)

Sol. a + 2d = 17

A + 16d = –25

–14d = 42

d = –3

a = 23

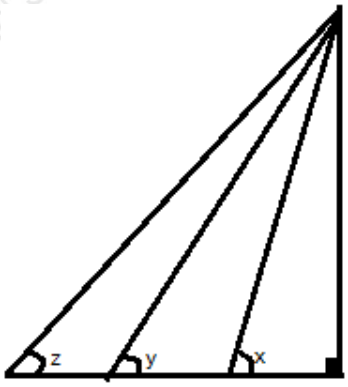
a_n = –1

23 + (n – 1)(–3) = –1

$\Rightarrow$ n = 9

59. The base of a right triangle is trisected as shown in the figure.

What is tan x : tan y : tan z?



(1) 2:3:6 (2) 3:2:1

(3) 1:2:3 (4) 6:3:2

Answer (4)

Sol. tan x : tan y : tan z

= 6 : 3 : 2

60. What is the ratio of areas of incircle and circumcircle of an equilateral triangle?

(1) 1:2 (2) 1:3

(3) 1:4 (4) 1:5

Answer (3)

Sol. 2r = R

Ratio= $\frac{r^2}{R^2}=\frac{1}{4}$

61. Distance of the Sun from the Earth is about :
(1) 8 light year (2) 1 Astronomical unit
(3) 3×10^8 m (4) 3,85,000 km

Answer (2)

Sol. The average distance between Sun to Earth is known as Astronomical unit.

62. The time interval between the maximum displacement and zero displacement of a point in a travelling wave is 0.0025 s. Then its frequency is :
(1) 400 Hz (2) 800 Hz
(3) 200 Hz (4) 100 Hz

Answer (4)

Sol. $f = \frac{1}{T}$

But $\frac{T}{4} = 0.0025$

$T = 0.01$

$\frac{1}{0.01} = 100$ Hz

63. In which of the following cases, the position and properties of the image formed remain almost the same independent of the position of the object?
(1) Convex mirror, Convex lens
(2) Convex mirror, Concave lens
(3) Convex lens, Concave mirror
(4) Convex lens, Concave lens

Answer (2)

Sol. In convex mirror and concave lens the image will form between pole and focus.

64. The potential difference across the ends of a conductor is 2 volt and the current through it is 1 A, then,
(1) Heat developed in it is at the rate of 1 J per second
(2) Heat developed in it is at the rate of 4 J per second
(3) The resistance of the conductor is $1\,\Omega$
(4) The resistance of the conductor is $2\,\Omega$

Answer (4)

Sol. $V = iR$

$2 = 1 \, x \, R$

$R = 2\,\Omega$

65. If the distance between two masses is doubled, the gravitational force will :
(1) Remains constant (2) Decrease by 50%
(3) Decrease by 75% (4) Decrease by 25%

Answer (3)

Sol. $\frac{F_1}{F_2} = \frac{R_2^2}{R_1^2}$

$\frac{4R_1^2}{R_1^2} = 4$

$\therefore F_2 = \frac{F_1}{4}$

66. Which of the following is used for detecting cracks and flaws in metal blocks?
(1) Ultrasonic waves
(2) Infrasonic waves
(3) Ultraviolet waves
(4) Infrared waves

Answer (1)

67. A wire of resistance R connected to a source of constant potential difference produces a heat H in time 't' seconds. If the wire is stretched to twice its original length, the heat developed when connected to the same source for the same time will be :
(1) 2 H (2) 4 H
(3) $\frac{H}{2}$ (4) $\frac{H}{4}$

Answer (4)

Sol. $R \propto \ell^2$ and

$\therefore R_2 = 4R_1$

$H = \frac{V^2}{R}t$

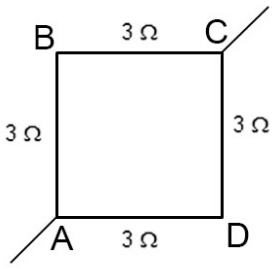
$\frac{H_1}{H_2} = \frac{R_2}{R_1} = \frac{4R_1}{R_1} = 4$

$H_2 = \frac{H_1}{4}$

68. A wire having 24 cm of length and $12\,\Omega$ resistance is used to make a square. What will be the effective resistance between the diagonally opposite points of this square?
(1) $6\,\Omega$ (2) $3\,\Omega$
(3) $\frac{3}{2}\,\Omega$ (4) $12\,\Omega$

Answer (2)

Sol.



$$\frac{1}{R}=\frac{1}{6}+\frac{1}{6}$$

$$R=3\ \Omega$$

69. By keeping the incident ray fixed, a plane mirror is rotated so as to vary the angle of incidence. When the mirror is turned by 10°, the reflected ray is turned by :

(1) 10° (2) 5°

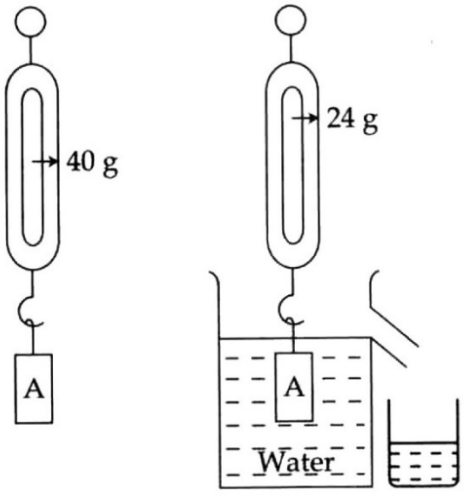
(3) 20° (4) 40°

Answer (3)

Sol. By keeping the incident ray fixed, a plane mirror is rotated so as to vary the angle of incidence.

When the mirror is turned by x°, the reflected ray is turned by 20°.

70. Analyse the figure and find out relative density of the solid :



(1) 1.66 (2) 2.5

(3) 1.33 (4) 0.6

Answer (2)

Sol. Relative density = $\frac{W_{air}}{W_{air}-W_{water}}$

$$\frac{40}{40-24}=\frac{10}{4}=2.5$$

71. Imagine that you are travelling in a space vehicle orbiting around the Earth. You are provided with two identical boxes. One is filled with sand and the other is filled with feathers. How can you tell which is which without opening the boxes?

(1) By weighing using a common balance

(2) By weighing using a spring balance

(3) By simply holding the boxes in your hand

(4) By giving a gentle horizontal push and analysing its motion

Answer (4)

Sol. For the same force heavier mass will move slowly.

72. When a stone is thrown vertically upwards :

(1) Its acceleration is zero at the highest point

(2) Its velocity and acceleration are zero at the highest point

(3) Its velocity is zero at the highest point.

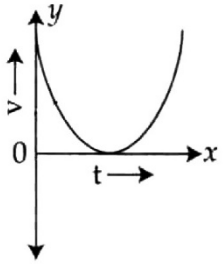
(4) Neither the velocity nor the acceleration is zero at the highest point.

Answer (3)

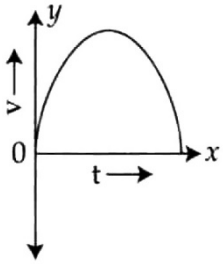
Sol. At the highest point velocity is zero and acceleration is g

73. Which of the following represents the graph of the motion of a body thrown vertically upwards?

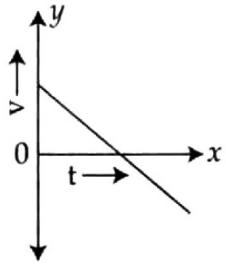
(1)



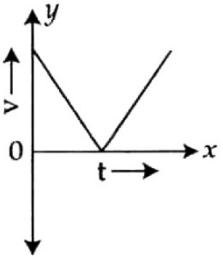
(2)



(3)



(4)



Answer (3)

Sol. Upward thrown body moves with constant acceleration. This acceleration we can explain with Velocity-Time graph.

74. Which among the following is/are trivalent ions?

(a) Nitride (b) Phosphate

(c) Chlorate (d) Phosphite

(1) (a), (b) and (d) (2) (a), (b), (c) and (d)

(3) (a) and (b) (4) (b) only

Answer (1)

Sol: Nitride: N^{3-} -Trivalent

Phosphate: PO_4^{3-} -Trivalent

Chlorate: ClO_3^- monovalent ion

Phosphite: PO_3^- Trivalent ion

75. Calamine is the ore of:

(1) Aluminium (2) Iron

(3) Magnesium (4) Zinc

Answer (4)

Sol: Calamine ore is a mixture of ZnO and 0.5% Fe_2O_3

Mainly it is the ore of zinc.

76. Which element was given the name Eka-aluminium by Mendeleev in his periodic table?

(1) Gallium (2) Germanium

(3) Scandium (4) Silicon

Answer (1)

Sol: Eka Boron : Scandium

Eka Aluminium : Gallium

Eka Silicon : Germanium

77. The pH value of two solutions P and Q are 3 And 5 respectively. Which of the following statements is correct?

(1) Solution P is twice as acidic as Q

(2) Solution Q is twice as acidic as P

(3) Solution P is 100 times more acidic than Q

(4) Solution Q is 100 times more acidic than P

Answer (3)

Sol: $pH(p) = -\log[H^+] = 3$

$= [H^+] = 10^{-3}$

$pH(Q) = -\log[H^+] = 5$

$= [H^+] = 10^{-5}$

$pH(Q) = [H^+]_Q = 10^{-5} = 10^{-2}$

$[H^+]_Q = 10^2[H^+]_Q$

$[H^+]$ Indicates acidic character

78. While anodising aluminium, the gas liberated at the anode is:

(1) Oxygen (2) Hydrogen

(3) Nitrogen (4) Chlorine

Answer (2)

Sol: $4OH^- \rightarrow 2H_2O + O_2 + 4e^-$

79. An element X exists in nature as three isotopic forms with masses 40u, 39u and 42u. If the natural abundance of these isotopes are 5% ,15% and 80% respectively, What would be the average atomic mass of X?

(1) 41.45 (2) 38.45

(3) 39.95 (4) 42.95

Answer (1)

Sol: Average atomic mass

$$= 40 \times \frac{5}{100} + 39 \times \frac{15}{100} + 42 \times \frac{80}{100}$$

$= 2 + 5.85 + 33.6$

$= 41.45$

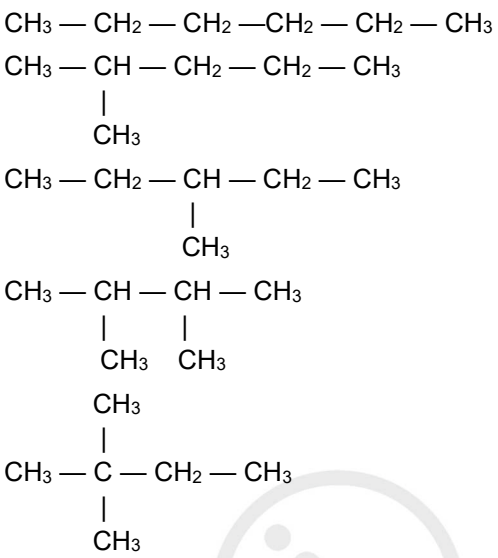
80. How many isomers are possible for the hydrocarbon with molecular formula C_6H_{14} ?

(1) 4 (2) 5

(3) 6 (4) 7

Answer (2)

Sol: Isomers of C_6H_{12}



81. Which among the following elements is expected to show the highest metallic character based on its position in the periodic table?

(1) Boron (2) Cesium

(3) Calcium (4) Iodine

Answer (2)

Sol: Alkali metals are more metallic in the complete periodic table. Hence most metallic is C. As atomic size increases down the group. Metallic character increases.

82. Which among the following is not a redox reaction?

(1) $2Na(s) + Cl_2(g) \rightarrow 2NaCl(s)$

(2) $Ca(OH)_2(aq) + 2HNO_3(aq) \rightarrow Ca(NO_3)_2(aq) + 2H_2O(l)$

(3) $2Pb(NO_3)_2(s) \rightarrow 2PbO(s) + 4NO_2(g) + O_2(g)$

(4) $Cl_2(g) + H_2O(l) \rightarrow HCl(aq) + HClO(aq)$

Answer (2)

Sol: $Ca(OH)_2 + 2HNO_3 \rightarrow Ca(NO_3)_2 + 2H_2O$

Not a Redox reaction. As there is no reduction and oxidation

83. When Propanol is treated with excess hot concentrated sulphuric acid, the resulting product will be.

(1) Methane (2) Ethene

(3) Propane (4) Propene

Answer (4)

Sol: $CH_3CH_2CH_2OH \xrightarrow[\text{hot}]{H_2SO_4} CH_3CH = CH_2 + H_2O$

84. Potassium permanganate reacts with concentrated hydrochloric acid based on the equations given below.

$KMnO_4 + bHCl \rightarrow cKCl + dMnCl_2 + eH_2O + fCl_2$

The value of '*f*' when the above chemical equation is balanced is:

(1) 3 (2) 4

(3) 5 (4) 6

Answer (3)

Sol: $2KMnO_4 + 16HCl \rightarrow 2KCl + 2MnCl_2 + 5Cl_2 + 3H_2$

F = 5

85. Which metal among the following, has an oxide that exhibits amphoteric behaviour?

(1) Lithium (2) Sodium

(3) Thallium (4) Zinc

Answer (4)

Sol: ZnO is amphteric in nature as shows both basic and acidic character

$Zn + HCl \rightarrow Zncl_2 + H_2$

$Zn + NaoH \rightarrow Na_2ZnO_2 + H_2$

86. Which of the following metal is an essential constituent of amalgams?

(1) Aluminium (2) Copper

(3) Mercury (4) Sodium

Answer (3)

Sol: Mercury is essential constitute of amalgams.

87. Anti Diuretic Hormone :

(1) Oxytocin (2) Vasopressin

(3) Calcitonin (4) Somatotropin

Answer (2)

Sol. Vasopressin is the other name of Anti diuretic hormone

88. Yellow spot and blind spot are seen in :

(1) Retina (2) Cornea

(3) Sclera (4) Pupil

Answer (1)

Sol. The retina is the innermost, light sensitive layer of tissue of the eye

89. Match the items of column-I with column-II and select the correct option from those given below:

Column-I	Column-II
a) Medulla Oblongata	i) Relay station of impulses
b) Thalamus	ii) Controls involuntary actions

c) Cerebellum — iii) Centre of thought and intelligence

d) Cerebrum — iv) Maintains equilibrium of the body

	(a)	(b)	(c)	(d)
(1)	(iii)	(ii)	(iv)	(i)
(2)	(ii)	(i)	(iv)	(iii)
(3)	(ii)	(iv)	(i)	(iii)
(4)	(iv)	(i)	(iii)	(ii)

Answer (2)

Sol. By observation

90. _____ attach one bone to another bone.

(1) Myofibril (2) Tendon

(3) Cartilage (4) Ligament

Answer (4)

Sol. By observation

91. Choose the correct option which includes the components of gastric juice

(1) Pepsin, Maltase, Mucus

(2) Amylase, HCl, Trypsin

(3) Pepsin, Mucus, HCl

(4) Trypsin, HCl, Mucus

Answer (3)

Sol. By observation

92. Which one of the following is a phagocyte?

(1) Neutrophil (2) Lymphocytes

(3) Eosinophil (4) Basophil

Answer (1)

Sol. Neutrophils and Monocytes are the phagocytic leucocytes

93. Choose the correct statement regarding AIDS :

(1) Caused by Human Papilloma Virus

(2) Spread by Sharing food

(3) HIV multiplies using the genetic mechanism of lymphocytes

(4) Spread through insects like mosquitoes

Answer (3)

Sol. Virus multiples using the genetic mechanism of the host which in the case of AIDS are the lymphocytes as HIV attacks the immune system.

94. Choose the statements related to Mitosis :

(1) Four daughter cells are formed

(2) Helps in the formation of gametes

(3) Two daughter cells are formed

(4) Occurs in the germinal cells

Answer (1)

Sol. In meiosis four daughter cells are formed

95. The dead cells of Xylem are :

(1) Tracheid, sieve tubes

(2) Tracheid, Vessels

(3) Vessels, Companion cells

(4) Sieve tube, companion cells

Answer (2)

Sol. Xylem is made up of Tracheids, vessels, Xylem parenchyma and xylem fibres of which Tracheids, vessels and xylem fibres are dead tissues.

96. Malaria is caused by :

(1) Bacteria

(2) Virus

(3) Protozoa

(4) Fungus

Answer (3)

Sol. Malaria is caused by a protozoa Plasmodium

97. Muscle fatigue is due to the accumulation of :

(1) Pyruvic acid (2) Acetic acid

(3) Citric acid (4) Lactic acid

Answer (4)

Sol. Lactic acid is produced in muscles due to lack of oxygen during strenuous activity.

98. An indoor plant placed near the window grows towards sunlight. The plant hormone responsible for this kind of growth is:

(1) Auxin (2) Cytokinin

(3) Ethylene (4) Gibberellins

Answer (1)

Sol. Auxin is light sensitive plant growth hormone. When light comes from one side of the plant, auxin diffuses to the shady side. This concentration of auxin stimulates the cells on shady side to grow longer. Thus the plant appears to bend towards light.

99. Choose the event that do not occur during photosynthesis :
    (1) Reduction of Carbohydrate
    (2) Release of Oxygen
    (3) Splitting of water
    (4) Conversion of Light energy to Chemical energy

Answer (1)

Sol. Reduction of carbon dioxide to carbohydrates occurs in photosynthesis.

100. Which one of the following is a Genetic disease?
    (1) Leprosy (2) Tuberculosis
    (3) Diabetes (4) Haemophilia

Answer (4)

Sol. Haemophilia is not caused by any infectious agent

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