DATE : 04/11/2018

Test Booklet Code

M5

MAHARASTRA

Aakash

Medical | IIT-JEE | Foundations

(Divisions of Aakash Educational Services Limited)

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Answers & Solutions

for

NTSE (Stage-I) 2018-19

INSTRUCTIONS TO CANDIDATES

1. Use blue/black ball point pen only. There is no negative marking.
2. All the questions are compulsory. This test booklet contains 200 questions (Paper-I : 100 & Paper-II : 100) of one mark each.
3. Paper-I : MAT : 1 - 100 questions

   Paper-II : SAT : 1 - 100 questions
4. Answer each question by darkening the one correct alternative among the four choices on the OMR Sheet with blue/black ball point pen.
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 answers 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.

PAPER-I : MENTAL ABILITY TEST (MAT)

Q.1. & 2 Find the odd term.

1. (1) ABDEF
   (2) JKMNX
   (3) GHJKR
   (4) IJLMT

Answer (4)

Sol.

(1) A +1 B +2 D +1 E +1 F
A

(2) J +1 K +2 M +1 N +10 X
J

(3) G +1 H +2 J +1 K +7 R
G

(4) I +1 J +2 L +1 M +7 T
I X

2. (1) CEG18
   (2) KMO42
   (3) UWY70
   (4) RTV63

Answer (3)

Sol.

(1) C E G 18
1 + 5 + 7 = 15(+3)

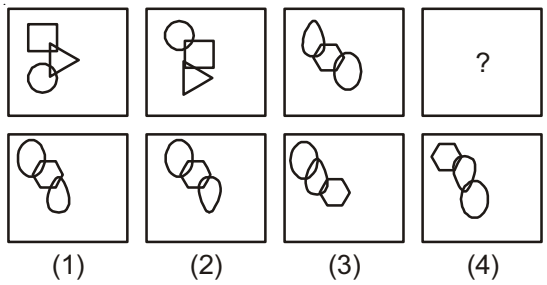
(2) K M O 42
11 + 13 + 15 = 39(+3)

(3) U W Y > 0
21 + 23 + 24 = 69(+1)X

(4) R T V 63
18 + 20 + 22 = 60(+3)

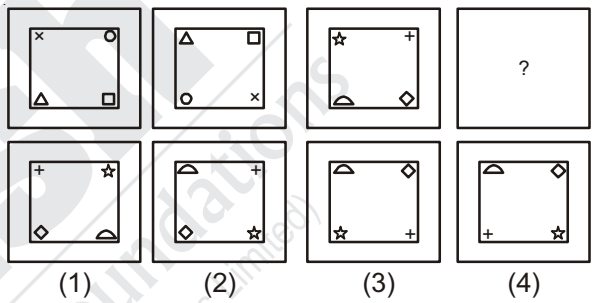
Q.3 & Q.5 Direction : In the following questions there is a specific relation between the first and the second figure. The same relationship exists between the third and the fourth figure which will replace the question mark. Select the correct figure from the altenatives given below each question.

3.



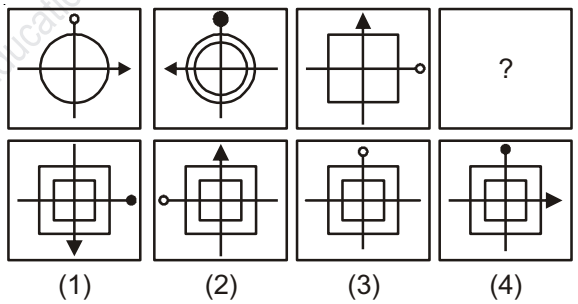
Answer (3)

4.



Answer (4)

5.



Answer (2)

6. ABCDEFGHIJKLMNZYXWVUTSRQPON

From the above letter series find the letter which is at the 6th position to the right side of the letter which is at the centre position of the letters which are at the 11th place form the left and 14th place from the right.

(1) U
(2) F
(3) Y
(4) L

Answer (Bonus)

7.. Direction: In the following question there is a specific relation between the first and second term. The same relationsnip exist between third and fourth term. Understanding the relationship find out the conect alternative to replace the question mark.

25 : 100 : : 81 : ?

(1) 648 (2) 468

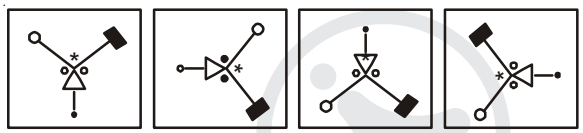
(3) 864 (4) 684

Answer (1)

Sol. 25 : 100 : : 81 : ?

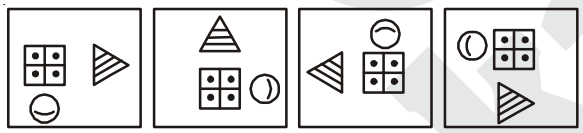
$5^2 : 5^2 \times (5-1) : : 92 : 9^2 \times (9-1)$

Q.8. & Q.10. Direction: Find the odd figure.

8. 

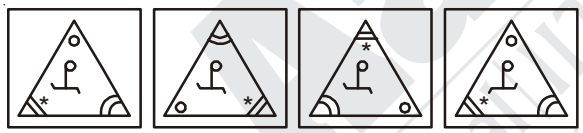
(1) (2) (3) (4)

Answer (3)

9. 

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

Answer (2)

10. 

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

Answer (4)

Q.11 to Q.14: Direction : In each of the following questions write which term in the sequence replaces the question mark.

11. 13, 23, 43, 83, 163?

(1) 326 (2) 323

(3) 321 (4) 318

Answer (2)

Sol. 13, 23, 43, 83, 163, ?

+10 +20 +40 +80 +160

10 × 2 = 20

20 × 2 = 40

40 × 2 = 80

80 × 2 = 160

163 + 160 = 323

12. 12, 15, 21, 24, 30, 33, ?, ?

(1) 36, 41 (2) 37, 42

(3) 38, 47 (4) 39, 51

Answer (Bonus)

13. 16, 40, 100, 250, ?

(1) 575 (2) 625

(3) 425 (4) 525

Answer (2)

Sol. 16, 40, 100, 250, ?

$$16 \times 2 = 32 + \frac{16}{2} = 40$$

$$= 40 \times 2 = 80 + \frac{40}{2} = 100 \text{ similarly}$$

$$= 250 \times 2 = 500 + \frac{250}{2} = 625$$

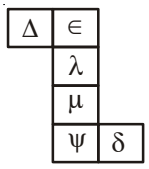
14. 23, 29, 47, 75, ?

(1) 87 (2) 93

(3) 110 (4) 117

Answer (Bonus)

Q.15. to Q17: Direction : The adjacent figure is folded to form a cube. Observe the figure and answer the following questions.



15. Which of the following symbol will not occur adjacent to ∈ ?

(1) μ (2) δ

(3) λ (4) ψ

Answer (1)

Sol. $\Delta \rightarrow \phi$ (opposite)

$\in \rightarrow \mu$ (opposite)

$\lambda \rightarrow \psi$ (opposite)

μ will not occur adjacent to $\in$ as it will be opposite.

16. Which of the following symbol will be on the opposite surface of the symbos λ ?

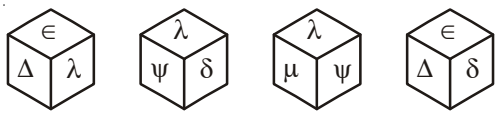
(1) Δ (2) ψ

(3) δ (4) μ

Answer (2)

Sol. $\lambda \rightarrow \psi$

17. Which of the following figure obtained by folding the paper to form a cube?



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

Answer (1)

Sol. λ is opposite of ψ.

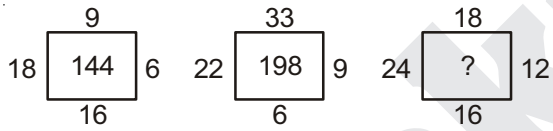
Option 2 eliminated

Option 3 eliminated

Δ is opposite of d option 4 eliminated.

Q.18. & Q.19: Direction : There is a specific relationship between the numbers that are given in the following figures. On the basis of the relationship choose the correct altemative to replace the question mark.

18.



(1) 210 (2) 266

(3) 288 (4) 318

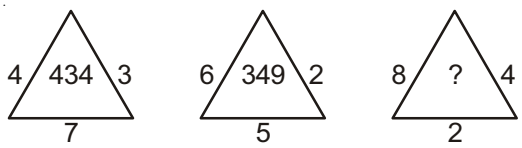
Answer (3)

Sol. 16 × 9 = 144

6 × 33 = 198

16 × 18 = 288

19.



(1) 473 (2) 623

(3) 389 (4) 584

Answer (4)

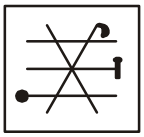
Sol. $4^3 + 3^3 + 7^3 = 434$

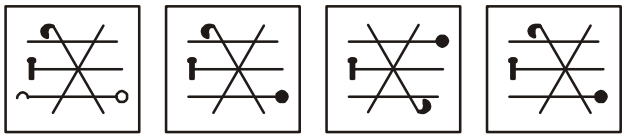
$6^3 + 2^3 + 5^3 = 349$

$8^3 + 4^3 + 2^3 = 584$

Q.20 & Q21 Direction : Choose the mirror image from the alternatives given for the given question figure.

20.

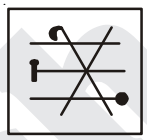




(1) (2) (3) (4)

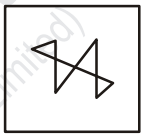
Answer (4)

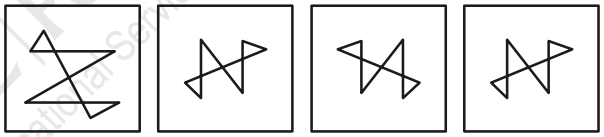
Sol.



(4)

21.

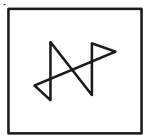




(1) (2) (3) (4)

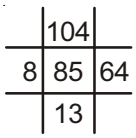
Answer (4)

Sol.

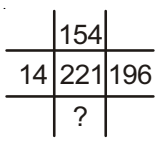


(4)

Q.22 to Q.24 Direction : Observe the arrangement of numbers that is given below. There is a specific rule in that arrangement. Study that rule carefully and choose the conect alternative to replace the question mark.



22.



(1) 11 (2) 13

(3) 15 (4) 17

Answer (1)

Sol.

	104	
8	85	64
	13	

$8 \times 13 = 104$

$8^2 = 64$

$14 \times ? = 154$

$\Rightarrow ? = 11$

23.

	315	
15	261	?
	21	

(1) 125 (2) 90

(3) 105 (4) 222

Answer (4)

Sol. $15^2 = 225$

24.

	?	
3	39	9
	27	

(1) 33 (2) 81

(3) 243 (4) 42

Answer (2)

Sol. $3 \times 27 = 81$

Q.25 to Q27: Direction : In the following questions there is a specific relation between the first and the second term. The same relationship exists between the third and the fourth term. Understanding the relationship find out the conect alternative to replace the question mark.

25. FILM : ADGH : : MILK : ?

(1) ADGE (2) HDGE

(3) HEGF (4) HDGF

Answer (4)

Sol.

F	I	L	M
6	9	12	13
–5 ↓ A 1	–5 ↓ D 4	–5 ↓ G 7	–5 ↓ H 8

–5

M	I	L	K
13	9	12	11
–5	–5	–5	–5
8	4	7	6
H	D	G	F

26. MK : $\frac{169}{121}$: : JH : ?

(1) $\frac{16}{4}$ (2) $\frac{25}{4}$

(3) $\frac{64}{100}$ (4) $\frac{121}{64}$

Answer (Bonus)

27. ? : DURXQG : : POLICE : SROLFH

(1) ARMOUR (2) AROUND

(3) GROUND (4) SHOULD

Answer (2)

Q.28 to Q. 30: Direction: Meena, Sarika, Geeta and Neet are four friends. They like different flowers. Geeta and Sarika like 'Champak' and 'Mogra'. Geeta likes all the flowers except 'Mogra'. Neeta does not like only 'Marigold'. Meena likes oly two types of flowers then

28. Who likes all types of flowers ?

(1) Neeta (2) Sarika

(3) Meena (4) Geeta

Answer (2)

29. Name the type of flower, that all the friends like?

(1) Marigold (2) Mogra

(3) Champak (4) Jui

Answer (3)

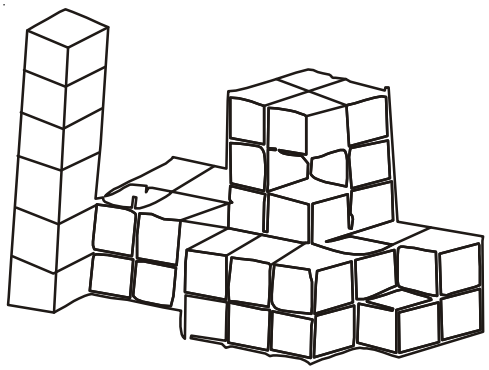
30. Who do not like 'Marigold'?

(1) Meena and Sarika (2) Meena and Geeta

(3) Meena and Neeta (4) Sarika and Neeta

Answer (3)

Q.31 to 33: Direction the following figure is made by joining some cubes of size 1 × 1 × 1 unit to each other. Outer surfaces of the figure are painted. Observe the figure and answer the questions by choosing the correct alternative.



31. Find the maximum number of faces of a cube that may have been painted.

(1) 5 (2) 4

(3) 3 (4) 2

Answer (1)

32. Find the number of cubes having no face painted?

(1) 0 (2) 1

(3) 2 (4) 3

Answer (3)

33. How many small cubes are used to form the given figure?

(1) 50 (2) 48

(3) 52 (4) 46

Answer (1)

34. In a certain code language

3 × 2 = 29; 4 × 5 = 74 ;

7 × 3 = 58; then, 6 × 8 = ?

(1) 113 (2) 118

(3) 116 (4) 132

Answer (3)

Sol. 3 × 2 = 29 ; (3 + 2) × 6 – 1 = 29 4 × 5 = 74; (4 + 5) × 8 = 72 + 2

7 × 3 = 58; (7 + 3) × 6 – 2 = 58 6 × 8 = ?; (6 + 8) × 8 = 112 + 4 = 116

35. In a certain code language

11 + 5 = 36; 22 + 6 = 58 ;

33 × 7 = 82; then, 55 + 9 = ?

(1) 112 (2) 163

(3) 136 (4) 124

Answer (3)

Sol. 11 + 5 = 36; $11 + 5^2 = 36$

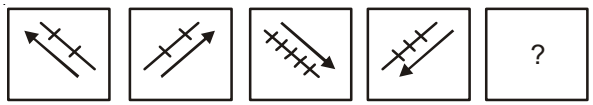
22 + 6 = 58; $22 + 6^2 + 58$

33 + 7 = 82; $33 + 7^2 = 82$

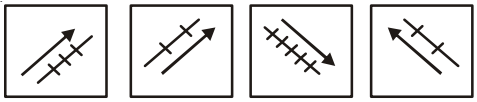
55 + 9 = ?: $55 + 9^2 = 136$

Q.36 & 37: Direction : In each of the following questions the question figure particular order. Decide which figure from the given alternatives will replace the question mark.

36. Question Figure



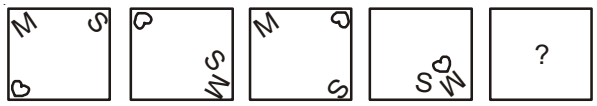
Answer Figure



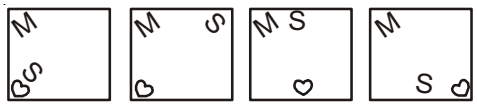
(1) (2) (3) (4)

Answer (4)

37. Question Figure



Answer Figure



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

Answer (1)

38. In the following question there is a specific rule between the letters and the numbers in each horizontal row. Identify the rule and choose the correct alternative to replace the question mark.

AD	17	39	CF
BP	258	108	HJ
GH	?	?	LM

(1) 9, 29 (2) 18, 210

(3) 179, 239 (4) 203, 181

Answer (Bonus)

39. Choose the correct alternative to replace the questions mark.

D		H
K	M	X
G		P

M		J
R	B	P
E		F

L		C
S	G	L
G		I

N		U
O	?	W
A		B

(1) H (2) I

(3) J (4) K

Answer (1)

Sol.

L		C
S	G	L
G		I

(12 + 19 + 7) – (3 + 12 + 9) = 38 – 24 = 14

N		U
O		W
A		B

(21 + 23 + 2) – (14 + 15 + 1) = 46 – 30 = 16

Q.40. & Q.41. Direction : Ajit walked 5 km. East from A. After turning left he walked 3 km. Then he turned in South-east direction and walked 5 km. Then he turned west and walked 4 km. Finally he turned left and walked 12 km. Then

40. How far Ajit is from his original place?

(1) 13 km (2) 17 km

(3) 18 km (4) 7 km

Answer (1)

41. Ajit is facing which direction now?

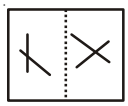
(1) East (2) South

(3) West (4) North

Answer (2)

Q.42 & 43: Direction : In the figure given below a transparent square shaped paper is folded along the dotted lines. Which figure will be obtained? Find the correct figure from the alternatives given.

42. Question Figure

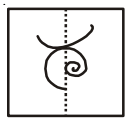


Answer Figure

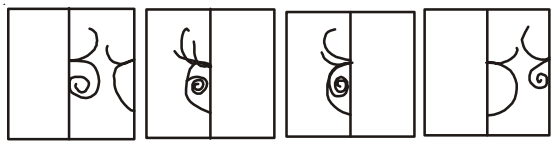
(1) (2) (3) (4)

Answer (2)

43. Question Figure



Answer Figure



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

Answer (3)

Q.44 & Q.47 : Direction : In the following choose the correct term that will replace the question mark.

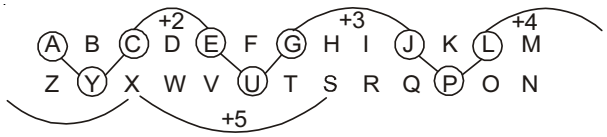
44. AYC, EUG, JPL, CWE, ?

(1) HRJ (2) IQK

(3) JPL (4) KOM

Answer (1)

Sol.



45. NTS, OUT, PTS, ?

(1) QWV (2) QRS

(3) QTP (4) QPO

Answer (1)

46. AMZN, BLYO, CKXP, ?

(1) DQJW (2) DJWQ

(3) DIWR (4) DWJQ

Answer (2)

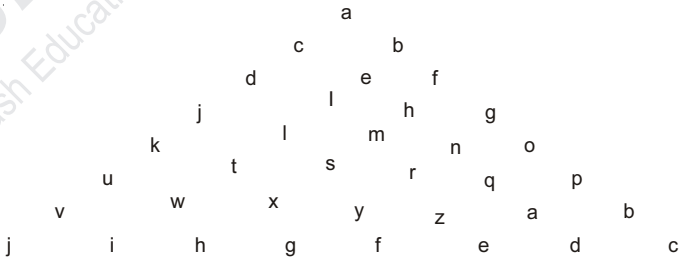
47. JBY, NIV, SOS, YTP, ?

(1) EVM (2) BVG

(3) FYL (4) FXM

Answer (4)

Q.48. to Q.50 : Direction : Observe the following pyramid of letters and decide which alternative will be in place of question mark in each of the following question.



48. acdj : ? : : eilt : ehnq

(1) abfg (2) acdi

(3) acei (4) abfh

Answer (1)

49. vihx : uwxt : : ? : pazq

(1) abde (2) bdez

(3) dbaz (4) azed

Answer (2)

50. jktljt : goqngp : : ilsmis : ?

(1) hnrmhr (2) hnrnmr

(3) hnrmhn (4) hrmnhn

Answer (1)

Direction : Eight players are standing to play 'Standing Kho–Kho' Geeta is at the third place to the right of Mahesh. Amar is to the first place to the right of Geeta. Asha is to the fourth place to the left of Geeta. Radha is at central place between Parag and Asha. Meena is at the central place between Geeta and Hemant. Then

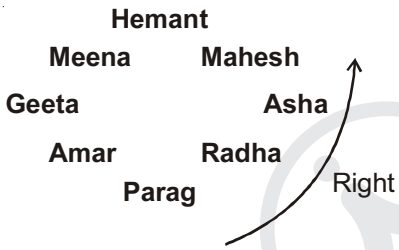
51. How is standing opposite to Hemant?

(1) Amar (2) Parag

(3) Radha (4) Geeta

Answer (2)

Sol.



52. Who is staing between Parag and Geeta?

(1) Hemant (2) Mahesh

(3) Amar (4) Meena

Answer (3)

53. Who is at the fourth place to the left of Geeta?

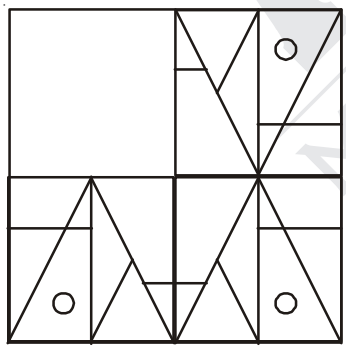
(1) Mahesh (2) Asha

(3) Parag (4) Radha

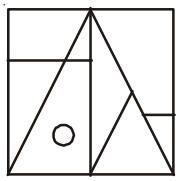
Answer (2)

Direction : Complete the question figure by choosing the correct answer figure.

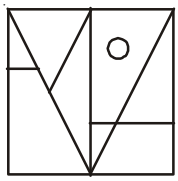
54.



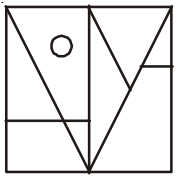
(1)



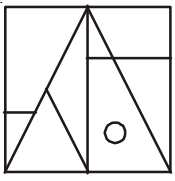
(2)



(3)

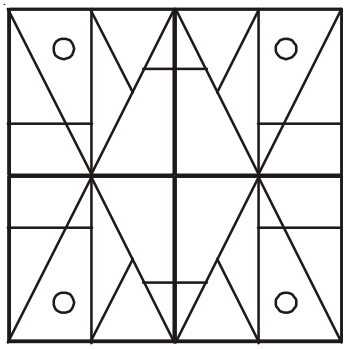


(4)

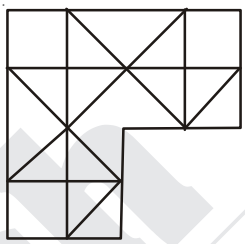


Answer (3)

Sol.

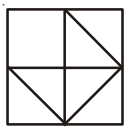


55.

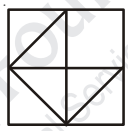


(1)

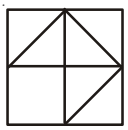
(2)



(3)

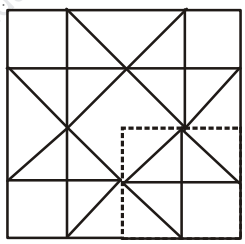


(4)



Answer (1)

Sol.



Direction : In each of the following questions write which symbol in the sequence will replace the question mark.

56. △○□⊕, ○□⊕△, □⊕△○, ?

(1) ⊕△□○ (2) ⊕△○□

(3) ⊕□○△ (4) ⊕□△○

Answer (2)

Sol. △○□⊕ ○□⊕△ □⊕△○

1 2 3 4 2 3 4 1 3 4 1 2

⊕△○□

4 1 2 3

57. $\propto nf\theta\lambda$, $\lambda\propto nf\theta$, $\theta\lambda\propto nf$, ?

(1) $f\theta\lambda n\propto$ (2) $nf\theta\lambda\propto$

(3) $f\theta\lambda\propto n$ (4) $n\theta\lambda\propto f$

Answer (3)

Sol. $\propto$ n f θ λ $\lambda\propto$ n f θ $\theta\lambda\propto$ n f
1 2 3 4 5 5 1 2 3 4 4 5 1 2 3

f θ λ $\propto$ n
3 4 5 1 2

Direction : Ten years ago the ratio of the ages of Ramesh and Suresh was 1 : 5. Ten years hence the ratio of their ages will be 3 : 5 then

58. Find the present age of Ramesh ?

(1) 14 years (2) 10 years

(3) 40 years (4) 24 years

Answer (1)

Sol. $\frac{R-10}{S-10} = \frac{1}{5}$ $\frac{R+10}{S+10} = \frac{3}{5}$

$5R - 50 = S - 10$ $5R - 3S = -20$

$\Rightarrow 5R - S = 40$

By simultaneous equation

S = 30 years

R = 14 years

59. How old was Suresh ten years ago ?

(1) 9 years (2) 20 years

(3) 40 years (4) 30 years

Answer (2)

Sol. S – 10 = 30 – 10 = 20 Yrs

Direction : In a queue, Suneeta is at the tenth plsce from front. Subhash is at 25th place from behind. Gargi is standing at the central place between Suneeta and Subhash. There are 50 persons in the queue. Then

60. Gargi is standing at which place from front ?

(1) 20 (2) 19

(3) 18 (4) 17

Answer (3)

Sol. N = 50

61. Gargi is at which place from behind ?

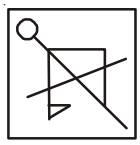
(1) 31 (2) 32

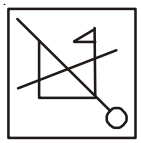
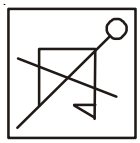
(3) 33 (4) 34

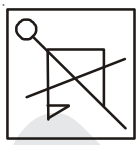
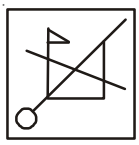
Answer (3)

Sol. 50 – 18 + 1 = 33

Direction : Choose the conect water image from the given alternatives for the given question figure.

62. 

(1)  (2) 

(3)  (4) 

Answer (4)

Sol. Water image

63. 

(1)  (2) 

(3)  (4) 

Answer (1)

Sol. Water image

Direction : In the following questions in every row the numbers outside the bracket are related to the number inside the bracket in a specific manner. From the given altematives choose the number that will replace the question mark.

64. 37 (46) 60

121 (74) 158

318 (?) 269

(1) 184 (2) 248

(3) 98 (4) 79

Answer (3)

Sol. 37 (46) 60 $60 - 37 = 23 \times 2 = 46$

121 (74) 158 $158 - 121 = 37 \times 2 = 74$

318 (?) 269 $318 - 269 = 49 \times 2 = 98$

65. 35 (36) 73

64 (38) 27

43 (?) 58

(1) 39 (2) 52

(3) 101 (4) 119

Answer (2)

Sol. 3 × 5 = 15 2 × 7 = 14 5 × 8 = 40

7 × 3 = 21 6 × 4 = 24 4 × 3 = 12

15 + 21 = 36 14 + 24 = 38 40 + 12 = 52

Direction : In the following questions a specific group the given of terms is given. From the given alternatives, find out the correct term that matches the given group.

66. JGDA ZWTQ UROL

(1) LIGD (2) SPMK

(3) LIFC (4) NKHF

Answer (3)

Sol. J G D A Z W T Q U R O L
(–2–2–2) (–2–2–2) (–2–2–2)

L I F C
(–2–2–2)

67. AGM DJP NHT

(1) GNT (2) EKP

(3) IOV (4) KQW

Answer (4)

Sol. A G M D J P N H T K Q W
(+3 +3 +3)
(+2 +2 +2) (+2 +2 +2)

68. BFYU GKTP FJUQ

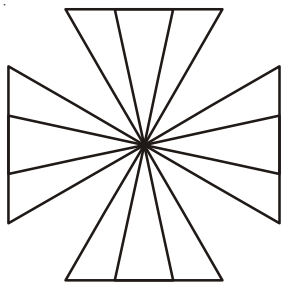
(1) AEZW (2) DHWS

(3) IMRO (4) CGXS

Answer (2)

Sol. B F Y U G K T P F J U Q D H W S
(–1 –1 +1 +1)
(+4 +4 –4 –4) (–1 –1 +1 +1)

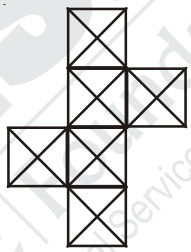
Direction : Find the number of triangles in the following figure.

69. 

(1) 16 (2) 32

(3) 40 (4) 80

Answer (3)

70. 

(1) 48 (2) 50

(3) 58 (4) 62

Answer (4)

Direction : In certain code languages the word PACK is written in four different code languages. Understanding the code, find out the correct code language for the word given in each of the following questions.

PACK = (1) TEGO

(2) MXZH

(3) VFGO

(4) QDHR

71. RAIN = NXFK

Answer (2)

Sol. R A I N N X F K
(–2 –2 –2)

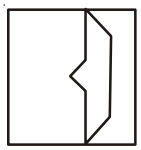
72. CROP = DUTW

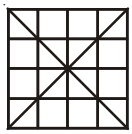
Answer (4)

73. SAND = WERH

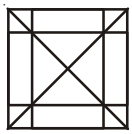
Answer (1)

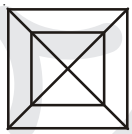
Direction : After folding a square piece of paper, it appears as shown in the question figure. The paper when unfolded will look like as shown in one of the alternatives. Select the correct alternative

74. 

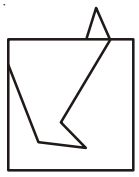
(1) 

(2) 

(3) 

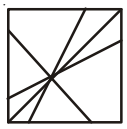
(4) 

Answer (2)

75. 

(1) 

(2) 

(3) 

(4) 

Answer (2)

Q.76 & 77

Direction : A rhythmic arrangement of alphabet is given. The missing alphabet appears in the same order in one of the alternative answer, choose the correct alternative.

76. _ b c _ a b _ c a a b c

(1) acb (2) bab

(3) aba (4) aac

Answer (1)

Sol. *abcc | abbc | aabc |*

77. a b b _ b a a _ a _ b a b _ a b

(1) abab

(2) ccac

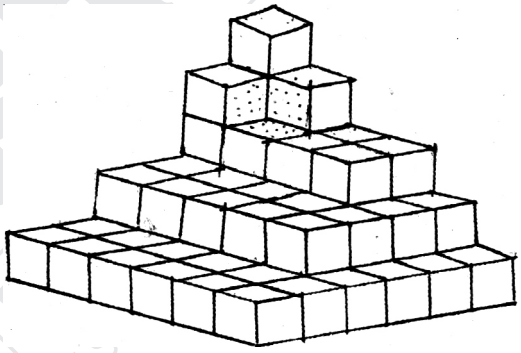
(3) aabb

(4) abba

Answer (4)

Sol. *abba | baab | abba | baab |*

Q.78 & 80 Direction : The following figure is made by arranging some cubes having each side 1 unit. The figure is painted from all the sides. Observe the figure and answer the questions by choosing the correct alternative.



78. How many cubes are there at the base level?

(1) 18

(2) 24

(3) 36

(4) 216

Answer (3)

79. How many cubes are there having three faces painted?

(1) 8

(2) 10

(3) 15

(4) 20

Answer (4)

80. How many cubes are there having no face painted?

(1) 3

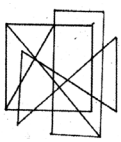
(2) 2

(3) 0

(4) 4

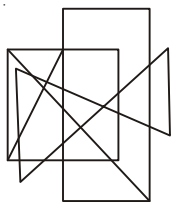
Answer (1)

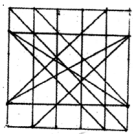
Q.81 & Q82 Direction : In the given question figure a complex figure is given. Find out which of the figure given in the alternatives is hidden in the complex figure?

81. Question figure 

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

Answer (3)

Sol. 

82. 

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

Answer (1) and (4)

Q.83 & Q85 Direction : In the following questions a specific group of number is given. From the given alternatives, choose the correct alternative that matches the given group.

83. 78 26 54

(1) 52 (2) 6
(3) –6 (4) 31

Answer (*)

84. 738 4930 2210

(1) 1341 (2) 6877
(3) 222 (4) 518

Answer (3)

Sol. Given group of numbers are in form $n^3 + n$

$738 = 9^3 + 9$

similarly $6^3 + 6 = 222$

85. 41 21 69

(1) 89 (2) 87
(3) 107 (4) 105

Answer (4)

Sol. Given group of numbers are in form $n^2 + 5$

$10^2 + 5 = 105$

Q.86 & 87 Direction : In the following questions symbol are given in column I and are coded in column II. But they are not arranged according to the order of symbols in column I. Find the code language and choose the correct alternative to answer the questions.

Column I	Column II
	378
	459
	275
	814

86.  = ?

(1) 143 (2) 237
(3) 549 (4) 943

Answer (4)

87. 135 = ?

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

Answer (2)

88. Observe the following code language and choose the correct alternative to answer the question.

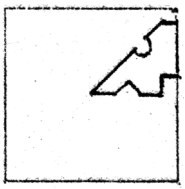
Letters →	E	L	O	A	U	K	T	P	S	J
Digit →	0	8	2	7	6	3	4	5	9	1

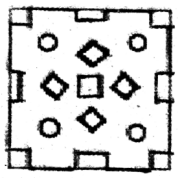
947580 = ?

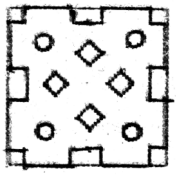
(1) SATPLE
(2) STAPLE
(3) STALPE
(4) SATLPE

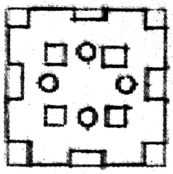
Answer (2)

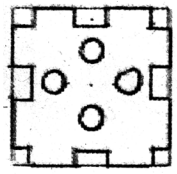
Q.89 & Q.90 Direction : A square place of paper is folded and cut at specific spots as shown in the figure. The paper when unfolded will look like as shown in one of the alternative

89. 

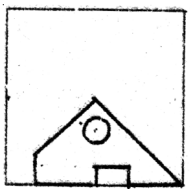
(1) 

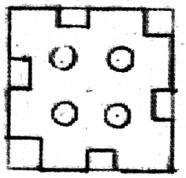
(2) 

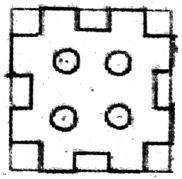
(3) 

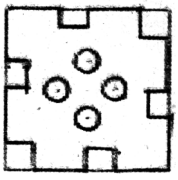
(4) 

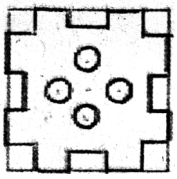
Answer (2)

90. 

(1) 

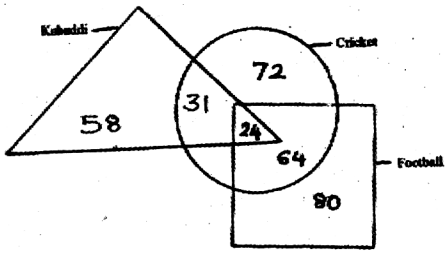
(2) 

(3) 

(4) 

Answer (3)

Q.91 & Q.93 Direction : Observe the following venn diagram and choose the correct alternative to answer the question.



91. How many players play only kabaddi and cricket?

(1) 24 (2) 72

(3) 58 (4) 31

Answer (4)

92. How many players play one one game?

(1) 151 (2) 216

(3) 183 (4) 210

Answer (4)

93. How many players do not play cricket and football?

(1) 24 (2) 58

(3) 64 (4) 72

Answer (2)

94. In a mathematical language if △ means +, ⊙ means ×, □ means – and ⌂ means ÷ then find the vlaue of the following expression

3⊙5□18⌂3⊙2△3=?

(1) –6 (2) 0

(3) 6 (4) –3

Answer (3)

Sol. 3⊙5□18⌂3⊙2△3=?

$3 \times 5 - 18 \div 3 \times 2 + 3$

$15 - 6 \times 2 + 3$

$15 - 12 + 3$

$= 6$

95. In a mathematical language if ÷ means +, + means ×, × means – and means ÷ then find the value of the following expression $4 \div 8 - 2 + 5 \times 7 = ?$

(1) 33 (2) 23

(3) 17 (4) –4

Answer (3)

Sol. $4 \div 8 - 2 + 5 \times 7 = ?$

$4 + 8 \div 2 \times 5 - 7$

$= 4 + 20 - 7$

$= 17$

Q.96 & Q.97 Direction : In the following table the digits are assigned with certain symbols. Observe them carefully and choose the correct alternative to answer the questions.

Digits	9	8	7	6	5	4	3	2	1	0
Symbol	₹	?	!	)	%	(	$	#	△	^

96. How will you write the number 8 7 4 6 0 5 3 ?

(1) ? !) (% ^ $

(2) ! ?) (% ^ $

(3) ? ! ( ) ^ % $

(4) ! ? ( ) ^ % $

Answer (3)

Sol. 8 7 4 6 0 5 3
? ! ( ) ^ % $

97. Which number will be expressed by the code (% ! $ ₹) △ # ?

(1) 4 7 5 9 3 6 1 2

(2) 4 5 7 3 9 6 1 2

(3) 4 7 5 3 9 6 1 2

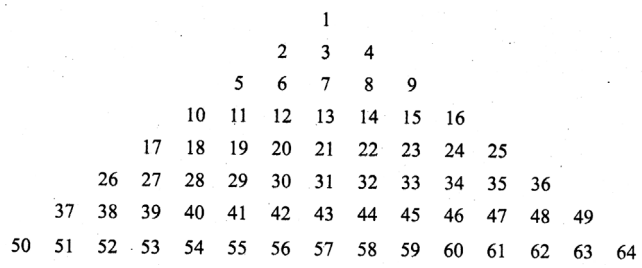
(4) 4 5 7 9 3 6 1 2

Answer (2)

Sol. (% ! $ ₹) △ #
4 5 7 3 9 6 1 2

Q.98 & 100

Direction : Observe the following pyramid and choose the correct alternative to answer the question



98. 52262839 : 62363447 : : 54283041 : ?

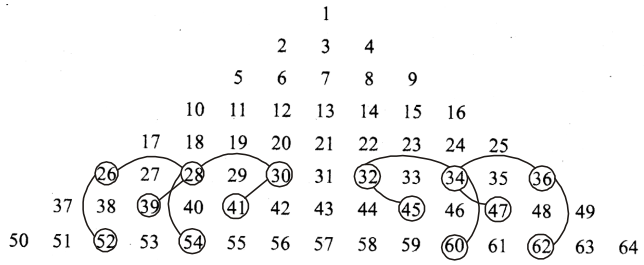
(1) 60343245 (2) 54283042

(3) 60343244 (4) 60463244

Answer (1)

Sol. 52262839 : 62363447 : 54283041 : ?

(60343245)



99. 2567 : 4987 : : 7256 : ?

(1) 7894

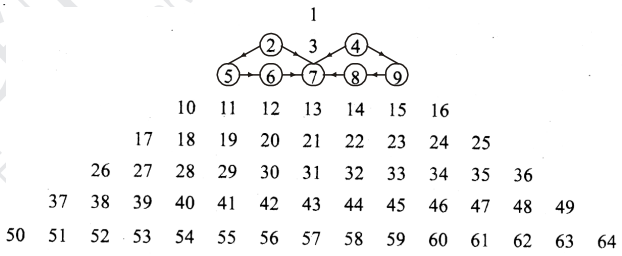
(2) 7489

(3) 7498

(4) 7948

Answer (3)

Sol.



100. 61820 : 82422 : : 121920 : ?

(1) 142223

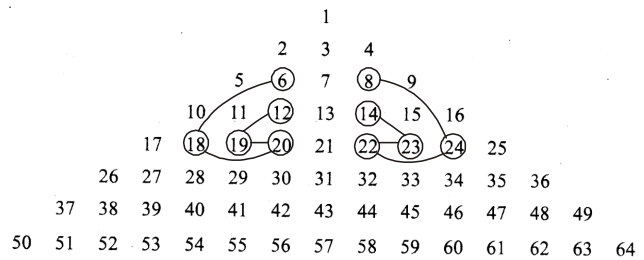
(2) 231524

(3) 191220

(4) 142322

Answer (4)

Sol.



PAPER-II : SCHOLASTIC APTITUDE TEST (SAT)

1. Value of acceleration due to gravity on earth is maximum at .....

   (1) poles

   (2) equator

   (3) depth of 60 km below earth's surface

   (4) height of 400 km above earth's surface

Answer (1)

Sol. Fact

2. Magnetic field due to current through a ..... is similar to magnetic field produced by a bar magnet.

   (1) circular loop of conducting wire

   (2) rectangular loop of conducting wire

   (3) solenoid

   (4) thick copper wire

Answer (3)

Sol. Fact

3. Choose the wrong statement related to refraction of light

   (1) Twinkling of stars

   (2) Oval shape of sun in morning and evening

   (3) Object in water appears bigger in size

   (4) Red light undergoes dispersion, while passing through prism

Answer (4)

Sol. Fact

4. How much time the satellite will take to complete one revolution around the earth, if velocity of satellite is 3.14 km/s and its height above earth's surface is 3600 km. (Radius of earth is 6400 km)

   (1) 2000 S (2) 20000 S

   (3) 1000 S (4) 10000 S

Answer (2)

Sol. $T = \frac{2\pi R}{v} = \frac{2\pi[R_E + h]}{v}$

$= \frac{2\pi[6400 + 3600]}{v}$

$= \frac{2\pi \times 10000 km}{3.14\, km/s}$

$= 20000\,\text{sec}$

5. A planet in an orbit sweeps out an angle of 160° from March - May, When it is at an average distance of 140 million km from sun. If the planet sweeps out an angle of 10° from October - December, then the average distance from sun is .....

   (1) 56×10^5 km

   (2) 56×10^6 km

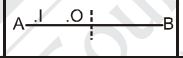
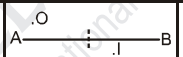
   (3) 56×10^7 km

   (4) 56×10^8 km

Answer (3)

Sol. $R^2 \times \theta$ is constant.

6. Observing the following table, choose the correct alternative

	Column I		Column II
A		(I)	Image formed by concave lens
B		(ii)	Image formed by convex lens with object at 2F
C		(iii)	Image formed by convex lens with object beyond 2F
D		(iv)	Image formed by convex lens with object within focal length

In Column I AB - principal axis of lens, O - point object, I - point image. Match the two Columns.

(1) A - (i), B - (ii), C - (iii), D - (iv)

(2) A - (iii), B - (i), C - (iv), D - (ii)

(3) A - (iv), B - (iii), C - (ii), D - (i)

(4) A - (ii), B - (iv), C - (i), D - (iii)

Answer (4)

Sol. Fact

7. How much heat energy in Joules is necessary to raise the temperature of 5 kg of water from 20° to 100° ?

   (1) 1672 KJ

   (2) 167200 J

   (3) 16720 J

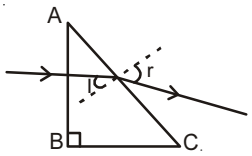
   (4) 1672 J

Answer (1)

Sol. $Q = MC\,\Delta T$

$C = 4.18 \times 10^3$ J/kg K

8. A ray falls on a prism ABC (AB = BC) and travels as shown in figure. If refractive index of glass with respect to air is 1.5, find Sin r



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

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

Answer (2)

Sol. $AB = AC$

$\Rightarrow \angle BAC = \angle CAB = 45°$

or, $\angle i = 45°$

Now, $\frac{\sin i}{\sin r} = \frac{\mu_2}{\mu_1} = \frac{\mu_{air}}{\mu_{glass}} = \frac{1}{1.5}$

$Sin\ r = 1.5\ sin\ i$

$= 1.5 \times sin\ 45° = \frac{3}{2\sqrt{2}}$

9. In a Helium gas discharge tube every second 40×10^{18} He^+ (ions) move towards the right through a cross - section of the tube, while n electrons move to the left in the same time. If the current in the tube is 8A towards right then n = ?

(1) 3×10^{18} (2) 3×10^{19}

(3) 3×10^{20} (4) 3×10^{21}

Answer (Bonus)

Sol. Incorrect Question.

10. Device/devices changing electrical energy into mechanical energy is/are .....

I Electric generator II Electric motor

III Voltmeter IV Ammeter

(1) I and II (2) II and III

(3) II, III and IV (4) Only II

Answer (3)

11. A convex lens produces an image of an object on a screen with a magnification of $\frac{1}{2}$. When the lens is moved 30 cm away from the object, the magnification of the image is 2. The focal length of the lens is

(1) 20 cm (2) 25 cm

(3) 30 cm (4) 35 cm

Answer (1)

Sol. $m_1 = \frac{f}{f + u_1}$, $m_2 = \frac{f}{f + u_2}$

$u_2 - u_1 = 30$

12. Two plane mirrors at an angle (x°) produces 5 images of a point. The number of images produced when x° is decreased to (x-30)° is

(1) 9 (2) 10

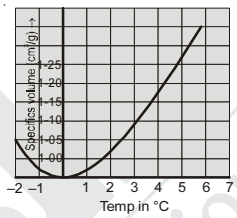
(3) 11 (4) 12

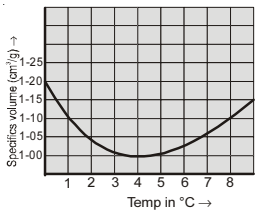
Answer (3)

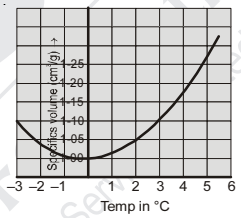
Sol. Hint : $n = \frac{360}{\theta}$, If n $\rightarrow$ Even no. of image = n – 1

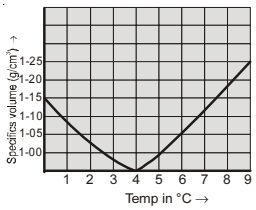
$\theta° = 60°$.

13. Choose the correct diagram (graph) showing anomalous behaviour of water

(1) 

(2) 

(3) 

(4) 

Answer (2)

Sol. Fact

14. In which year National Chemical Laboratory Pune was established?

(1) 1950 (2) 1995

(3) 2005 (4) 1989

Answer (1)

15. What is chemical formula of red oxide?

(1) Fe_2O_3 (2) FeO_3

(3) FeO (4) FeO_2

Answer (1)

16. In water purification Fullerene is used as

(1) Fuel (2) Insulator

(3) Catalyst (4) Reductant

Answer (3)

17. Which block elements are called transition elements?

(1) S - block (2) P - block

(3) D - block (4) F - block

Answer (3)

18. What is chemical formula of Rust of Iron?
(1) Fe_2O_3 (2) $Fe_2O_3 \cdot H_2O$
(3) FeO (4) FeO_2

Answer (2)

Sol. $Fe_2O_3.H_2O$
Rust is Hydrated Ferric Oxide

19. What is the percentage of Al_2O_3 in Bauxite?
(1) 30% to 70% (2) 35% to 70%
(3) 30% to 75% (4) 70% to 75%

Answer (1)

Sol. Bauxite contains 30% to 70% of Al_2O_3 [Fact]

20. Chemical formula of lime stone is
(1) $Ca(OH)_2$ (2) $CaCO_3$
(3) $CaCl_2$ (4) CCl_4

Answer (2)

Sol. $CaCO_3$ is lime stone [Fact]

21. What is the condensed structural formula of alcohol?
(1) –OH (2) –CHO
(3) –COOH (4) $–NH_2$

Answer (1)

Sol. Alcohols contain –OH functional group.

22. In which of the following elements does not consist isotopes?
(1) Carbon (2) Neon
(3) Chlorine (4) Iodine

Answer (2)

Sol. Fact

23. In which of the following ink silver nitrate is used?
(1) Voting ink (2) Writing ink
(3) Printing ink (4) Marker pen ink

Answer (1)

24. To prevent the misuse of important commercial solvent ethanol is mixed with .....
(1) Methanol (2) Propanol
(3) Ethanoic acid (4) Propane

Answer (1)

Sol. Fact

25. Chemical formula of cryolite is .....
(1) NaAlF (2) Na_3AlF_6
(3) Na_2AlF_3 (4) Na_2AlF_2

Answer (2)

26. Which of the following is not Dobereiner's Triad?
(1) Li, Na, K (2) Cl, K, Cr
(3) Ca, Sr, Ba (4) Cl, Br, I

Answer (2)

27. By using only one of the two strands of DNA, mRNA is produced. This process is called as .....
(1) Transcription (2) Translation
(3) Translocation (4) Replacement

Answer (1)

28. Identify phase in mitosis shown by: centromeres split and thereby sister chromatids of each chromosome seperates and they are pulled apart in opposite direction.
(1) Telophase (2) Prophase
(3) Metaphase (4) Anaphase

Answer (4)

29. If the embryonic cells are divided into two groups 8 days after the zygote formation then there is high possibility of formation of .....
(1) Genetically different twin girls
(2) Siamese twins
(3) Genetically different twin boys
(4) Genetically different one boy one girl

Answer (2)

30. Which is the sequence of four whorls of flower from outside to inside?
(1) calyx → corolla → androecium → gynoecium
(2) gynoecium → androecium → corolla → calyx
(3) calyx → androecium → corolla → gynoecium
(4) gynoecium → corolla → androecium → calyx

Answer (1)

31. Sunderban sanctuary of West Bengal is reserved for which animals?
(1) Rhino (2) Bison
(3) Tiger (4) Asiatic lion

Answer (3)

32. From the following which animal is warm blooded, presence of mammary glands and body divided into head, neck, trunk and tail.
(1) Penguin
(2) Tortoise
(3) Pigeon
(4) Bat

Answer (4)

33. In process of fermentation of production of wine from grapes which micro organism is used?
(1) Saccharomyces cerevisiae
(2) Aspergillus oryzae
(3) Lactobacillus brevis
(4) Aspergillus niger

Answer (1)

34. Given below are the pairs of proteins produced by biotechnology and disease they are used against. Find the odd pair.

Proteins Produced	Diseases
(1) Insulin	- Diabetes
(2) Erythropoietin	- Anaemia
(3) Interleukin	- Cancer
(4) Interferon	- Hemophilia

Answer (4)

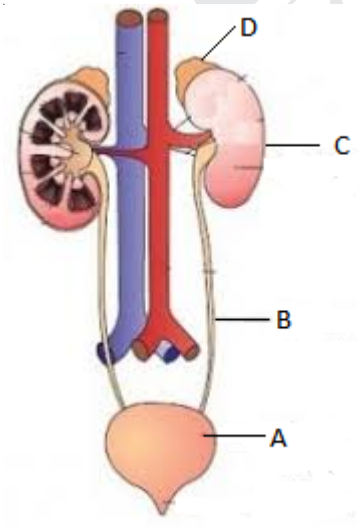
35. Which factor from the following decreases efficiency of nervous system, liver as well as lifespan of person.
(1) Tobacco (2) Gutkha
(3) Alcohol (4) Stress

Answer (3)

36. Who is responsible at the district level disaster management and implementation of rehabilitation schemes?
(1) Chief Minister (2) Home Minister
(3) Collector (4) Tahsildar

Answer (3)

37. Identify the adrenal gland from the following figure



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

Answer (4)

38. Identify the correct sequence for process of energy production from carbohydrates.
(1) Carbohydrates → Glycolysis → Pyruvic acid → AcetylCoA → Krebs cycle → CO_2 + H_2O + energy
(2) Carbohydrates → Glycolysis → Pyruvic acid → Krebs cycle → AcetylCoA → CO_2 + H_2O + energy
(3) Carbohydrates → Glycolysis → AcetylCoA → Pyruvic acid → Krebs cycle → CO_2 + H_2O + energy
(4) Carbohydrates → Glycolysis → AcetylCoA → Krebs cycle → Pyruvic acid → CO_2 + H_2O + energy

Answer (1)

39. Identify the function of columnar epithelium.
(1) Selective transport of substances
(2) Prevention of wearing of organs
(3) Secretion of digestive juice
(4) Reabsorption of useful materials from urine

Answer (3)

40. Body structure of different animals is given below. Identify to which phylum the animal belongs.
1. Long, cylindrical, metamerically, segmented.
2. Triploblastic, bilaterally symmetrical, eucoelomate.
3. They have setae or parapodia or suckers for locomotion.
(1) Arthropoda
(2) Annelida
(3) Aschelminthes
(4) Mollusca

Answer (2)

41. Who was the founder of modern Historiography?
(1) Voltair
(2) Michel Foucault
(3) Karl Marx
(4) Mollusca

Answer (1)

42. Identify the wrong pair from the pairs given below.

(1) Who were the shudras	- History of Subaltern
(2) Stri - Purush Tulana	- Feminist writing
(3) Cambridge History of India	- Colonial Historiography
(4) The Indian war of Independence	- Marxist History

Answer (4)

43. The Main Office of National Film Archives of India is at .....

(1) Mumbai (2) Pune

(3) Kolkata (4) Delhi

Answer (2)

44. Identify the styles of the temple architecture that has been shown in the above picture?

(1) Dravid (2) Vesara

(3) Nagara (4) Bhoomija

Answer (3)

45. Who started the First English Newspaper in India?

(1) Alen Hume

(2) Sir John Marshal

(3) James Augustus Hickey

(4) Michel Foucault

Answer (3)

46. Who is known - as the first Keertankar of Maharashtra?

(1) Saint Dnyaneshwar (2) Saint Tukaram

(3) Saint Namdev (4) Saint Ekanth

Answer (3)

47. Write the name of the Wooden dolls made in Maharashtra.

(1) Thaki (2) Kali Chandika

(3) Gangavati (4) Champavati

Answer (1)

48. 'Bhilar' - the village near Mahableshwar is famous as the 'village of .....'

(1) Plants (2) Books

(3) Forts (4) Mangoes

Answer (2)

49. Identify the wrong pair from the famous museums and its location in India.

(1) Kolkata - Indian Museum

(2) Delhi - National Museum

(3) Hyderabad - Salarjang Museum

(4) Mumbai - The Calico Museum of Textiles

Answer (4)

50. Who said that, the prevailing practice of arranging historical events in a chronological order is not right?'

(1) Michel foucault

(2) Seamaw The Bolva

(3) Leopold von Ranke

(4) George Wilhelm friendrich Hegel

Answer (1)

51. Which style of architecture has been used to build, 'Chhatrapati Shivaji Maharaj Railway Teminus'?

(1) Muslim (2) Nagara

(3) Dravid (4) Indo - Gothic

Answer (4)

52. 6th January is celebrated as ..... Day

(1) Right to Information (2) Journalist

(3) Human rights (4) Cleanliness

Answer (2)

53. ..... is the birthdate of Major Dhyan Chand is celebrated as the 'National Sports Day' in India.

(1) 28 October (2) 29 August

(3) 10 December (4) 14 April

Answer (2)

54. Under the leadership of Socialist leader ..... women in Mumbai participated in a demonstration which came to be known as 'Laatne Morcha'

(1) Pramila Dandavate (2) Mrinal Gore

(3) Gaura Devi (4) Dr. Phulrenu Guha

Answer (2)

55. Which industry is known as 'Sunrise Sector' of India?

(1) Jute Industry

(2) Automobile industry

(3) Cement Industry

(4) Khadi and village Industry

Answer (2)

56. In the year 1983, The Indian cricket team won the World Cup under the captainship of .....
(1) Sunil Gavaskar (2) Sandip Patil
(3) Sayyed Kirmani (4) Kapil Dev

Answer (4)

57. Several attempts were made towards democratic decentralisation. One of these attempts was the .....amendement of Indian Constitution.
(1) 71 and 72 (2) 72 and 73
(3) 73 and 74 (4) 74 and 75

Answer (3)

58. Identify the article of the Indian Constitution, which has established Election Commission as autonomous body?
(1) Art. - 314 (2) Art. - 324
(3) Art. - 334 (4) Art. - 344

Answer (2)

59. Who appoints the Election Commissioner in India?
(1) President (2) Prime Minister
(3) Speaker of Loksabha (4) Vice President

Answer (1)

60. Which one of the following is incorrect / wrong pair in concern with the region & the movement raised in it?
(1) Chota Nagpur - Ramoshi
(2) Orissa - Gond
(3) Maharashtra - Koli
(4) Bihar - Munda

Answer (1)

61. Which one of the following is irrelevant to the challenges faced by the Indian Democracy?
(1) Terrorism
(2) Corruption
(3) Naxlism
(4) Environmental Degradation

Answer (4)

62. The essence of Democracy is .....
(1) Universal Adult Franchise
(2) Decentralisation of Power
(3) Policy of reservation of seats
(4) Judicial decisions

Answer (2)

63. Identify the Nation which is not a Member of 'BRICS' - an International Organization?
(1) India (2) England
(3) China (4) Russia

Answer (2)

64. In 2005 The Indian, U.S. Civil Nuclear Agreement was signed by ..... the Prime Minister of India and George W. Bush - the American President
(1) Rajiv Gandhi (2) P. V. Narsimha Rao
(3) Dr. Manmohan Singh (4) Atal Bihari Vajpayee

Answer (3)

65. India has no coastline along the ..... direction
(1) East (2) West
(3) South (4) North

Answer (4)

66. Identify the oddman out
(1) Snow (2) hailstone
(3) Ice (4) rainFall

Answer (3)

67. Though India has a higher national income as compared to Brazil, the per capita income of India is lower than Brazil because.....
(1) The Population of India is more.
(2) The Population of India is less.
(3) The Population of Brazil is more.
(4) The Population of Brazil and India is equal.

Answer (1)

68. Identify the wrong statement, regarding Importance of Population .....
(1) Exapnasion of trade
(2) Rapid Industrialization
(3) Tourism Development
(4) Lack of employment opportunities

Answer (4)

69. India too has a alarge longitudinal extent. The different between the two extreme most points is .....
(1) 110 (2) 120
(3) 130 (4) 140

Answer (2)

70. Find out the odd man out from given option
(1) Ganga (2) Sabarmati
(3) Sindhu (4) Yamuna

Answer (2)

71. Which type of settlement has been found at the uneven topography of Himalaya?
(1) Nucleated
(2) Linear
(3) Dispersed
(4) Star - Shaped

Answer (3)

72. Which on is not the mean of Communication?
(1) Computer
(2) Mobiles
(3) Internet
(4) Encyclopeadia

Answer (4)

73. Identify the correct option from pairs given below

State	Travel Place
(A) Maharashtra	(I) Udagmandalam
(B) Rajasthan	(II) Masoori
(C) Uttarakhand	(III) Aajintha
(D) Tamilnadu	(IV) Jaisalmer

(1) A - III, B - IV, C - II, D - I
(2) A - IV, B - III, C - I, D - II
(3) A - II, B - I, C - III, D - IV
(4) A - I, B - II, C - IV, D - III

Answer (1)

74. Which country do not share their border with Brazil?
(1) Argentina
(2) Myanmar
(3) Peru
(4) French Guiana

Answer (2)

75. Identify the correct option from pairs given below

'A' Group	'B' Group
(A) Temperate Grasslands	(I) Savanna
(B) Thorny Shrubs	(II)Amazon River Basin
(C) Tropical Grasslands	(III) Coatinga
(D) Equatorial Forests	(IV) Pampas

(1) A - I, B - II, C - IV, D - III
(2) A - II, B - IV, C - III, D - I
(3) A - III, B - I, C - II, D - IV
(4) A - IV, B - III, C - I, D - II

Answer (4)

76. Which river has been shown with letter 'A' in the given outline map of Brazil?

(1) Paraguay (2) Paraniba
(3) Urugway (4) Purus

Answer (3)

77. ..... is large coastal island located between the mouths of River Amazon and River Tocantins.
(1) Sao Francisco (2) Marajo
(3) Marcos (4) Rio

Answer (2)

78. Identify the correct option of pairs given below

Group 'A'	Group 'B'	Group 'C'
Region	Average Rain Fall	Type of Forest
(A) Giana Highlands	(I) 1500 mm	(P) Temperate Grasslands
(B) Amazon Basin	(II) 600 mm	(Q) Deciduous Forests
(C) Paraguay-Parana Basin	(III) 1600 mm	(R) Tropical Forests
(D) Brazilian Highland	(IV) 2000 mm	(S) Equatorial Forests

(1) A - III - R, B - IV - S, C - I - Q, D - I - P
(2) A - IV - S, B - III - R, C - II - P, D - I - Q
(3) A - I - P, B - II - Q, C - III - R, D - IV - S
(4) A - II - Q, B - I - P, C - IV - S, D - III - R

Answer (1)

79. Choose the correct option of favourable factors for highest population density .....
(1) fertile land - plain lands - availability of water
(2) fertile land - agricultural development - dry desert area
(3) plain lands - development of industry - hilly regions
(4) hilly regions - dense forest area - fertile land

Answer (1)

80. In which district, of Meghalaya - the highest rainfall place Mawsynram is situated?

(1) Garo (2) Jaitiya

(3) Khasi (4) Dispur

Answer (3)

81. Which of the following two linear equations have only one unique solution $x = 2$ and $y = -3$

(1) $x + y = -1;\ 2x - 3y = -5$

(2) $2x + 5y = -11;\ 4x + 10y = 22$

(3) $2x - y = 1;\ 3x + 2y = 0$

(4) $x - 4y = -14 = 0;\ 5x - y - 13 = 0$

Answer (4)

Sol. $x = 2,\ y = -3$ satisfies $x - 4y - 14 = 0$ & $5x - y - 13 = 0$

82. If $\alpha + \beta = -3$ and $\alpha\beta = -\frac{5}{2}$ then find the quadratic equation whose roots are α and β ?

(1) $2x^2 - 5x + 6 = 0$ (2) $2x^2 - 6x + 5 = 0$

(3) $2x^2 + 6x - 5 = 0$ (4) $2x^2 - 6x - 5 = 0$

Answer (3)

Sol. $x2 - (\alpha + \beta)x + \alpha\beta = 0$

$$\therefore x^2 + 3x - \frac{5}{2} = 0$$

$$\therefore 2x^2 + 6x - 5 = 0$$

83. What is the probability of having 53 Thursday in ordinary year (except leap year) ?

(1) $\frac{2}{7}$ (2) $\frac{3}{7}$

(3) $\frac{1}{7}$ (4) $\frac{4}{7}$

Answer (3)

Sol. (3)

84. How many natural numbers between 15 to 500 when divided by 6 leave remainder 5?

(1) 80 (2) 81

(3) 82 (4) 83

Answer (2)

Sol. Its an A.P where terms are 17, 23, ..., 497

$$\therefore a_n = a + (n-1)d$$

$$\therefore 497 = 17 + (n-1)6$$

$$\therefore n = 81$$

85. $\begin{vmatrix} \frac{5}{3} & \frac{7}{2} \\ \frac{3}{4} & \frac{3}{2} \end{vmatrix}$ Choose correct alternative for the value of determinant

(A) $\frac{1}{8}$ (B) $\frac{-1}{8}$

(C) $\left(\frac{-1}{2}\right)^3$ (D) $\frac{-1}{\sqrt[3]{512}}$

(1) A and C (2) B, C and D

(3) A, B and C (4) A, C and D

Answer (2)

Sol. $\left(\frac{5}{3}\times\frac{3}{2}\right) - \left(\frac{7}{2}\times\frac{3}{4}\right) = -\frac{1}{8}$

86. If roots of the quadratic equation $3ax^2 + 2bx + c = 0$ are in the ratio 2:3 then which of the following statement is true?

(1) $8ac = 25b$ (2) $8ac = 9b^2$

(3) $8b^2 = 9ac$ (4) $8b^2 = 25ac$

Answer (4)

Sol. $3ax^2 + 2bx + c = 0$

$$\alpha + \beta = \frac{-2b}{3a}, \alpha\beta = \frac{c}{3a} \ \& \ \frac{\alpha}{\beta} = \frac{2}{3}$$

$$\therefore \alpha = \frac{-4b}{15a}, \beta = \frac{-2b}{5a}$$

$$\text{but } \alpha\beta = \frac{c}{3a}$$

$$\therefore \left(\frac{-4b}{15a}\right)\times\left(\frac{-2b}{5a}\right) = \frac{c}{3a}$$

$$\therefore 8b^2 = 25ac$$

87. In Arithmetic Progression there are n terms (n is odd) and middle term is m then what is Sn =?

(1) $\frac{mn}{2}$ (2) mn

(3) $2mn$ (4) mn^2

Answer (2)

Sol. $a_{\frac{n+1}{2}} = m$

$\therefore a+\left(\frac{n+1}{2}-1\right)d = m$

$\therefore 2a+(n-1)d = 2m$

$\therefore \frac{n}{2}(2a+(n-1)d) = 2m\times\frac{n}{2}$

$\therefore S_n = mn$

88. If $N = 70$, $h = 10$, $c.f. = 22$, $f = 10$, $L = 30$ then using this information find median ?

(1) 42 (2) 45

(3) 43 (4) 34

Answer (3)

Sol. $L+\left(\frac{N}{2}-c.f.\right)\times\frac{h}{f}$

89. Two dice are rolled simultaneously, what is the probability of getting sum of the digits on the upper face as a prime number ?

(1) $\frac{5}{36}$ (2) $\frac{5}{12}$

(3) $\frac{5}{18}$ (4) $\frac{11}{36}$

Answer (2)

Sol. Favourable outcomes =(1, 1), (1, 2),(1, 4),(1, 6)
(2, 1), (2, 3), (2, 5), (3, 2)
(3, 4), (4, 1), (4, 3), (5, 2), (5, 6)
(6, 5)

$\therefore$ Probability = $\frac{15}{36}=\frac{5}{12}$

90. The number formed when 5 is subtracted after multiplying by 8 to the sum of digits of a two digit number is equal to the number formed when 3 is added after multiplying by 16 to the difference of digits in a number. What is the number ?

(1) 83 (2) 84

(3) 85 (4) 78

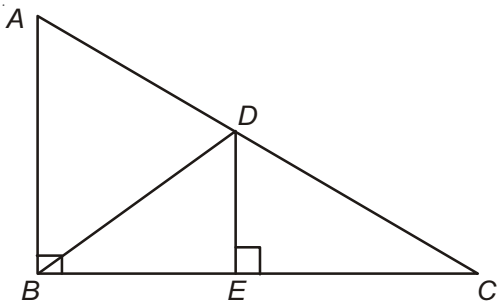
Answer (1)

Sol. $8(x + y)–5 = 16(x –y) +3$

$\therefore x-3y=-1$

Only (1) satisfies

91. In the adjoining figure ΔABC is a right angled triangle. Point D is the midpoint of hypotenuse AC, Segment $DE \perp$ side $BC\ \angle ABC = 70°$ then find $m\angle CDE - m\angle DBE$?.



(1) 70° (2) 20°

(3) 50° (4) 30°

Answer (3)

Sol. $\angle ABE = \angle DEC = 90°$

$DE \parallel AB \longrightarrow$ (corresponding angles)

$\therefore \frac{CD}{AD}=\frac{CE}{BE}$

but $CD = AD$

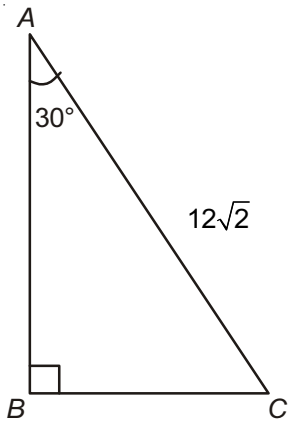
$\therefore CE = BE$

$\therefore \Delta DEB \cong \Delta DEC \rightarrow$ sas test

$\therefore \angle BDE = \angle CDE = 70° \rightarrow$ c.p.ct

$\therefore \angle CDE - \angle DBE = 70 - 20 = 50°$

92. Observe the adjoing figure. From the given information the perimeter of the triangle is given below. Choose the correct alternative?



(A) $\left(18\sqrt{2}+6\sqrt{6}\right)$ (B) $\left(6\sqrt{3}+12\sqrt{2}\right)$

(C) $\left(18+6\sqrt{3}\right)\sqrt{2}$ (D) $\left(18+6\sqrt{6}\right)\sqrt{2}$

(1) A and B (2) A and C

(3) C and D (4) only D

Answer (2)

Sol. $\sin 30 = \frac{BC}{AC}$

$\frac{1}{2} = \frac{BC}{12\sqrt{2}}$

$\therefore BC = 6\sqrt{2}$

$\cos 30 = \frac{AB}{AC}$

$\frac{\sqrt{3}}{2} = \frac{AB}{12\sqrt{2}}$

$\therefore AV = 6\sqrt{6}$

$\therefore$ Perimeter is $\left(18\sqrt{2} + 6\sqrt{6}\right)$

93. Read the following statements carefully and choose the correct alternative

(A) The ratio of the circumference of a circle to its diameter is denoted by the Greek letter π.

(B) π is non - terminating, recurring decimal fraction and its exact value is $\frac{22}{7}\left(\pi = \frac{22}{7}\right)$.

Alternatives:

(1) Statements A and B false

(2) Statements A and B correct

(3) Statements A correct but B false

(4) Statements A false but B correct

Answer (3)

94. Read the following statement carefully and choose the correct alternative.

(A) The slope of the line parallel to X-axis can be derived by the formula $\frac{x_2 - x_1}{y_2 - y_1}$

(B) The slope of the line parallel to Y-axis is 1

(C) The cotangent ratio of an angle made by the line with the positive direction of X-axis is called the slope of that line.

(D) The slope of the line which makes acute angle with X-axis is less than zero and the slope of the line making obtuse angle with X-axis is greater than zero.

(1) Statement A and B correct

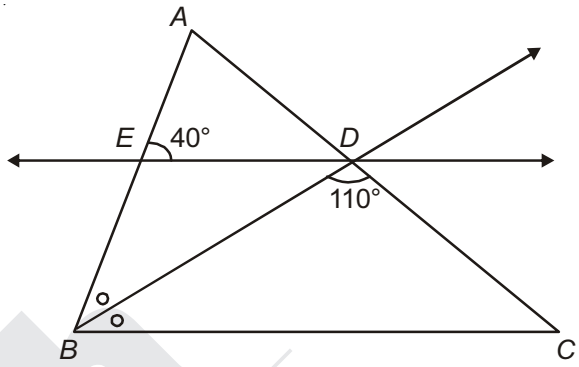
(2) Statement C and D correct

(3) Statement C wrong

(4) All statements are wrong

Answer (4)

95. In the adjoining figure ray BD bisects $\angle ABC$ of ΔABC seg ED || side BC $m\angle AED = 40°$ and $m\angle BDC = 110°$ then find the measurments of $\angle EDB$ and $\angle DCB$ respectively. Choose the correct alternative from the following.



(1) 20° and 50° (2) 50° and 20°

(3) 40° and 50° (4) 40° and 70°

Answer (1)

Sol. ED || BC

$\therefore \angle ABC = \angle AED = 40°$

$\therefore \angle EBD = 20°$

$\therefore \angle BED = 140°$

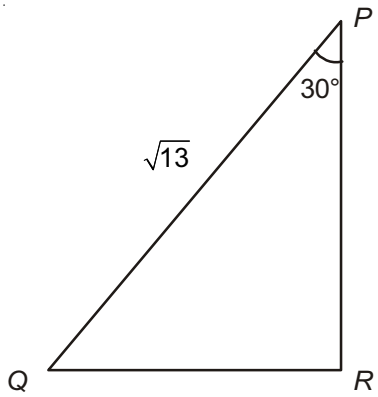
$\therefore \angle EDB = 20°$

$\therefore \angle EDC + \angle DCB = 180°$

$\therefore \angle DCB = 180 - (110 + 20)$

$= 50°$

96. In ΔPQR $M\angle R = 90°$, $M\angle P = 30°$ $PQ = \sqrt{13}$. From the given information find the value of cosec60°–sec60°?



(1) $\left(\frac{2}{\sqrt{3}} - \frac{1}{\sqrt{3}}\right)$ (2) $\left(\frac{\sqrt{13}}{2} - \frac{\sqrt{39}}{2}\right)$

(3) $\left(\frac{\sqrt{39}}{2} - \frac{\sqrt{13}}{2}\right)$ (4) $2\left(\frac{1}{\sqrt{3}} - 1\right)$

Answer (4)

Sol. $\sin 30 = \frac{QR}{PQ}$

$\frac{1}{2} = \frac{QR}{\sqrt{13}}$

$\therefore QR = \frac{\sqrt{13}}{2}$

$PR = \frac{\sqrt{39}}{2}$

$\therefore \cos ec60 - \sec 60 = 2\left(\frac{1}{\sqrt{3}} - 1\right)$

97. In right angled triangle ABC $M\angle B = 90°, \Delta ABC$ is in the first and second quadrant on the graph paper. The co-ordinater of the points A and C are (2, 5) and (–2, 3) respectively. Find the possible pairs of co-ordinates of point B from the following alternative

(1) (–2, 5) or (2, 3) (2) (5, –2) or (3, 2)

(3) (–2, 2) or (5, 3) (4) (2, –2) or (5, 3)

Answer (1)

Sol. Product of slopes of perpendicular lines is –1

98. Choose the correct figure that has all the following properties

(A) Both the diagonals are congruent

(B) It is called as rectangle

(C) The perimeter of the figure is four times its length or breadth

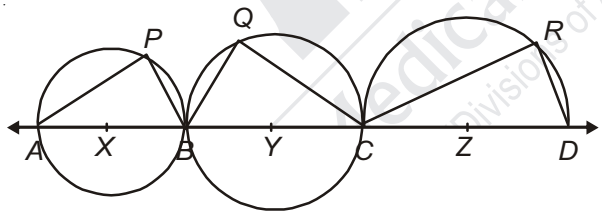
(D) It is a rhombus

(1) Rhombus (2) Rectangle

(3) Trapezium (4) Square

Answer (4)

99.



In the figure semi-circles are drawn whose centre are X, Y, Z respectively. Points (X, Y, Z); are collinear points (X – Y– Z) AX = 2.5 BY = 6.5, CZ = 8.5 and AP + QC = 16; QC + CR = 27 and CR + AP 19 then find the value if AP + PB + BQ + QC + CR + RD =?

(1) 37 (2) 41

(3) 53 (4) 47

Answer (4)

Sol. $AP + QC = 16$

$QC + CR = 27$

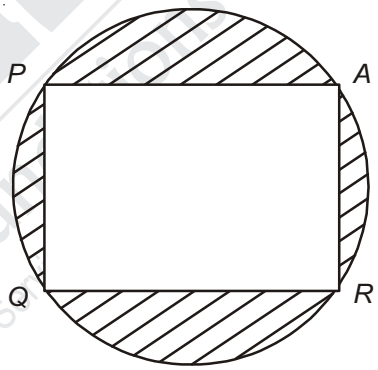
$CR + AP = 19$

$\therefore AP = 4, QC = 12, CR = 15$

$\therefore PB = 3, QB = 5, RD = 8$

$\therefore AP + PB + BQ + QC + CR + RD = 47$

100. In the figure $PQRS$ is a cyclic quadrilateral. If the area of the shaded part is $\frac{72}{7}$ sq. units then find the radius of the circle.



(1) $\sqrt{7}$ units

(2) 4 units

(3) 3 units

(4) 2 units

Answer (3)

Sol. $\square PQRS$ is square

Let 'a' be side of square

$\therefore QS$ is the diameter of circle

$\therefore \sqrt{2}a = 2r$

$\therefore \pi r^2 - a^2 = \frac{72}{7}$

$\therefore r = 3cm$

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