

Date: 13/12/2020



Test Booklet Code

XM5

Maharashtra

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Answers & Solutions

for

NTSE (Stage-I) 2020-21

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 : 101 - 200 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	⊗ ⊖ ⊙ ④

Student must darkening the right oval only after ensuring correct answer on OMR Sheet.

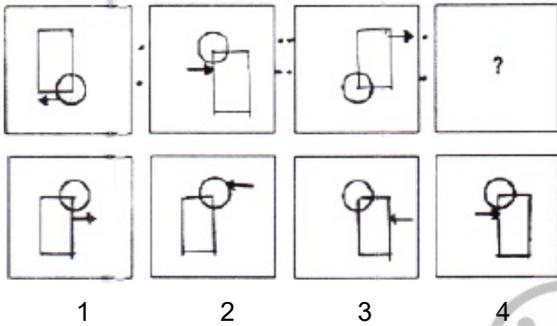
5. Students are not allowed to scratch / alter / change out an answer once marked on OMR Sheet, by using white fluid / eraser / blade / tearing / wearing or in any other form.
6. Separate sheet has been provided for rough work in this test booklet.
7. Please handover the OMR Sheet to the invigilator 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)

Q.1 to 3

Directions: In each of the following questions there is a specific relationship between the first and second figure. The same relationship exist between the third and fourth figure which will replace the question mark. Select the correct option from the given alternatives.

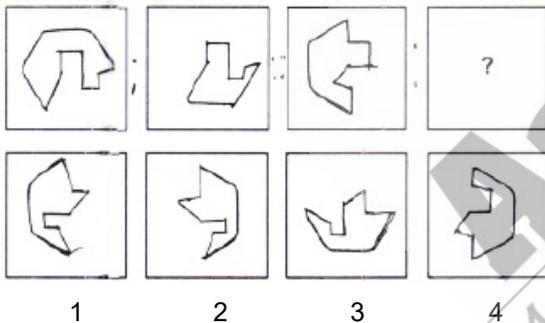
1. Question Figures



Answer (2)

Sol. Refer Figure

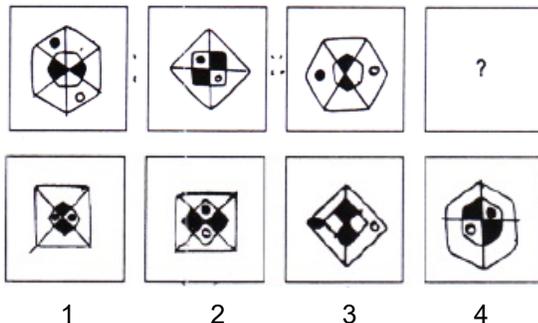
2. Question Figures



Answer (4)

Sol. Refer Figure

3. Question Figures



Answer (2)

Sol. Refer Figure

4. A B Z Y C D X W E F V U G H T S I J R Q K L P
O M N

Observe the letter series and observe letter which is at the central place of letters which is at 8th place from the left and at 13th place from right, find the serial number of that letter from left?

- (1) 13
- (2) 14
- (3) 16
- (4) 11

Answer (4)

Sol. 'V' is the central place of letters and its serial number from left is 11.

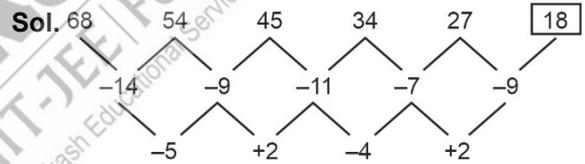
Q.5 to 8

Directions: Which number will replace the question mark in the given series. Select the correct number from the given alternatives.

5. 68, 54, 45, 34, 27, ?

- (1) 13
- (2) 17
- (3) 18
- (4) 21

Answer (3)



6. 18, 30, 48, 72, 96?

- (1) 96
- (2) 106
- (3) 115
- (4) 120

Answer (1)

Sol. $18 \times 2 - 6 = 30$

$30 \times 2 - 12 = 48$

$48 \times 2 - 24 = 72$

$72 \times 2 - 48 = 96$

$96 \times 2 - 96 = 96$

7. 8, 1, 9, 10, 19, 29, ?, 77

- (1) 38
- (2) 48
- (3) 52
- (4) 56

Answer (2)

Sol. $8 + 1 = 9, 9 + 1 = 10, 10 + 9 = 19,$

$19 + 10 = 29, 29 + 19 = 48$

8. 12, 32, 72, 152, ?, 632

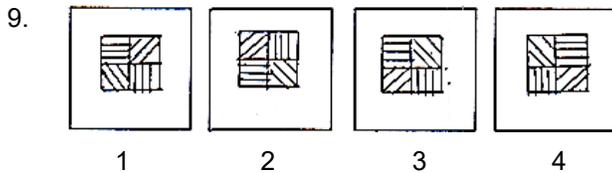
- (1) 312 (2) 515
 (3) 613 (4) 815

Answer (1)

Sol. $12 + 20 = 32$, $32 + 40 = 72$, $72 + 80 = 152$, $152 + 160 = 312$

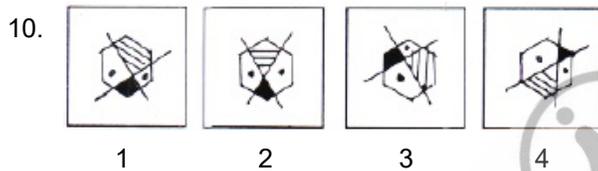
Q. 9. to 11

Directions: Find the odd figure.



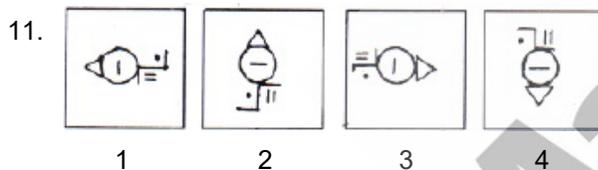
Answer (3)

Sol. Refer Figure



Answer (2)

Sol. Refer Figure

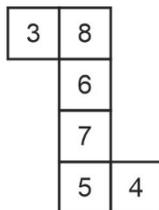


Answer (2)

Sol. Refer Figure

Q.12 to 14

Directions: The figure given alongside is folded on the given lines to construct a cube. Observe the figure and answer the following questions by choosing correct alternative.



12. From the following which number will be opposite to 8?

- (1) 4 (2) 5
 (3) 6 (4) 7

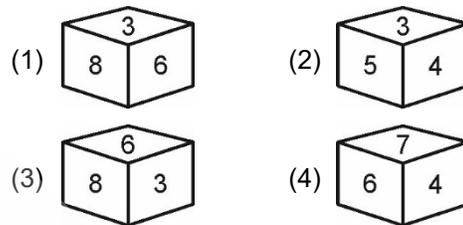
Answer (4)

13. From the following which number will not be adjacent to 4?

- (1) 3 (2) 8
 (3) 6 (4) 7

Answer (1)

14. From the following which figure is not obtained by folding the paper to form a cube?



Answer (2)

15. In the following question there is a specific relationship between the first and second term. The same relationship exists between the third and fourth term. Considering the relationship select correct alternative to replace question mark:

$4 : 80 :: 21 : ?$

- (1) 9702 (2) 8702
 (3) 8820 (4) 421

Answer (1)

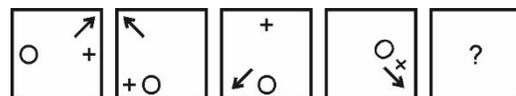
Sol. $4^3 + 4^2 = 80$

$\therefore 21^3 + 21^2 = 9702$

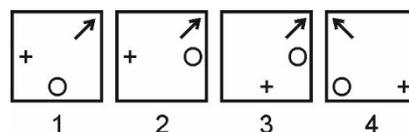
Q.16 and 17

Directions: In each of the following, the question figures change in a particular order. Decide which figure from the given alternatives will replace the question mark.

16. Question figures



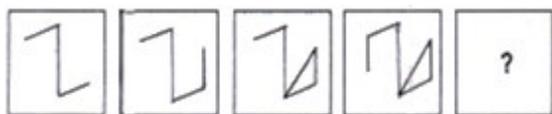
Answer figures



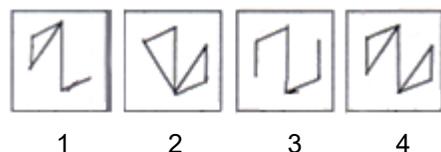
Answer (2)

Sol. Refer Figure

17. Question figures



Answer figures



Answer (4)

Sol. Refer Figure

Q.18 to 20

Directions: Sushil, Vipin, Prashant, Amar are four class friends. Sushil does not like dance. Vipin likes only music and dance. Only three of them like dance and craft. Prashant likes all subjects except music. Sushil is master in drawing and music.

18. Amar likes which subjects?

- (1) Music and craft
- (2) Dance and drawing
- (3) Dance and craft
- (4) Music and drawing

Answer (3)

Sol. Sushil → Drawing, Music and Craft

Vipin → Music and Dance

Prashant → Dance, Craft, Drawing

Amar → Dance, Craft

19. Which subject Vipin, Prashant and Amar likes?

- (1) Drawing (2) Music
- (3) Dance (4) Craft

Answer (3)

Sol. Sushil → Drawing, Music and Craft

Vipin → Music and Dance

Prashant → Dance, Craft, Drawing

Amar → Dance, Craft

20. Who likes drawing?

- (1) Sushil and Vipin
- (2) Vipin and Prashant
- (3) Sushil and Prashant
- (4) Prashant and Amar

Answer (3)

Sol. Sushil → Drawing, Music and Craft

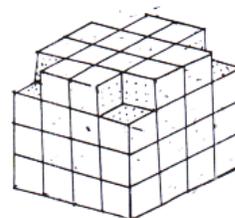
Vipin → Music and Dance

Prashant → Dance, Craft, Drawing

Amar → Dance, Craft

Q.21 to 23

Directions: A wooden block of 4×4 dimensions is taken. All faces of block are painted from outside. As shown in figure it is cut into smaller cubes. Answer the questions by studying adjoining figure.



21. How many cubes are there having at least one face painted?

- (1) 64 (2) 52
- (3) 48 (4) 24

Answer (2)

Sol. Refer Figure

22. If the base layer of the block would be same as the top layer then how many cubes will be in the block?

- (1) 56 (2) 52
- (3) 60 (4) 62

Answer (1)

Sol. Refer Figure

23. If the base layer and top layer of block is same then at the most how many faces of the cube will be painted?

- (1) 3 (2) 2
- (3) 1 (4) 0

Answer (1)

Sol. Refer Figure

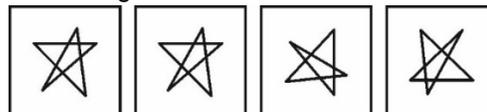
Q.24 and 25

Directions: Choose the mirror image from the alternatives given for the given question figures.

24. Question figure



Answer figure



1 2 3 4

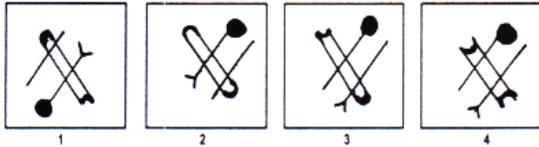
Answer (1)

Sol. Refer Figure

25. Question figure



Answer figure



Answer (3)

Sol. Refer Figure

Q.26 and 27

Directions: A rhythmic arrangement of letters is given. The missing letters appear in the same order in one of the alternative answers. Find the correct alternative.

26. p – rsqr – – rs – q – pqr

- (1) qrspq (2) qrrpp
 (3) qspqs (4) qspqr

Answer (3)

Sol. p – rsqr – – rs – q – pqr
 ↓ ↓ ↓ ↓ ↓
 q s p p s

Pattern is

pqrs, qrsp, rspq, spqr

27. a – cb – ac – – ab

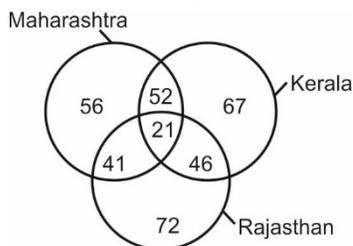
- (1) bcabb (2) bcaab
 (3) bacbc (4) bcabc

Answer (4)

Sol. Pattern is “abc, bca, cab, abc”

Q.28 to 30

Directions: The numbers in the figure show number of tourists from different states. Observe the figure and choose the answer from given alternatives for following questions.



28. How many tourists visited all three states?

- (1) 119 (2) 108
 (3) 21 (4) 195

Answer (3)

Sol. Refer Figure

29. Find number of tourists visiting only two states.

- (1) 93 (2) 98
 (3) 87 (4) 139

Answer (4)

Sol. Refer Figure

30. Find number of tourists who visited Kerala and Rajasthan but not visited Maharashtra?

- (1) 139 (2) 185
 (3) 206 (4) 232

Answer (?)

Sol. Wrong Question

Q.31 and 32

Directions: Find the odd term.

31.

- (1) ACEDB (2) HJLIK
 (3) TVXWU (4) PRTSQ

Answer (2)

Sol. ACEDB HJLIK
 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
 1 3 5 4 2 8 10 12 9 11

 TVXWU P R T S Q
 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
 20 22 24 23 21 16 18 20 19 17

All follow similar pattern except HJLIK.

32.

- (1) ZBX (2) VFT
 (3) RJO (4) SIQ

Answer (3)

Sol. Z B X → Z Y X
 ↓ ↓ ↓ ↓ ↓ ↓
 All follows Z B X

Same order except RJO.

Q. 33 and 34

Directions: Which symbols will come in the order. Choose the correct alternative.

33. $\Sigma\theta\Delta\mu\beta, \theta\Sigma\Delta\mu\beta, \theta\Delta\Sigma\mu\beta, ?$
 (1) $\theta\Delta\beta\Sigma\mu$ (2) $\theta\Delta\mu\beta\Sigma$
 (3) $\theta\Delta\Sigma\beta\mu$ (4) $\theta\Delta\mu\Sigma\beta$

Answer (4)

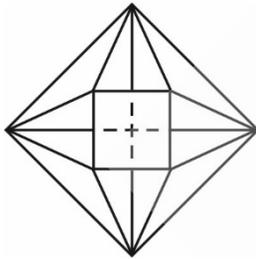
Sol. $\Sigma\theta\Delta\mu\beta \rightarrow \theta\Sigma\Delta\mu\beta$
 $\theta\Sigma\Delta\mu\beta \rightarrow \theta\Delta\Sigma\mu\beta$
 $\theta\Delta\Sigma\mu\beta \rightarrow \theta\Delta\mu\Sigma\beta$

34. $\psi\Omega\Box\circ, \Omega\Box\circ\delta, \Box\circ\delta\alpha, ?$
 (1) $\circ\delta\alpha\eta$ (2) $\circ\delta\alpha\Omega$
 (3) $\circ\delta\alpha\psi$ (4) $\circ\delta\alpha\Box$

Answer (1)

Sol. Fact

35. **Directions:** Find number of triangles in the given figure.

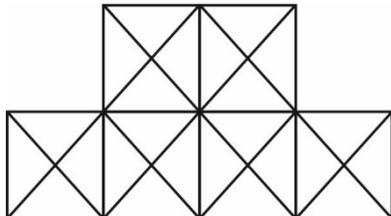


- (1) 16 (2) 20
 (3) 24 (4) 32

Answer (3)

Sol. Fact

36. **Directions:** Find total number of squares in the following figure.



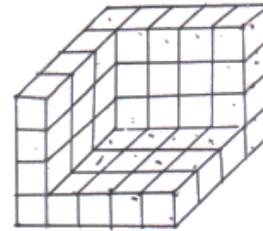
- (1) 6 (2) 12
 (3) 13 (4) 15

Answer (N/A)

Sol. Fact

Q.37 to 39

Directions: The following figure is made by arranging some cubes having each side 1 unit. This is painted from all sides. Observe the figure and choose correct alternative for following questions.



37. Find the number of cubes having maximum number of faces painted.
 (1) 1 (2) 2
 (3) 3 (4) 4

Answer (3)

Sol. Fact

38. How many cubes are used to make the arrangement as shown in the figure?
 (1) 35 (2) 40
 (3) 44 (4) 46

Answer (3)

Sol. Fact

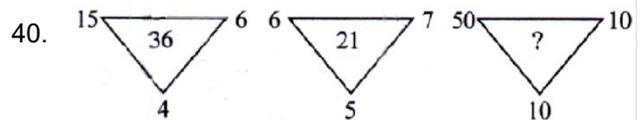
39. Find the number of cubes having no face painted.
 (1) 0 (2) 1
 (3) 2 (4) 3

Answer (1)

Sol. Fact

Q.40 and 41

Directions: In the following figure numbers are written with a specific rule. Find the rule and decide which alternative will be in place of question mark.



- (1) 140 (2) 220
 (3) 320 (4) 500

Answer (4)

Sol. $\frac{15 \times 6 \times 4}{10} = 36$

$\frac{6 \times 7 \times 5}{10} = 21$

$\frac{50 \times 10 \times 10}{10} = 500$

41.

	36	
49	26	64
	25	

	9	
81	21	25
	16	

	25	
64	?	144
	36	

- (1) 19 (2) 23
(3) 31 (4) 25

Answer (3)

Sol. $\sqrt{49} + \sqrt{36} + \sqrt{64} + \sqrt{25} = 7 + 6 + 8 + 5 = 26$

$\sqrt{9} + \sqrt{81} + \sqrt{16} + \sqrt{25} = 3 + 9 + 4 + 5 = 21$

$\sqrt{25} + \sqrt{64} + \sqrt{36} + \sqrt{144} = 5 + 8 + 6 + 12 = 31$

Q.42 to 44

Directions: In the following questions there is a specific relation between first and second term. The same relationship exists between third and fourth term, which will replace the question mark. Select the correct alternative from the given alternatives.

42. EJOT : VQLG :: BGLQ ?

- (1) DINS (2) RMHC
(3) SNID (4) EJOT

Answer (3)

E	J	O	T	B	G	L	Q
+17	+7	+23	+13	+17	+7	+23	+13
V	Q	L	G	S	N	I	D

43. FJUL : BOQQ :: LHRX : ?

- (1) BKPR (2) MNCC
(3) HRY Y (4) HMNC

Answer (4)

F	J	U	L	L	H	R	X
-4	+5	-4	+5	-4	+5	-4	+5
B	O	Q	Q	H	M	N	C

44. QPRS : TUWV :: JIKL : ?

- (1) MNOP (2) NMOP
(3) MNPO (4) NMPO

Answer (3)

Q	P	R	S	J	I	K	L
+3	+5	+5	+3	+3	+5	+5	+3
T	U	W	V	M	N	P	O

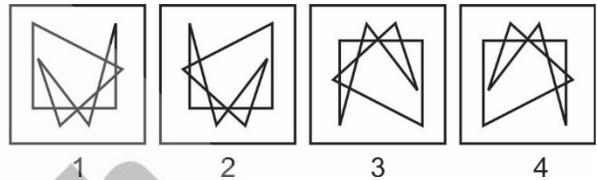
Q.45 and 46

Directions: Choose the mirror image from the alternatives given for the given question figures.

45. Question figure



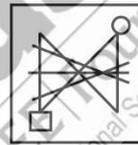
Answer figures



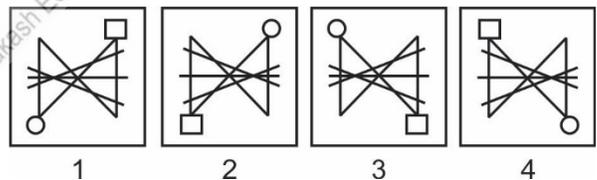
Answer (4)

Sol. Fact

46. Question figure



Answer figures



Answer (3)

Sol. Fact

Q.47 and 48

Directions: In a row Pradyuman is twelfth from front and Sarvesh is Twentyfifth from behind. Rahul is exactly at the centre place between Pradhyuman and Sarvesh. There are 70 persons in the row then.

47. Rahul is standing at which place from front?

- (1) 29 (2) 33
(3) 17 (4) 42

Answer (1)

Sol. $8 \div 2 = 70$

$$8^2 = (8-2) = 64 + 6 = 70$$

$$7 \div 5 = 7^2 + (7-5) = 51$$

65. If according to mathematical code $9 + 2 = 36$,
 $8 + 3 = 72$, $7 + 4 = 112$ then $6 + 5 = ?$

- (1) 84
- (2) 130
- (3) 75
- (4) 150

Answer (4)

Sol. $9 + 2 = 36$

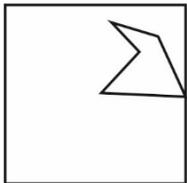
$$9 \times 2^2 = 9 \times 4 = 36$$

$$6 + 5 = 6 \times 5^2 = 6 \times 25 = 150$$

Q.66 and 67

Directions: A square shaped paper is folded as shown in the figure. The paper when unfolded will look like as shown in one of the alternatives. Select the correct alternative.

66. Question figure



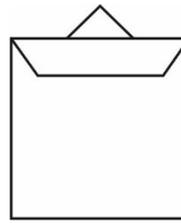
Answer figures

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

Answer (4)

Sol. Fact

67. Question figure



Answer figures

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

Answer (3)

Sol. Fact

Q. 68 and 69

68. Ten years before ratio of ages of Ram and Shyam was $1 : 7$, ten years after ratio of their ages is $1 : 3$. Find present age of Ram.

- (1) 10 years
- (2) 20 years
- (3) 30 years
- (4) 70 years

Answer (2)

Sol. Let current age of Ram and Shyam at x and y

Before 10 years ago

$$x-10 \text{ and } y-10$$

According to the question

$$\frac{x-10}{y-10} = \frac{1}{7}$$

$$7x-70 = y-10$$

$$7x-y = 60 \quad \dots(i)$$

After 10 years age will be

$$x+10 \text{ and } y+10$$

$$\text{then } \frac{x+10}{y+10} = \frac{1}{3}$$

$$3x+30 = y+10$$

$$3x-y = -20 \quad \dots(ii)$$

Then $x = 20$ (Ram Age)

69. From the above information what will be the age of Shyam after 10 years?
- (1) 70 years
 - (2) 80 years
 - (3) 90 years
 - (4) 30 years

Answer (3)

Sol. Fact

Q. 70 and 71

Directions: In the following questions the number outside the bracket are related to number inside the bracket in a specific manner. From the given alternatives find the right number which matches and will be replaced the question mark.

70. 78 (20) 82
 37 (12) 59
 45 (?) 91
- (1) 13
 - (2) 17
 - (3) 19
 - (4) 23

Answer (2)

Sol. All first and last number and then divided by 8, we will get the answer.

$$\frac{78+82}{8} = 20$$

Similarly, $45 + 91 = 136$

then divided by 8, we will get $\frac{136}{8} = 17$

71. 95 (53) 87
 152 (82) 58
 76 (?) 174
- (1) 46
 - (2) 93
 - (3) 89
 - (4) 78

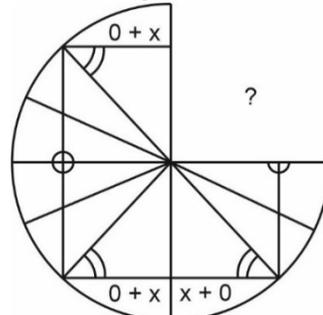
Answer (1)

Sol. Fact

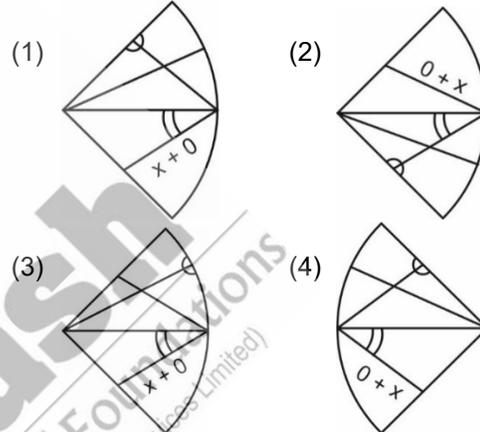
Q. 72 and 73

Directions: Select the correct alternatives which can complete the figures.

72. Question figure



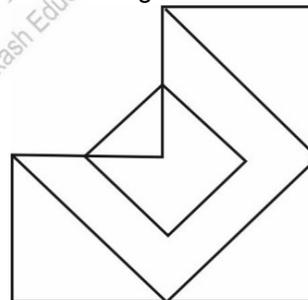
Answer figures



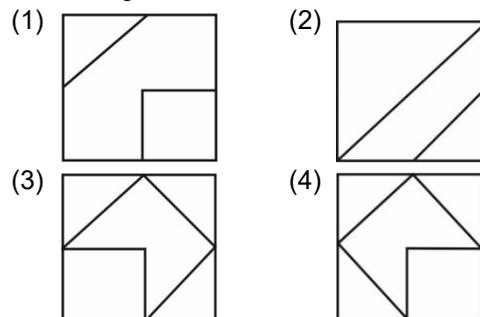
Answer (4)

Sol. Fact

73. Question figure



Answer figure



Answer (2)

Sol. Fact

Q. 74 to 76

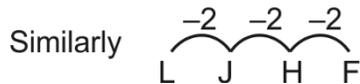
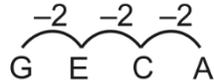
Directions: In the following questions specific group of letter are given. From the given alternatives, find out the right letters which matches the given group.

74. GECA ZXVT SQOM

- (1) YWUT (2) VTRQ
(3) MKIH (4) LJHF

Answer (4)

Sol.

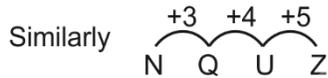


75. BEIN EHLQ ILPU

- (1) NQUZ (2) HKOS
(3) LOSY (4) JMQT

Answer (1)

Sol.

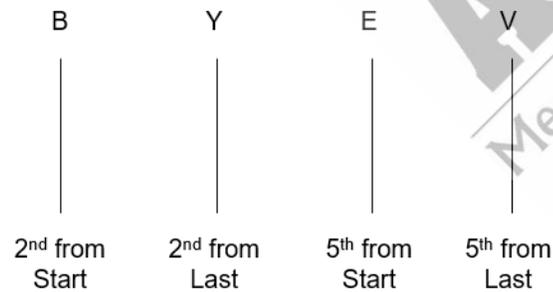


76. BYEV DWHS IRLO

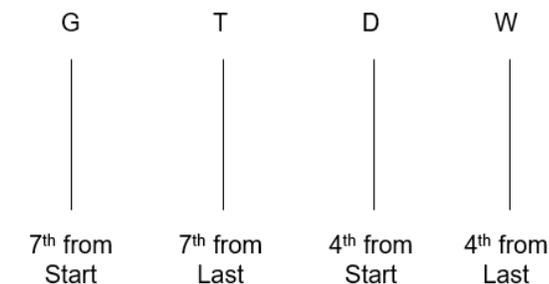
- (1) FUKO (2) CXJP
(3) GTDW (4) AZCW

Answer (3)

Sol.



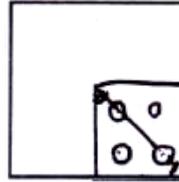
Similarly



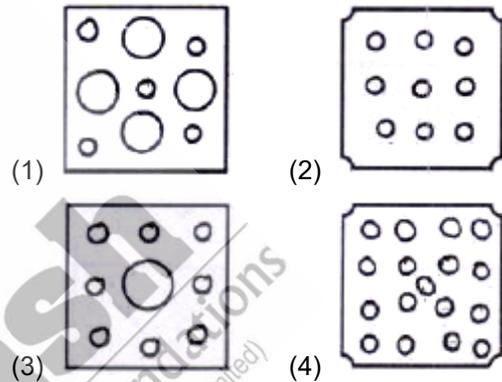
Q. 77 and 78

Direction: A square piece of paper is folded and cut at specific spots as show in the figures. The paper when unfolded will look-like as shown in one of the alternatives. Select the correct alternative.

77. Question figure



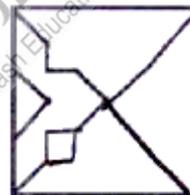
Answer figures



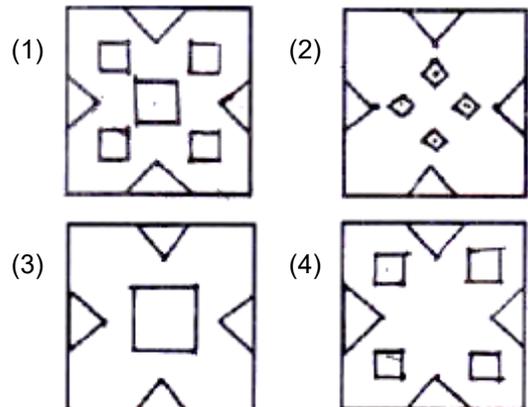
Answer (4)

Sol. Fact

78. Question figure



Answer figures



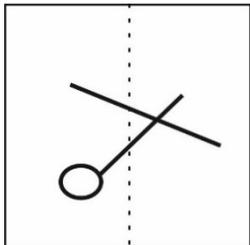
Answer (4)

Sol. Fact

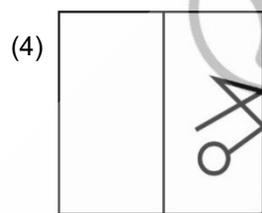
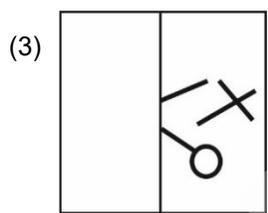
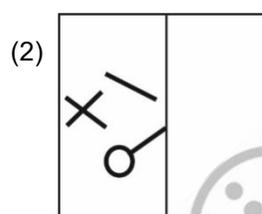
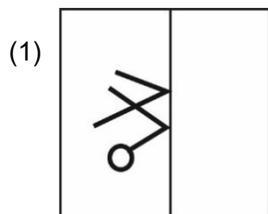
Q. 79 and 80

Directions: In the figure given below a transparent square shaped paper is folded along the dotted lines, which figure will be obtained? Find the figure from the alternative figure given.

79. Question figure



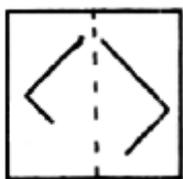
Answer figures



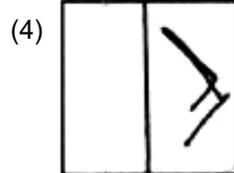
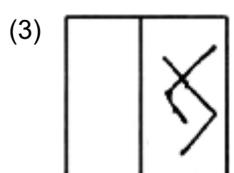
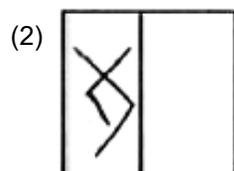
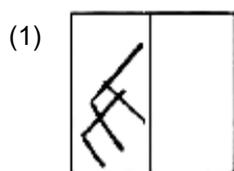
Answer (1)

Sol. Fact

80. Question figure



Answer figures



Answer (4)

Sol. Fact

Q. 81 and 83

Directions: In a certain code language the word BASIC has been 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.

Word	Code language
BASIC	= (1) EDVLF
	(2) CISAB
	(3) YASIZ
	(4) BZRHC

81. EARTH = BARTE

Answer (3)

Sol.

E	A	R	T	H
-3				-3
B	A	R	T	E

82. CLOUD = CKNTD

Answer (4)

Sol.

C	L	O	U	D
	-1	-1	-1	
C	K	N	T	D

83. LEARN = OHDUQ

Answer (1)

Sol.

L	E	A	R	N
+3	+3	+3	+3	+3
O	H	D	U	Q

84. In a certain code language if

$$@ \times \star = 45, \cup \times P = 48,$$

$P \times \star = 40$ and $\# \times @ = 27$ then find the value of # ?

- (1) 5 (2) 6
(3) 3 (4) 9

Answer (3)

Sol. $@ = 9, \star = 5, P = 8, \cup = 6$

then $\# \times @ = 27$

$$\# = \frac{27}{@}$$

$$\# = \frac{27}{9} = 3$$

85. In a certain code language if || mean 4,

|||| mean 12, @ means \times , \odot figure mean \div ,
mean + and \$ mean - is used

Then find |||| @ ||||| \$ |||| \odot || # ||||| = ?

- (1) 104 (2) 106
(3) 102 (4) 30

Answer (2)

Sol. || \rightarrow 4

|||| \rightarrow 8

||||| \rightarrow 12

$$8 \times 12 - 8 \div 4 + 12 \Rightarrow 106$$

Q. 86 to 88

Directions: In the following questions specific group of number are given. From the given alternatives, find out the right number which matches the given group.

86. 416 749 525

- (1) 982 (2) 864
(3) 637 (4) 319

Answer (2)

Sol. Square at first digit

$$8^2 = 64 \rightarrow 864$$

87. 294 648 448

- (1) 84 (2) 94
(3) 100 (4) 194

Answer (3)

Sol. 294, 648, 448, _____

$$294 \rightarrow 7^3 - 7^2 = 343 - 49 = 294$$

$$648 \rightarrow 9^3 - 9^2 = 648$$

$$448 \rightarrow 8^3 - 8^2 = 448$$

Similarly

$$5^3 - 5^2 = 125 - 25 = 100$$

88. $3\frac{1}{3}$ 3.2 3.25 $3\frac{2}{3}$

- (1) 3.5 (2) 5
(3) 4.2 (4) $\frac{13}{3}$

Answer (2)

Sol. $3\frac{1}{3}, 3.2, 3.25, 3\frac{2}{3},$ _____

$$\frac{10}{3}, \frac{16}{5}, \frac{13}{4}, \frac{11}{3}$$

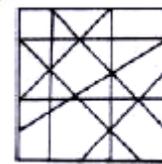
$$\Rightarrow \frac{20}{6}, \frac{16}{5}, \frac{13}{4}, \frac{11}{3}, \frac{10}{2}$$

$$= 5$$

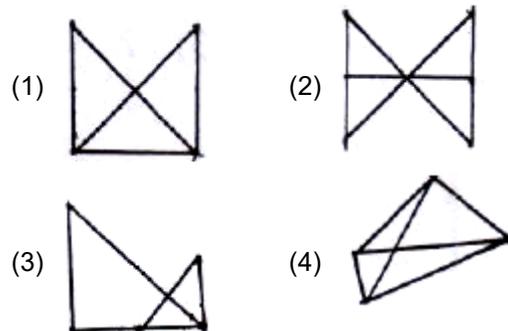
Q. 89 and 90

Directions: In the given questions a complex figure is given. Find out which of the simple figures given in the alternatives is hidden in the complex figure.

89. Question figure



Answer figures



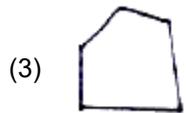
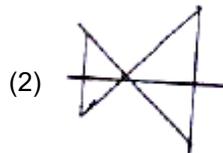
Answer (4)

Sol. Fact

90. Question figure



Answer figures



Answer (1)

Sol. Fact

91. In the following question letter and numbers are written with a specific rule in horizontal rows. Find the rule and decide which will be in place of question mark.

JN	28	27	GP
CE	12	45	TU
LR	?	?	MS

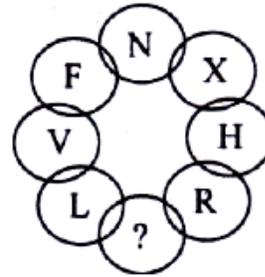
- (1) 30, 41 (2) 30, 32
 (3) 34, 36 (4) 35, 35

Answer (3)

Sol. Add their place value and after then add 4.

L	R	M	S
12	18	13	19
+	+	+	+
	4 = 34		4 = 36

92. Write the correct alternative to replace question mark.



- (1) C
 (2) B
 (3) Z
 (4) A

Answer (2)

Sol. Fact

Q. 93 and 94

Directions: In the following table the digits are assigned with certain symbol. Observe them carefully and choose the correct alternative to answer the questions.

Digits	0	1	2	3	4	5	6	7	8	9
Symbols	⊕	卐	+	∪	∇	#	⊗	∩	△	\$

93. How will you write the number 635104?

- (1) ⊕ ∇ ⊕ ∪ # 卐
 (2) ⊗ ∪ # 卐 ⊕ ∇
 (3) ⊕ ∪ △ # 卐 ⊗
 (4) ⊗ △ ∩ # 卐 ⊕

Answer (2)

Sol. Fact

94. Which number will be expressed by \$ # 卐 △ ∩ ∇ ?

- (1) 951478
 (2) 958174
 (3) 951847
 (4) 951874

Answer (4)

Sol. Fact

Q. 95 and 96

Directions: In the following questions word letters are given in column I and are coded in column II. But they are not arranged according to the order of word letters in column I. Find the code language and choose the correct alternative to answer the questions.

Column I	Column II
TEAR	8623
PURN	5641
TALK	9872
NET	235

95. What is the code for the word PREAK?

- (1) 13689
- (2) 16389
- (3) 16839
- (4) 16489

Answer (2)

Sol. T→2 R→6 A→8 N→5 E→3 P→1 U→4 L→7

96. 542687 code is for which word?

- (1) NATURE
- (2) NATEUR
- (3) NUTRAL
- (4) NURTAL

Answer (3)

Sol. Fact

97. Observe the following code language and choose the correct alternative to answer the questions.

Letters	Z	A	W	O	D	I	Y	L	P	C
Digits	0	1	2	3	4	5	6	7	8	9

What is the code for the word ZODIAC?

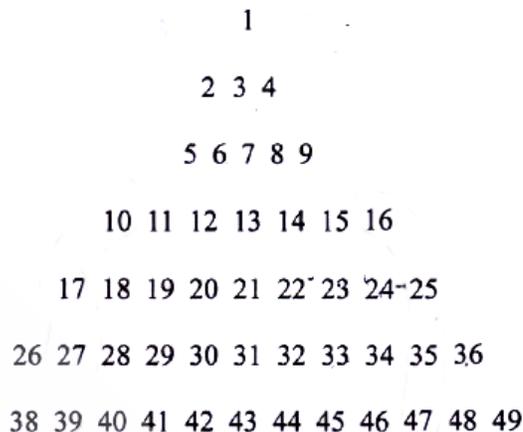
- (1) 034159
- (2) 034519
- (3) 043951
- (4) 093415

Answer (2)

Sol. Fact

Q. 98 to 100

Directions: Observe the pyramid of number and choose the correct alternative which will replace question mark.



98. 18284041 : 24344645 :: 20304243 : ?

- (1) 22324443
- (2) 21314344
- (3) 22324445
- (4) 24344647

Answer (1)

Sol. Fact

99. 261728 : ? :: 292031 : 332231

- (1) 281930
- (2) 302132
- (3) 362534
- (4) 352433

Answer (3)

Sol. Fact

100. 37261718 : 49362524 :: 39271710 : ?

- (1) 39281920
- (2) 47352516
- (3) 47342322
- (4) 46342416

Answer (2)

Sol. Fact

PART-II : SCHOLASTIC APTITUDE TEST (SAT)

101. Observe the columns I and II, match them and select the correct alternative from the given options.

A. Motion of earth around sun	Centri petal force	(i) Nuclear force
B. Motion of stone tied to a string and whirled in a circle		(ii) Electro-magnetic force
C. Motion of electron around nucleus		(iii) Gravitational force
D. Motion of blades of fan		(iv) Tension

- (1) A – (i), B – (ii), C – (iv), d – (iii)
 (2) A – (ii), B – (iii), C – (i), d – (iv)
 (3) A – (iv), B – (i), C – (iii), d – (ii)
 (4) A – (iii), B – (iv), C – (i), d – (ii)

Answer (4)

- Sol.** A – (iii) Gravitational force: due to gravitational force it moves
 B – (iv) Tension (Tension provide centripetal force)
 C – (i) Nuclear force
 D – (ii) Due to Electromagnetic force torque is produced, which rotate blade

102. Heat is a form of _____ energy.
 (1) Potential (2) Kinetic
 (3) Chemical (4) Elastic

Answer (2)

Sol. Kinetic energy

Because it develops due to random motion of particle in matter.

103. If mass of a planet is 25 times mass of earth and radius of the planet is 125 times radius of earth then escape velocity of an object from the planet (V_P) is _____ times the escape velocity from earth (V_E).

- (1) $\frac{1}{\sqrt{5}}$ (2) $\sqrt{5}$
 (3) $\frac{1}{5}$ (4) 5

Answer (1)

- Sol.** We know escape velocity

$$V_e = \sqrt{\frac{2GM}{R_e}} \quad \dots\dots (i)$$

$$\text{If } M_p = 25M \quad R_p = 125R_e$$

$$\therefore V_e' = \sqrt{\frac{2G(25M)}{125R_e}} = \sqrt{\frac{2GM}{5R_e}} \quad \dots\dots(ii)$$

Comparing (i) & (ii)

$$V_e' = \frac{1}{\sqrt{5}} V_e$$

104. Equal masses of iron, water, aluminium and mercury at same initial temperatures are heated uniformly for 5 mins. If the temperatures obtained are

T_1 — mercury, T_2 — aluminium, T_3 — water, T_4 — iron, then choose the correct alternative.

- (1) $T_1 < T_4 < T_2 < T_3$
 (2) $T_1 > T_4 < T_2 > T_3$
 (3) $T_1 > T_4 > T_2 > T_3$
 (4) $T_1 < T_4 > T_2 < T_3$

Answer (3)

- Sol.** $m_{\text{water}} = m = m_{\text{AL}} = m_{\text{mes}} = m$

$$Q = ms\Delta T$$

Q(heat for all are same)

$$\Delta T = \frac{Q}{mS}$$

Final temperature depends on specific heat capacity, $\Delta T \propto \frac{1}{S}$

$$S_w > S_{\text{Al}} > S_{\text{iron}} > S_{\text{mer}}$$

$$\therefore T_1 > T_4 > T_2 > T_3$$

105. If approximate refractive index of sapphire is 1.8, then approximate decrease in velocity of light, when light enters sapphire is _____.

- (1) 40%
 (2) 45%
 (3) 50%
 (4) 55%

Answer (2)

Sol. $\mu = \frac{C}{V_{\text{sapphire}}} \Rightarrow V_{\text{sap}} = \frac{C}{\mu} = \frac{3 \times 10^8}{1.8}$

$= \frac{10^8}{0.6} \text{ m/s}$

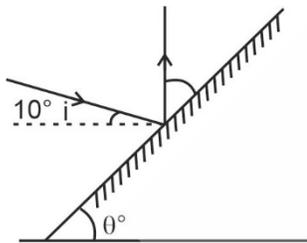
% decrease = $\left(\frac{3 \times 10^8 - \frac{10^8}{0.6}}{3 \times 10^8} \right) \times 100$

$= \frac{3 - \frac{1}{0.6}}{3} \times 100$

$= \frac{1.8 - 1}{1.8} \times 100 = \frac{0.8}{1.8} \times 100 = 44.44\%$

$= 45\% \text{ (approx.)}$

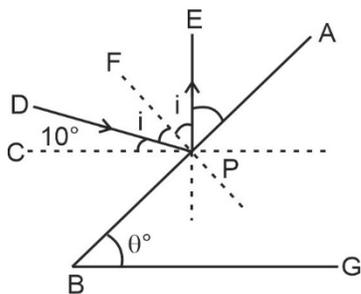
106. If an incident ray making an angle of 10° with the horizontal is to be reflected perpendicular to the horizontal, by an inclined plane mirror, then inclination of the plane mirror (θ) should be _____



- (1) $\theta = 30^\circ$ (2) $\theta = 40^\circ$
(3) $\theta = 50^\circ$ (4) $\theta = 60^\circ$

Answer (3)

Sol.



According to the figure

$\angle CPE = 90^\circ$

$\angle DPF = \angle FPE = i$

(angle of incidence = angle of reflection)

$\therefore \angle CPE = \angle CPD + \angle DPF + \angle FPE$

$90 = 10 + i + i$

$80 = 2i$

$i = 40$

$\angle FPB = 90^\circ$ (right angle)

$\angle FPD = \angle DPC + \angle CPB = 90^\circ$

$i + 10 + \angle CPB = 90^\circ$

$40 + 10 + \angle CPB = 90^\circ$

$\angle CPB = 40^\circ$

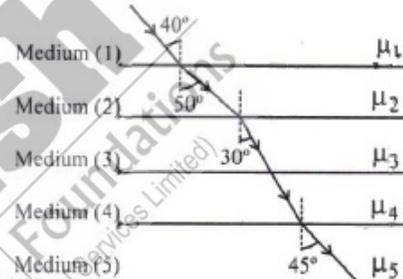
$\angle CPB = \angle ABG$ (alternate angle)

$\angle ABG = 40^\circ$

$\angle ABG = \theta$

Hence, $\theta = 40^\circ$

107. A ray of light follows the path as shown in figure as it travels through different media. Choose the correct relation regarding refractive indices from the given alternatives.



- (1) $\mu_1 > \mu_2 < \mu_3 = \mu_4 > \mu_5$
(2) $\mu_1 = \mu_2 < \mu_3 = \mu_4 > \mu_5$
(3) $\mu_1 > \mu_2 < \mu_3 > \mu_4 < \mu_5$
(4) $\mu_1 < \mu_2 < \mu_3 = \mu_4 > \mu_5$

Answer (1)

Sol. (i) From medium (1) to (2) bends always from normal

$\therefore \mu_1 > \mu_3$

From (2) to (3) bends towards normal

$\mu_2 < \mu_3$

Similarly, from (3) to (4) passes undeviated

$\therefore \mu_3 = \mu_4$

and in 4 to 5 bends away

$\therefore \mu_4 > \mu_5$

From option

$\mu_1 > \mu_2 < \mu_3 = \mu_4 > \mu_5$

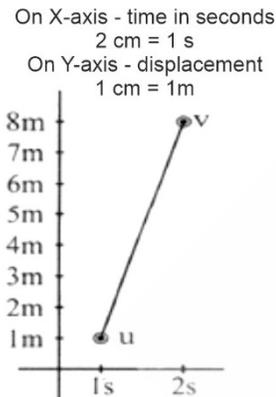
108. The main objective of _____ satellite launched by COEP [College of Engineering, Pune] orbiting at a height of _____ is to provide point-to-point messaging services.

- (1) Samarpan, 550 km
- (2) Sampurnam, 540 km
- (3) Swayam, 515 km
- (4) Sayam, 500 km

Answer (3)

Sol. COEP launch "Swayam at 515 km" in 2008

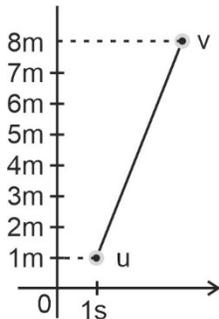
109. The position-time details travelled by a particle are as shown in figure. The initial velocity and acceleration of the particle is _____ respectively.



- (1) $u = 2 \text{ cm/s}^2, a = 2 \text{ m/s}$
- (2) $u = 2 \text{ cm/s}, a = 2 \text{ m/s}^2$
- (3) $u = 0.2 \text{ m/s}, a = 0.2 \text{ m/s}^2$
- (4) $u = 2 \text{ m/s}, a = 2 \text{ m/s}^2$

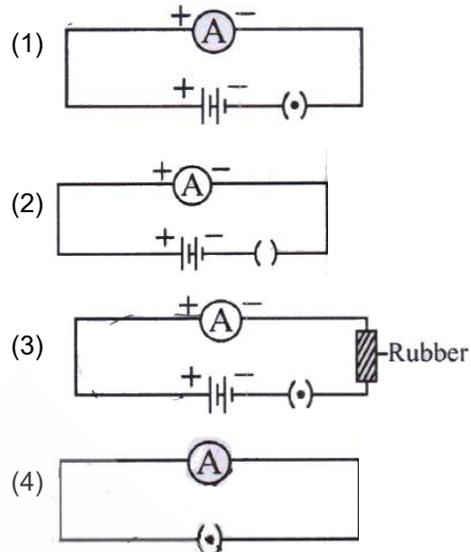
Answer (incorrect)

Sol.



As $(x - t)$ graph is straight line so its velocity is constant, hence acceleration become 0.

110. In which of the following circuits ammeter shows deflection?



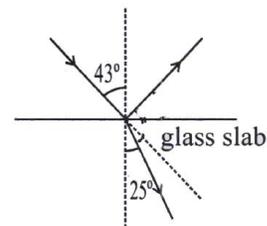
Answer (1)

Sol. In the figure (2) key is not closed

In the figure (3) Current will not flow because rubber is connected in series with it and rubber is an insulator.

In the figure (4) – Battery is not there, so, no flow of current

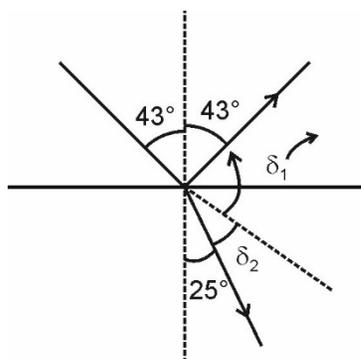
111. In partial reflection and refraction of light from surface of glass slab, if angle of incidence $\angle i = 43^\circ$ and angle of refraction $\angle r = 25^\circ$, then the reflected ray and refracted ray are deviated from the incident ray by _____ and _____ respectively



- (1) $18^\circ, 94^\circ$
- (2) $94^\circ, 18^\circ$
- (3) $112^\circ, 15^\circ$
- (4) $15^\circ, 112^\circ$

Answer (2)

Sol.



S_1 (reflected ray)

$$= 180 - 2i$$

$$= 180 - 86 = 94^\circ$$

$$S_2 = i - r$$

$$= 43 - 25 = 18^\circ$$

112. Three bulbs of 100 W each, a fan of 1500 W and an electric iron of 1100 W are daily operated for 5 hours, 7 hours and 2 hours respectively. What will be the total electrical consumption expenses of these appliances for the month of April. [The electrical company charges 5 ₹ /unit]

- (1) ₹ 1500 (2) ₹ 1080
(3) ₹ 2130 (4) ₹ 2080

Answer (3)

Sol. Power of 3 Bulb = $3 \times 100 = 300$ W and operated for 5 hr.

$$\therefore \text{Energy} = \text{Power} \times \text{time}$$

$$\therefore \text{Energy} = 300 \times 5 = 1500 \text{ W-hr} = 1.5 \text{ kW-hr}$$

$$\text{Energy of Fan} = 1500 \times 7 = 10500 \text{ W-hr} = 10.5 \text{ kW-hr}$$

$$\text{Energy of Iron} = 1100 \times 2 = 2.2 \text{ kW-hr}$$

Energy consumed in Month of April (30 days)

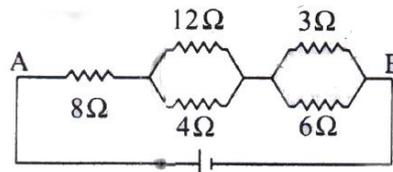
$$\begin{aligned} \therefore E_{\text{Total}} &= (E_B + E_F + E_I) \times 30 \\ &= (1.5 + 10.5 + 2.2) \times 30 \text{ kW-hr} \\ &= (14.2 \times 30) \text{ kW-hr} \end{aligned}$$

$$1 \text{ Unit} = 1 \text{ kW-hr}$$

$$\text{Cost of 1 unit} = 5$$

$$= 2130 \text{ Rs}$$

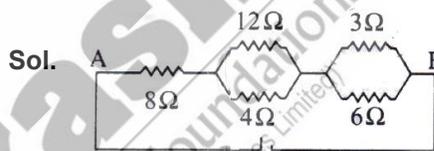
113. In the circuit diagram shown in figure potential difference across 3Ω resistance is 10V. Match the following two columns.



Potential difference across resistances	Resistances
(i) 65 V	(A) 6 Ω
(ii) 40 V	(B) 4 Ω
(iii) 15 V	(C) 8 Ω
(iv) 10 V	(D) AB

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

Answer (1)



Potential across $3 \Omega = 10$ V (Given)

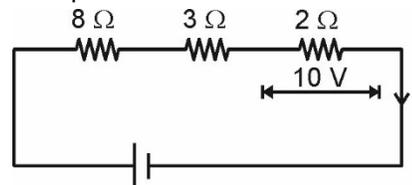
\therefore Potential across $3 \Omega = 10$ V (connected in parallel)

Here 12Ω & 4Ω are in parallel so their equivalent is 3Ω .

Similarly, 3Ω & 6Ω are in parallel.

So, their equivalent is 2Ω

So, the equivalent circuit is



So, current across 2Ω resistor is,

$$10 \text{ V} = I \times 2 \Omega$$

$$I = \frac{10}{2} = 5 \text{ A}$$

Voltage across 8Ω will be $\rightarrow I \times R = 5 \times 8 = 40$ V

Voltage across 3Ω will be $\rightarrow IR = 5 \times 3 = 15$ V

Voltage difference across AB

$$V_{AB} = 40 + 15 + 10$$

$$V_{AB} = 65 \text{ V}$$

114. As per Dalton's sign, the symbol of hydrogen element is represented by

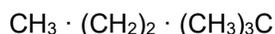
- (1)  (2) 
 (3)  (4) 

Answer (1)

Sol.  is the correct option

- (2)  – Copper (4)  – sulphur
 (3)  – Carbon

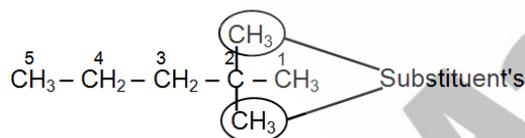
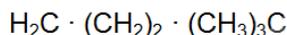
115. What is the IUPAC name of the following compound?



- (1) 2, 2-dimethyl butane
 (2) 2-methyl butane
 (3) 2, 2-dimethyl pentane
 (4) 2-methyl pentane

Answer (3)

Sol. 2, 2 - dimethyl pentane is the correct option



116. Extraction of gold metal is done by _____ method.

- (1) Froth floatation method
 (2) Leaching method
 (3) Magnetic separation method
 (4) Hydraulic separation method

Answer (2)

Sol. Leaching method is the correct option.

117. Comparative atomic radius of beryllium is _____.

- (1) Be > Li (2) B > Be
 (3) Li > Be (4) Be < N

Answer (3)

Sol. Li > Be is the correct option

Atomic Radius decreases across a period from left to right.

118. Identify the oxidation process from the following—

- (A) $\text{Zn} \rightarrow \text{Zn}^{++}$ (B) $\text{Fe}^{3+} \rightarrow \text{Fe}^{2+}$
 (C) $\text{Zn}^{++} \rightarrow \text{Zn}$ (D) $\text{Fe}^{2+} \rightarrow \text{Fe}^{3+}$
 (1) A & C (2) B & D
 (3) B & C (4) A & D

Answer (4)

Sol. A & D is the correct option

- (A) $\text{Zn} \rightarrow \text{Zn}^{++}$ loss of $2e^-$
 \therefore oxidation
 (B) $\text{Fe}^{3+} \rightarrow \text{Fe}^{2+}$ gain of $1e^-$
 \therefore reduction
 (C) $\text{Zn}^{++} \rightarrow \text{Zn}$ gain of $2e^-$
 \therefore reduction
 (D) $\text{Fe}^{2+} \rightarrow \text{Fe}^{3+}$ loss of $1e^-$
 \therefore oxidation

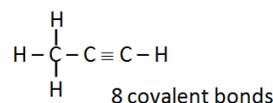
119. How many covalent bonds are present in propyne molecule?

- (1) 8 (2) 7
 (3) 6 (4) 5

Answer (1)

Sol. 8 is the correct option

Propyne Chemical formula C_3H_4



120. The substance in molten state is diluted in water and cooled to 50°C results into precipitation of aluminium hydroxide. The substance is _____.

- (1) Na_2O (2) Al_2O_3
 (3) NaAlO_2 (4) SiO_2

Answer (3)

Sol. NaAlO_2 is the correct option



121. Actual atomic mass of Sr is 87.6. What is the average atomic mass of Sr. according to Dobereiner's triad?

- (1) 88.7 (2) 87.2
 (3) 88.2 (4) 88.0

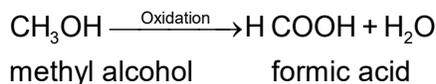
Answer (1)

Sol. Fact

122. Oxidation product of methyl alcohol is _____.
- (1) acetic acid (2) methyl amine
 (3) formic acid (4) ethyl acetate

Answer (3)

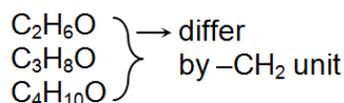
Sol. Formic acid is the correct option



123. Which of the following is not an example of homologous series?
- (1) C₂H₆O (2) C₄H₈O
 (3) C₄H₁₀O (4) C₃H₈O

Answer (2)

Sol. C₄H₈O is the correct option



124. From the given diagram, identify the element 'X' and 'Y'.

Group	13	14	15	16	17	18
period ↓						
II	B					
III		Si				
IV		'X'	As			
V			'Y'	Te		
VI					At	

- (1) Ga & Sn (2) Ge & Po
 (3) Ge & Sb (4) Sb & Po

Answer (3)

Sol. Ge & Sb is the correct option

125. Reddish coloured poisonous gas is produced when copper reacts with nitric acid, the gas is _____.
- (1) NO₂ (2) NO
 (3) N₂O (4) N₂O₂

Answer (1)

Sol. NO₂ is the correct option



126. How many atoms are present in a mole of Ca(HCO₃)₂?
- (1) 5 × 6.02 × 10²³ (2) 7 × 6.02 × 10²³
 (3) 9 × 6.02 × 10²³ (4) 11 × 6.02 × 10²³

Answer (4)

Sol. 11 × 6.02 × 10²³ is the correct option



1 mole = 6.022 × 10²³ molecules

1 molecule of Ca(HCO₃)₂ = 11 atoms

1 mol of Ca(HCO₃)₂ = 11 × 6.02 × 10²³ atoms

127. Carbon dating method developed by Willard Libby is based upon the radioactive decay of naturally occurring carbon _____.
- (1) C¹⁴ (2) C¹¹
 (3) C⁶ (4) C²²

Answer (1)

Sol. Carbon dating method is based on radioactive decay of naturally occurring C-14

128. In which of the following cells a cell plate is formed exactly along midline of the cell and thus completing cytokinesis?
- (1) Blood cells
 (2) Muscle cells
 (3) Nerve cells
 (4) Cells in the root of onion

Answer (4)

Sol. Cell plate is formed exactly along midline of the cell in case of plant cells and thus cytokinesis is completed. Rest of the option are of animal cell. So, option 4 correct.

129. Identify the members in embryo-sac of flowers before fertilization occurs
- (1) one haploid egg cell and one haploid male gamete
 (2) two haploid male gametes and two haploid polar nuclei
 (3) one haploid egg cell and two haploid polar nuclei
 (4) one haploid male gamete and two haploid polar nuclei

Answer (3)

Sol. Embryo sac formed in each ovule by meiosis, consists of a haploid egg cell and two haploid polar nuclei

130. What is indicated in clause 49A of Wildlife Protection Act 1972?
- (1) Ban on use of articles prepared from skin or organs of wild animals
 (2) Compulsion for disclosure of stock of artifacts made from rare wild animals
 (3) Ban on trading of rare wild animals
 (4) Completely ban on migration of rare animals

Answer (3)

Sol. As per clause 49 A of wildlife protection Act 1972, trading of rare animals has been completely banned

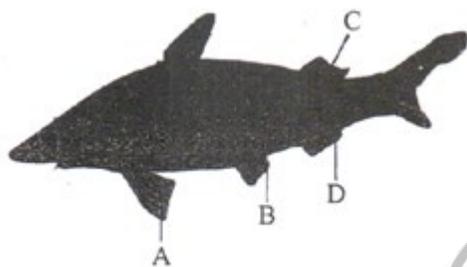
131. 'Molai Jungle' is in which state?

- (1) Meghalaya
- (2) Assam
- (3) Arunachal Pradesh
- (4) Nagaland

Answer (2)

Sol. The jungle in Kokilamukh of Jorhat district of Assam is well known as 'Molai Jungle'

132. Identify pelvic fin in the given figure.



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

Answer (2)

Sol. A- pectoral fin, B- pelvic fin, C- posterior dorsal fin, D- ventral fin

133. _____ is most clever animal among all non-chordates and which can change its colour

- (1) Octopus
- (2) Lizard (chameleon)
- (3) Snail
- (4) Balanoglossus

Answer (1)

Sol. Octopus is most clever animal among all non-chordates. It can change its colour

134. Which is effective antibiotics against tuberculosis?

- (1) cephalosporins
- (2) neomycin
- (3) streptomycin
- (4) rifamycin

Answer (4)

Sol. Rifamycin is effective against tuberculosis

135. Glucose and fructose syrup can be obtained from cornflour by action of enzymes obtained from _____ and _____

- (1) Brevibacterium and Corynebacterium
- (2) Hansenula and lacto-bacillus brevis
- (3) Saccharomyces cerevisiae and Candida
- (4) bacillus and Streptomyces

Answer (4)

Sol. Glucose and fructose syrup can be obtained from corn flour by action of enzymes obtained from bacillus and Streptomyces

136. From the following pairs of living organisms which pair is used for freshwater fishery?

- (1) Rohu, Catla
- (2) Shrimp, lobsters
- (3) Rohu, lobsters
- (4) Catla, lobsters

Answer (1)

Sol. Rohu and Catla are freshwater fishes

137. Consumption of tobacco products lead to which disease in human beings?

- (1) tuberculosis
- (2) AIDS
- (3) cancer of the lungs
- (4) leprosy

Answer (3)

Sol. Tobacco consumption leads to cancer of the lungs

138. Identify action plan from the following pre-disaster management

- (1) Participation of preferably local people saved from the disaster in arranging help of victims.
- (2) Quick establishment of help centre
- (3) Categorization of the help material received from control centre, delivering the material to victims
- (4) Increasing awareness about disaster management among the general public

Answer (4)

Sol. The other options are steps taken under action plan for post-disaster management. So option 4 is correct

139. Amongst the following which disease spread through bacteria?

- (1) Hepatitis
- (2) Pneumonia
- (3) Influenza
- (4) Chicken pox.

Answer (2)

Sol. It is a bacterial disease. Rest all are viral diseases.

140. Identify the odd pair of hormone and its function from the following:

- (1) Gibberellins-helps in elongation in stem
- (2) Cytokinins-help in cell division
- (3) Abscisic acid-production of flowers
- (4) Auxin-help in enlargement of cells

Answer (3)

Sol. It does not help in production of flowers, it prevents growth.

141. Annales School gave a new direction to history writing. Identify the newly recognized aspect which was stated by Annales School.

- (1) History is only about political events
- (2) Great leaders and their accordingly politics
- (3) Study of trade technology means of – communication
- (4) Study of kings and wars

Answer (3)

Sol. Fact

142. Who argued that the prevailing practice of arranging historical events in a chronological order is not right?

- (1) Michel Foucault
- (2) Karl Marx
- (3) Leopold Von Ranke
- (4) Friedrich Hegel

Answer (1)

Sol. Fact

143. Ishwardas Nagar, Bhimsen Saxena were the historians of _____'s times.

- (1) Jahangir
- (2) Aurangzeb
- (3) Shahjahan
- (4) Akbar

Answer (2)

Sol. Fact

144. Identify the style of painting which influenced Maratha style of painting.

- | | |
|-----------------|-------------------|
| (1) Art Style | (2) Varli Kala |
| (3) Rajput Kala | (4) Classical Art |

Answer (3)

Sol. Fact

145. The temples built in the Hemadpanti style and places of it are given below. Identify the wrong pair.

- | | |
|-------------|------------------|
| (1) Verul | – Kailash |
| (2) Mumbai | – Ambreshwar |
| (3) Nashik | – Gondeshwar |
| (4) Hingoli | – Aundha Nagnath |

Answer (1)

Sol. Fact

146. Newspaper _____ began to publish articles about the nationwide situations, books in the native languages and the politics in other countries.

- (1) Maratha
- (2) Kesari
- (3) Deenbandhu
- (4) Indu Prakash

Answer (2)

Sol. Fact

147. Who was the editor of the periodical named 'Pragati' (1929)?

- (1) Pandit Narendra Sharma
- (2) Balshastri Jambhekar
- (3) Traymbak Shankar Shejwalkar
- (4) Gopal Hari Deshmukh

Answer (3)

Sol. Fact

148. Identify the correct option from the alternatives given below.

- | | |
|---------------------|-------------------------|
| (I) Patan at Gujrat | (a) The Capital Complex |
| (II) Hampi | (b) Chhau Dance |
| (III) Chandigarh | (c) Rani-Ki-Vav |
| (IV) West Bengal | (d) Group of Monuments |

- (1) (I) – d, (II) – a, (III) – b, (IV) – c
- (2) (I) – c, (II) – d, (III) – a, (IV) – b
- (3) (I) – b, (II) – c, (III) – d, (IV) – a
- (4) (I) – a, (II) – b, (III) – c, (IV) – d

Answer (2)

Sol. Fact

149. Identify the wrong pair related to the movie and its directors.

- | | |
|-----------------------|------------------------|
| (1) Bal Shivaji | – Prabhakar Pendharkar |
| (2) Dhanya te Santaji | – Dinakar D. Patil |
| | Dhanaji |
| (3) Bajirao Mastani | – Bhalji Pendharkar |
| (4) Baji Prabhu | – Dadasaheb Torane |
| | Deshpande |

Answer (4)

Sol. Fact

150. _____ scheme was launched in 1970-1971 in Maharashtra.
- (1) Rural Water Supply
 - (2) Nutritious diet
 - (3) To supply more electricity for pumps
 - (4) Pulse Polio Vaccination

Answer (2)

Sol. Fact

151. Which game was not mentioned in the ancient Indian literature and in the EPICS?
- (1) Dice (dyut)
 - (2) Horse and the chariot races
 - (3) Boxing
 - (4) Chess

Answer (3)

Sol. Fact

152. Identify the name of the book which has description of flying dolls?
- (1) Kathasaritsagar
 - (2) Kitchak Vadh
 - (3) Harshacharit
 - (4) Manasollas

Answer (1)

Sol. Fact

153. Observe the picture and identify the name of the cave, where this sculpture is carved.



- (1) Ajanta
- (2) Gharapuri
- (3) Panhalaje
- (4) Verul

Answer (2)

Sol. Fact

154. Identify first nuclear reactor of India functioning on atomic energy.
- (1) Dhruv
 - (2) Apsara
 - (3) Tarapur
 - (4) Zarrina

Answer (2)

Sol. Fact

155. Which five-year plan consisted of measures to lay the foundation of planned economic development?

- (1) Second
- (2) Third
- (3) Fourth
- (4) First

Answer (4)

Sol. Fact

156. Identify the well-known play of Shakespeare on which Marathi play 'Natsamarat' was styled?
- (1) Hamlet
 - (2) King Lear
 - (3) Julius Ceaser
 - (4) Romeo – Juliet

Answer (2)

Sol. Fact

157. Which provision is not included in the basic structure of the constitution?
- (1) Federal structure of constitution
 - (2) Promotion of unity and integrity of the nation
 - (3) Sovereignty of the nation
 - (4) Supremacy of parliament

Answer (4)

Sol. Fact

158. After which reform the farmers' movement became more active and effective?
- (1) Tenancy laws
 - (2) Laws related to titling of the lands
 - (3) Debt relief
 - (4) Green revolution

Answer (4)

Sol. Fact

159. Choose the wrong option which is not mentioned in Article 51 of the Indian constitution.
- (1) Establish international peace and security
 - (2) Foster respect for international law
 - (3) Discourage settlement of international disputes by arbitration
 - (4) Maintain justice and honourable relations between nations.

Answer (3)

Sol. Fact

160. According to you, which two conditions among the options are violating code of conduct?

- (A) The candidate distributes items of household use
- (B) Promise made to resolve the water problem if elected
- (C) To go from door-to-door to meet voters and request them to vote
- (D) To appeal on the basis of caste and religion to get support

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

Answer (2)

Sol. Fact

161. Who is known as 'Waterman of India'?

- (1) Shree Anna Hajare
- (2) Sardar Vallabhbhai Patel
- (3) Dr. Rajendra Singh Rana
- (4) Shree Sundarlal Bahuguna

Answer (3)

Sol. Fact

162. Which organ of the United Nation passes the annual budget of United Nation as its function?

- (1) General Assembly
- (2) Security Council
- (3) Economic and Social Council
- (4) Trustship Council

Answer (1)

Sol. Fact

163. The idea of party less democracy is put forth by the following leaders. Choose the wrong option. Name of the leader who does not support the concept of party less democracy.

- (1) Mahatma Gandhi (2) Lokmanya Tilak
- (3) Vinoba Bhave (4) Jaiprakash Narayan

Answer (2)

Sol. Fact

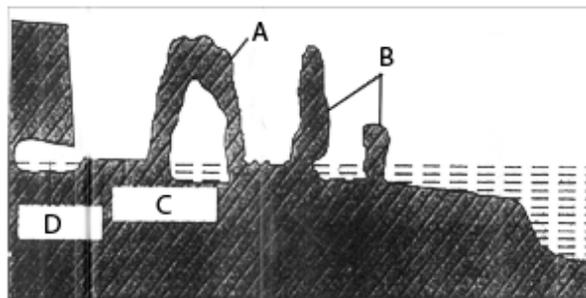
164. Choose the number of percentage which has been raised to increase representation of women in politics.

- (1) 33% (2) 50%
- (3) 60% (4) 58%

Answer (2)

Sol. Fact

165. In the above diagram wave cut platform has been shown with letter _____.



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

Answer (3)

Sol. Fact

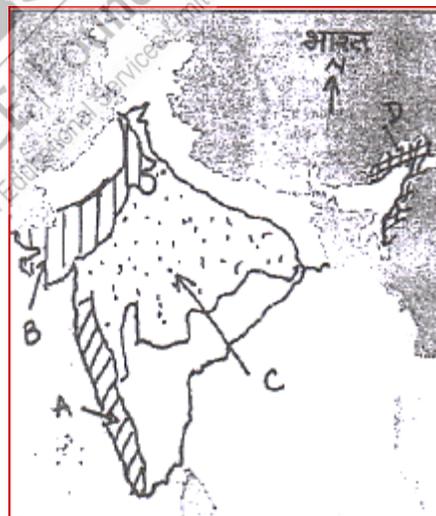
166. Increase in the _____ is an indicator of development of that society of a country.

- (1) Life expectancy (2) Sex ratio
- (3) Density (4) Population

Answer (1)

Sol. Fact

167. Match the appropriate pair of a region and its major forest type shown with the code letters in the outline map of India.



- (I) Himalayan forest
- (II) Deciduous forest
- (III) Thorny shrubs forest
- (IV) Evergreen forest
- (1) A – II, B – IV, C – I, D – III
- (2) A – IV, B – III, C – II, D – I
- (3) A – I, B – II, C – III, D – IV
- (4) A – III, B – I, C – IV, D – II

Answer (2)

Sol. Fact

168. _____ from the Western Rajasthan is considered as the most dry part in India.

- (1) Jaisalmer (2) Ajmer
 (3) Jodhpur (4) Jaipur

Answer (1)

Sol. Fact

169. Identify the wrong statement from the statements given below:

- (1) Brazil is fifth in the world with respect to area
 (2) The density of population in Brazil is around 230 persons per sq. km.
 (3) According to census 2011 population of India was 121 crores.
 (4) According to census 2011 India's density of population is 382 persons per sq. km.

Answer (2)

Sol. Fact

170. In India about _____ percent of passengers are carried by road.

- (1) 75% (2) 65%
 (3) 85% (4) 80%

Answer (3)

Sol. Fact

171. In which direction of Brazil, there is no sea coast?

- (1) East (2) West
 (3) South (4) North

Answer (2)

Sol. Fact

172. Identify the correct option for correct pairs:

Column 'A'

Column 'B'

- | | |
|-----------------------|--------------------|
| (A) Pantanal | (I) Pink dolphins |
| (B) Looks like a lion | (II) Condors |
| (C) Fish variety | (III) Anacondas |
| (D) Huge sized bird | (IV) Golden tamrin |

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

Answer (1)

Sol. Fact

173. Which one of the following is not a major trading partner of Brazil?

- (1) Pakistan (2) Germany
 (3) India (4) Canada

Answer (1)

Sol. Fact

174. What type of tourism is developing in Brazil?

- (1) Historical (2) Cultural
 (3) Eco-tourism (4) Professional

Answer (3)

Sol. Fact

175. Choose the correct order of mountain ranges from Southern Himalayan ranges to Northern Himalayan ranges.

- (1) Lesser Himalayas – Sivaliks – Himadri
 (2) Sivaliks – Himadri – Lesser Himalayas
 (3) Himadri – Lesser Himalayas – Sivaliks
 (4) Sivaliks – Lesser Himalayas – Himadri

Answer (4)

Sol. Fact

176. India is located in the _____ hemispheres of the earth.

- (1) Southern and Eastern
 (2) Northern and Eastern
 (3) Northern and Western
 (4) Southern and Western

Answer (2)

Sol. Fact

177. Which international organization is using the logo printed below?



- (1) World Trade Organization (W.T.O.)
 (2) ASEAN
 (3) APEC
 (4) OPEC

Answer (4)

Sol. Fact

178. _____ is the most urbanized state in India.

- (1) Maharashtra (2) Gujarat
 (3) Goa (4) Kerala

Answer (3)

Sol. Fact

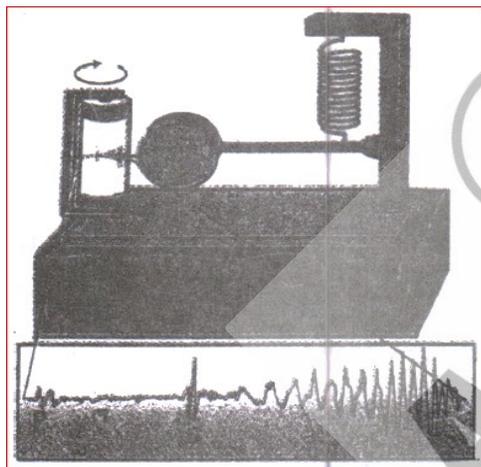
179. Identify the wrong pair:

River	Tributary
(1) Ganga	– Yamuna
(2) Sindhu	– Satluj
(3) Krishna	– Tungabhadra
(4) Tapi	– Bhima

Answer (4)

Sol. Fact

180. Which letter indicates the surface waves in the given diagram?



- (1) P (2) S
 (3) M (4) L

Answer (4)

Sol. Fact

181. Arpita has some coins of ₹ 1 and ₹ 2. The total number of coins that she has is 50. Total amount that she has is ₹ 75. Find the number of coins that she has of ₹ 1 and ₹ 2 respectively.

- (1) 35 and 15 (2) 35 and 20
 (3) 15 and 35 (4) 25 and 25

Answer (4)

Sol. Let ₹ 1 and ₹ 2 coins x and y

$$x + y = 50$$

$$x + 2y = 75$$

$$\therefore y = 25; x = 25$$

182. One root of the quadratic equations $x^2 - bx + 6 = 0$ and $x^2 - 6x + c = 0$ is equal. The ratio of the remaining roots is 3 : 4. If all the roots are positive integers find the value of b and c respectively.

- (1) 3, 4 (2) 5, 8
 (3) 1, 6 (4) 8, 5

Answer (2)

Sol.

Let equal roots is x

Two roots of $x^2 - bx + 6 = 0$ are α and $3k$

$$\text{Product of roots } (\alpha)(3k) = 6 \quad \dots(1)$$

Two roots of $x^2 - 6x + c = 0$ α and $4k$

$$\text{Product of roots } (\alpha)(4k) = c \quad \dots(2)$$

From (1) and (2)

$$\frac{3}{4} = \frac{6}{c} \Rightarrow c = 8$$

Second eq is $x^2 - 6x + 8 = 0$

$$x = 4, 2$$

If equal roots is 2, from eq 1

$$(2)^2 - b(2) + 6 = 0$$

$$b = 5$$

183. Speed of the boat in still water is 6 km / hr. The time required to go downstream is half of the time required to go upstream. Find the speed of the water current.

- (1) 5 km / hr
 (2) 4 km / hr
 (3) 3 km / hr
 (4) 2 km / hr

Answer (4)

Sol. Speed of boat (in still water) = 6 km/hr

Speed of current = y km / hr

Let distance is d km

$$\frac{1}{2} \left(\frac{d}{6-y} \right) = \left(\frac{d}{6+y} \right)$$

$$6+y = 12-2y$$

$$3y = 6$$

$$y = 2 \text{ km / hr}$$

184. The sum of the 3rd and 8th term of an A.P is 7 and the sum of the 7th term and 14th term is -3. Find the 10th term of the A.P

- (1) -1 (2) +1
 (3) 0 (4) 2

Answer (1)

Sol. $T_3 + T_8 = 7$

$$(a + 2d) + (a + 7d) = 7$$

$$2a + 9d = 7 \quad \dots(1)$$

$$T_7 + T_{14} = -3$$

$$a + 6d + a + 13d = -3$$

$$2a + 19d = -3 \quad \dots(2)$$

From (1) and (2)

$$10d = -10 \Rightarrow d = -1$$

$$\therefore a = 8$$

$$T_{10} = a + 9d$$

$$= 8 + 9(-1)$$

$$= -1$$

185. A bag contains 5 red and some blue balls. One ball is taken out of the bag at random. The probability that the ball taken out is blue is double of the probability that the ball drawn is red. Find the total number of balls in the bag.

- (1) 15 (2) 10
 (3) 5 (4) 20

Answer (1)

Sol. Let number of blue balls = x

$$\text{Total balls} = (5 + x)$$

$$P(R) = \frac{5}{5 + x}$$

$$P(B) = \frac{x}{5 + x}$$

$$P(B) = 2P(R)$$

$$\frac{x}{5 + x} = 2 \left(\frac{5}{5 + x} \right)$$

$$x = 10$$

186. 'n' is an odd number. Which of the following statement is true?

- (1) $(2^n + 1)$ is divisible by 5
 (2) $(2^n + 1)$ is divisible by 3
 (3) $(2^n - 1)$ is divisible by 5
 (4) $(2^n - 1)$ is divisible by 3

Answer (2)

Sol. Fact

187. The first term in an A.P is 1. Common difference is 3. If the sum of the 'n' terms in the A.P is 2380, find the nth term.

- (1) 117 (2) 118
 (3) 119 (4) 120

Answer (2)

$$\text{Sol. } S_n = \frac{n}{2} [2a + (n-1)d]$$

$$2380 = \frac{n}{2} [2 + (n-1)3]$$

$$4760 = n[3n - 1]$$

$$3n^2 - n - 4760 = 0$$

$$\therefore n = 40$$

$$T_{40} = 1 + (40 - 1)3$$

$$= 1 + 117$$

$$= 118$$

188. Find the probability that a leap year has 53 Sundays.

- (1) $\frac{4}{7}$ (2) $\frac{3}{7}$
 (3) $\frac{2}{7}$ (4) $\frac{1}{7}$

Answer (3)

Sol. Cases of 53 Sunday in leap year.

(Sun, Mon), (Mon, Tue), (Tue, Wed), (Wed, Th),
 (Th, Fri), (Fri, Sat), (Sat, Sun)

Out of 7 cases, two give 53 Sundays

$$P(S) = \frac{2}{7}$$

189. Observe the following frequency distribution table. It shows the distances travelled by 250 public transport buses in a day. Find the median of the distance travelled.

Distance in (km)	200-210	210-220	220-230	230-240	240-250
No. of buses	40	60	80	50	20

- (1) 225 (2) 217.80
(3) 223.125 (4) 230

Answer (3)

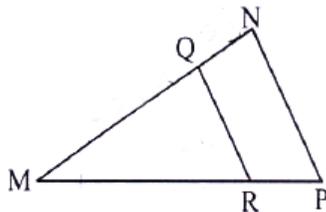
Sol. Median = $l + \left(\frac{n/2 - cf}{f} \right) \times h$
 $= 220 + \left(\frac{250/2 - 100}{80} \right) \times 10$
 $= 220 + \frac{25}{8}$
 $= 220 + 3.125$
 $= 223.125$

190. If $a + b = 2\sqrt{3}$ and $ab = 3$ then $a^4 + b^4 = ?$
 (1) 14 (2) 16
 (3) 18 (4) 20

Answer (3)

Sol. $a + b = 2\sqrt{3}$
 $ab = 3$
 $(a + b)^2 = a^2 + b^2 + 2ab$
 $(2\sqrt{3})^2 = a^2 + b^2 + 6$
 $a^2 + b^2 = 6$
 $(a^2 + b^2)^2 = 6^2$
 $a^4 + b^4 + 2a^2b^2 = 36$
 $a^4 + b^4 = 36 - 18 \Rightarrow 18$

191. In $\triangle MNP$ Seg. $QR \parallel$ Seg. NP . If $3.2 QN = 5.3 QM$ and $QR = 6.4$ then $NP = ?$



- (1) 11.7 (2) 17
(3) 10.4 (4) 15.9

Answer (2)

- Sol.** If $3.2QN = 5.3QM$

$$\frac{QM}{QN} = \frac{32}{53}$$

$$\frac{QM}{QM + QN} = \frac{32}{53 + 32}$$

$$\frac{QM}{MN} = \frac{32}{85}$$

We Know $\frac{QR}{NP} = \frac{QM}{MN}$

$$\frac{6.4}{NP} = \frac{32}{85}$$

$$NP = 17$$

192. If point $P(x, y)$ is equidistant from points $Q(-2, 5)$ and $R(6, -1)$ then find the relation between x and y .

- (1) $4x - 3y = 2$ (2) $x - 3y = 2$
 (3) $4x + 3y = -2$ (4) $2x - 3y = 2$

Answer (1)

Sol.



$$PQ^2 = PR^2$$

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

$$x^2 + 4 + 4x + y^2 + 25 - 10y = x^2 + 36 - 12x + y^2 + 1 + 2y$$

$$4x - 10y + 29 = -12x + 2y + 37$$

$$16x - 12y = 8$$

$$4x - 3y = 2$$

193. From the information given below find out which triangles can not be constructed. Choose the correct alternative.

- (A) $PQ = 6.2$ cm; $(PR + QR)^2 = 81$ cm
 (B) $AB = 13\sqrt{3}$ cm; $BC = 11\sqrt{2}$ cm; $AC = 5\sqrt{7}$ cm
 (C) $XY = 0.2$ m; $YZ = 0.21$ m; $XZ = 0.29$ m
 (D) $MN + NP = 4$; $NP + PM = 8$; $MN + PM = 6$
 (1) Only B and C (2) Only A and C
 (3) Only A and D (4) Only B and D

Answer (3)

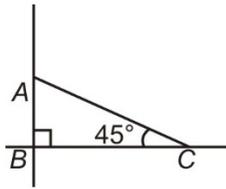
- Sol.** Sum of two sides of triangle more than third side and their difference less than third side.

194. A storm broke a tree and the treetop rested $13\sqrt{6}$ m from the base of the tree, making an angle 45° with the horizontal. Find the height of the tree.

- (1) $26\sqrt{6}$ m
- (2) $13\sqrt{3}(2 + \sqrt{2})$ m
- (3) $26\sqrt{3}$ m
- (4) $26\sqrt{2} + 13\sqrt{3}$ m

Answer (2)

Sol.



$$BC = 12\sqrt{6} \text{ cm}$$

$$\therefore AB = 13\sqrt{6} \text{ cm}$$

$$AC = 13\sqrt{12} \text{ cm}$$

$$\text{Height of tree} = AB + AC$$

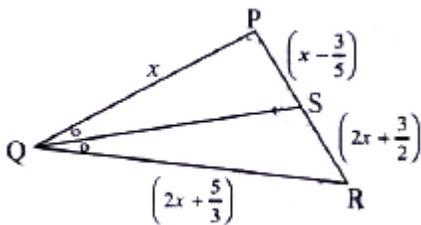
$$= 13\sqrt{6} + 13\sqrt{12}$$

$$= 13\sqrt{3}(\sqrt{2} + 2)$$

195. In ΔPQR , Seg. QS is the bisector of $\angle PQR$. If

$$PQ = x; \quad QR = \left(2x + \frac{5}{3}\right); \quad PS = \left(x - \frac{3}{5}\right);$$

$RS = \left(2x + \frac{3}{2}\right)$. Find the value of x . Choose the correct alternative.



- (1) -1
- (2) $\frac{31}{30}$
- (3) $\frac{-31}{30}$
- (4) $\frac{-30}{31}$

Answer (4)

Sol. $\frac{QR}{QP} = \frac{RS}{PS}$

$$\frac{2x + 5/3}{x} = \frac{2x + 3/2}{x - 3/5}$$

$$\left(2x + \frac{5}{3}\right)\left(x - \frac{3}{5}\right) = x\left(2x + \frac{3}{2}\right)$$

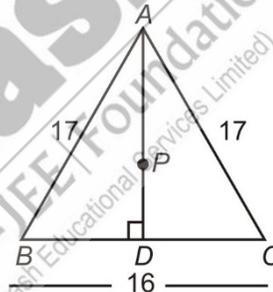
$$\therefore x = \frac{-30}{31}$$

196. In an isosceles triangle length of one of the side of the congruent sides is 17 cm and the length of non-congruent side is 16 cm. Find the distance between the vertex opposite to non-congruent side and the centroid.

- (1) 10 cm
- (2) 8 cm
- (3) 9 cm
- (4) 6 cm

Answer (1)

Sol.



$$AB^2 = AD^2 + BD^2$$

$$289 = AD^2 + 64$$

$$AD^2 = 225$$

$$AD = 15 \text{ cm}$$

$$AP = \frac{2}{3} AD$$

$$= 10 \text{ cm}$$

197. If $\sin\theta + \cos\theta = \frac{3}{2}$ then $\sin\theta \cdot \cos\theta = ?$

- (1) 1
- (2) $\frac{2}{3}$
- (3) $\frac{5}{8}$
- (4) 0

Answer (3)

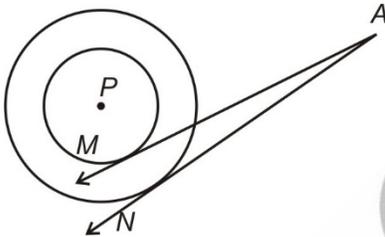
Sol. $\sin \theta + \cos \theta = \frac{3}{2}$

$$(\sin \theta + \cos \theta)^2 = \frac{9}{4}$$

$$\sin^2 \theta + \cos^2 \theta + 2 \sin \theta \cos \theta = \frac{9}{4}$$

$$\sin \theta \cos \theta = \frac{5}{8}$$

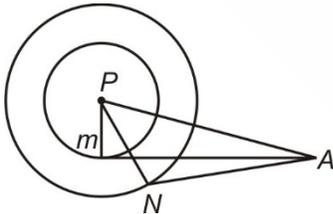
198. P is the centre of two concentric circles having radius 3 cm and 5 cm. Two tangents are drawn from point A which is outside the circle. Tangent AM touches the smaller circle at point M and tangent AN touches the bigger circle at point N. If AM = 13 cm then AN = ?



- (1) $\sqrt{153}$ cm (2) $\sqrt{178}$ cm
(3) $\sqrt{191}$ cm (4) $\sqrt{161}$ cm

Answer (1)

Sol.



$PM = 3$ cm, $PN = 5$ cm, $AM = 13$ cm, $AN = ?$

In $\triangle AMP$,

$$AP^2 = AM^2 + PM^2$$

$$AP^2 = 169 + 9$$

$$AP^2 = 178$$

In $\triangle ANP$,

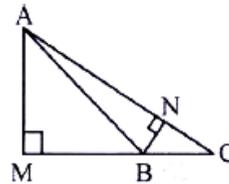
$$AP^2 = AN^2 + PN^2$$

$$178 = AN^2 + 25$$

$$AN^2 = 153$$

$$AN = \sqrt{153} \text{ cm}$$

199. In the adjacent figure Seg. $AM \perp$ Seg. BC , Seg. $BN \perp$ Seg. AC . If $BC = 7$ cm; $AM = 8\sqrt{3}$ cm; $AC = 14\sqrt{3}$ cm then $BN = ?$



- (1) $4\sqrt{3}$ cm (2) $5\sqrt{3}$ cm
(3) $2\sqrt{3}$ cm (4) 4 cm

Answer (4)

Sol.

$BC = 7$ cm, $AM = 8\sqrt{3}$ cm, $AC = 14\sqrt{3}$

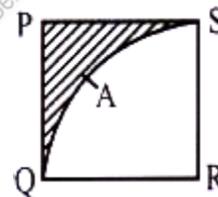
$\triangle AMC$ and $\triangle BNC$

$$\therefore \frac{AM}{BN} = \frac{CA}{BC}$$

$$\frac{8\sqrt{3}}{BN} = \frac{14\sqrt{3}}{7}$$

$$BN = 4 \text{ cm}$$

200. $\square PQRS$ is a square. $PQ = 7\sqrt{3}$ cm with centre R and radius RS , Sector $R-QAS$ is drawn. Find the area of the shaded portion.



- (1) 29.5 cm² (2) 17.5 cm²
(3) 23.7 cm² (4) 31.5 cm²

Answer (4)

Sol. Area of Shaded portion = Area of square – Area of sector

$$= (7\sqrt{3})^2 - \frac{90}{360} \times \pi (7\sqrt{3})^2$$

$$= 147 - \frac{1}{4} \times \frac{22}{7} \times 147$$

$$= 147 - \frac{231}{2}$$

$$= 147 - 115.5$$

$$= 31.5 \text{ cm}^2$$

