DATE : 04/11/2018

Test Booklet Code

A

HARYANA

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)

1. In the following series of numbers, find out how many times 1, 3 and 7 have appeared together, 7, being in the middle and 1 and 3 on either side of 7.

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

(1) 3 (2) 4

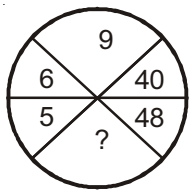
(3) 5 (4) More than 5

Answer (1)

Sol. 2 9 7 3 1 (7) 3 7 7 1 3 3 1 (7) 3 8 5 7 1 3 7 7 1 (7) 3 9 0 6

3 times, So option (1) is the correct answer.

2. ***Direction :*** In the following question insert the missing number in place of question mark from the given alternatives.

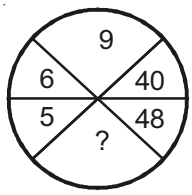


(1) 54 (2) 70

(3) 72 (4) 80

Answer (3)

Sol.



In this question each number is multiplied by 8 to get the number diagonally opposite to it.

$5 \times \boxed{8} = 40$

$6 \times \boxed{8} = 48$

$9 \times \boxed{8} = 72$

3. The following questions are based on letter series in which some letters are missing. The missing letters are given in a proper sequence as one of the alternatives among the given four alternatives under the question.

b __ abbc __ bbca __ bcabb __ ab

(1) acaa (2) acba

(3) cabc (4) cacc

Answer (3)

Sol. bcab/bcab/bcab/bcab/bcab

So answer is cabc

4. The numbers have been arranged under some rule. Based on that rule, which number will come in place of the question mark?

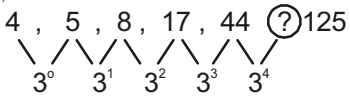
4, 5, 8, 17, 44, ?

(1) 102 (2) 104

(3) 125 (4) 110

Answer (3)

Sol.



So, answer is 125

5. In the question below is given two or more statements followed by two conclusions numbered I and II. You have to take the given statements to be true even if they seem to be at variance from commonly known facts. Read all the conclusion and then decide which of the given conclusions logically follows from the given statements disregarding commonly known facts

Statements:

No giraffe is leopard.

All leopards are kangaroos.

All kangaroos are wolfs.

Conclusions:

(I) All kangaroos can never the giraffes.

(II) All giraffes are definitely wolfs.

Given Answer

(1) If only conclusion I follows

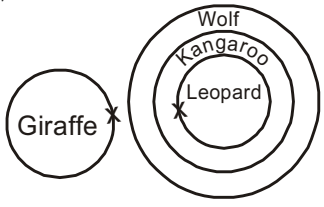
(2) If only conclusion II follows

(3) If either conclusion I or conclusion II follows

(4) If both conclusion I and II follows

Answer (1)

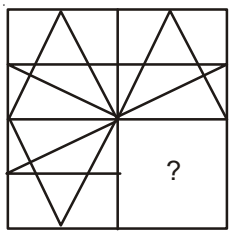
Sol.



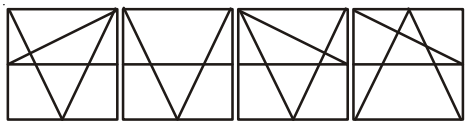
Conclusion(1) is true as all leopards are kangaroos and it is also given that no giraffe is a leopards. So all the kangaroos can never be giraffes is true.

Conclusion (2) is false as we can see from the basic Venn-Diagram that there are no giraffes that are wolfs.

6. Identify the figure that completes the pattern (x)



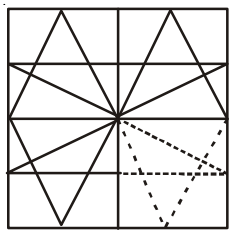
(X)



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

Answer (3)

Sol.



7. A monkey climbs 10 meters at the beginning of each hour and rest for a while when he slips back 5 metres before he again starts climbing in the beginning next hour. If he starts climbing at 8 a.m. at what time will be first touch the flag at 50 metres from the ground?

(1) 4 p.m. (2) 5 p.m.

(3) 6 p.m. (4) 7 p.m.

Answer (2)

Sol. First, find out the time to reach (50–10) = 40 mtr.

In 1 hour he reach [10 mtr (↑) – 5 mtr (↓)] = 5 mtr.

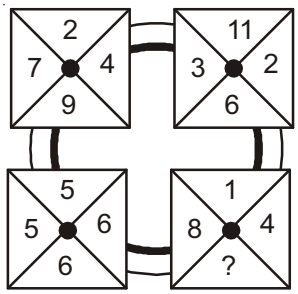
So, to reach 40 mtr he takes = 8 hrs.

In next hour he takes a jump of 10 mtr and reach the top.

So total time to reach the top is 9 hrs.

It reach the top by 5:00 PM.

8. Which number replaces the question mark?

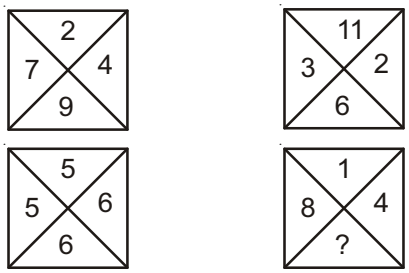


(1) 9 (2) 11

(3) 12 (4) 13

Answer (1)

Sol.



Sum of the numbers in each square is 22.

9. Which number replace the question mark in the figure given below?

3	GNQ	8
3	RBS	9
4	TUA	2
2	FPC	5
3	OLH	?

(1) 3

(2) 5

(3) 8

(4) 9

Answer (2)

Sol.

3	GNQ	8
3	RBS	9
4	TUA	2
2	FPC	5
3	OLH	(?)

G → 7 N → 14 Q → 17

G + N + Q = 38

Now, 38 is used as 3 on the left side and 8 on the right side.

Similarly

O → 15 L → 12 H → 8

O + L + H = 35

So In place of (?) we get 5.

10. In a family of eight people, lawyer is married to a teacher and has three sons, one engineer, one doctor and one actor. The actor's wife is a dancer and aunt of Emily. Emily, the daughter of engineer learns martial arts with her brother Joseph. How is doctor related to Joseph?

(1) Son

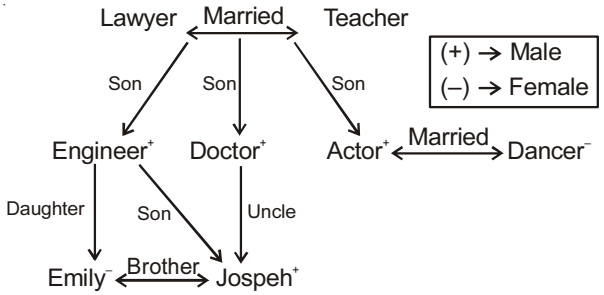
(2) Brother

(3) Nephew

(4) Uncle

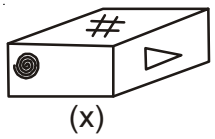
Answer (4)

Sol.

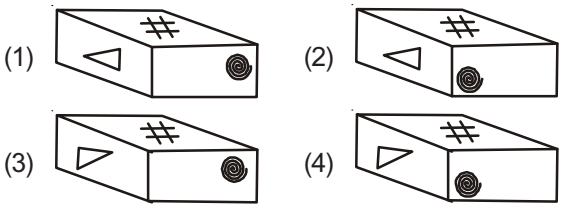


So Doctor is uncle of Jospeh.

11. Which of the following is mirror image of the figure (x) given?



(x)



(1) (2)

(3) (4)

Answer (1)

12. Arrange the following words as per order in the dictionary

(1) Tortoise (2) Torrid

(3) Torso (4) Torque

(5) Tortuous

Options:

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

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

Answer (1)

13. The reflex angle between the hands of a clock at 10:25 is

(1) 180° (2) $192\frac{1}{2}^\circ$

(3) 195° (4) $197\frac{1}{2}^\circ$

Answer (4)

Sol. $M = \frac{2}{11}(30\,T_1 + \theta^\circ)$

M = 48 minute and $T_1 = 10$

$25 = \frac{2}{11}(30 \times 10 + \theta^\circ)$

$\frac{275}{2} = 300 + \theta^\circ$

$\theta^\circ = -300 + \frac{275}{2}$

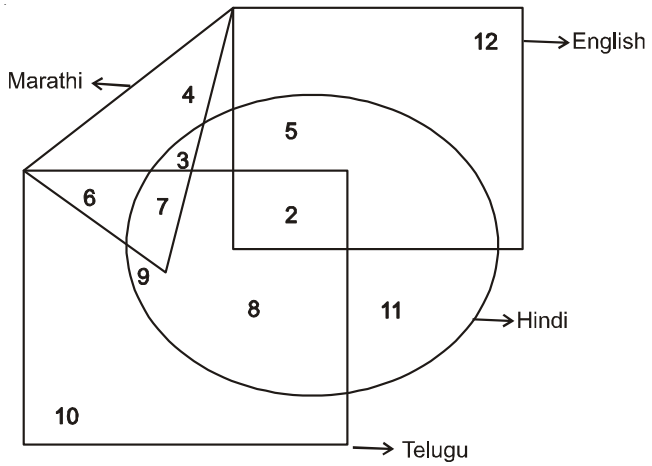
$= \frac{-600 + 275}{2} = \frac{-325}{2} = -162\frac{1}{2}^\circ$

So, angle is $162\frac{1}{2}^\circ$

To find reflex angle subtract it from 360°.

$\Rightarrow \quad 360 - 162\frac{1}{2}^\circ = 197\frac{1}{2}^\circ$

Direction (Q.14 to Q.16) : *In the following figure small square represents the persons who know English, triangle to those who Marathi, big square to those who know Telugu and circle to those who know Hindi. In the different regions of the figures from 2 to 12 are given.*



14. How many persons can speak English and Hindi both languages only?

(1) 5 (2) 8

(3) 7 (4) 18

Answer (1)

15. How many persons can speak English, Hindi and Telugu?

(1) 8 (2) 2

(3) 7 (4) 10

Answer (2)

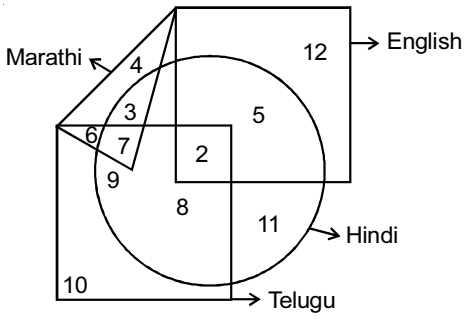
16. How many persons can speak all the languages?

(1) 1 (2) 8

(3) 2 (4) None

Answer (4)

Sol.



17. Choose the alternative which closely resembles the water-image of the given combination.

DISC

(1) CSID (2) ɔƨIᗡ

(3) DIƨC (4) DISC

Answer (3)

Sol. DISC / DIƨC

18. First bunch of bananas has (1/4) again as many bananas as second bunch. If the second bunch has three bananas less than the first bunch, then the number of bananas in the first bunch are

(1) 9 (2) 10

(3) 12 (4) 15

Answer (4)

Sol. Let, Second bunch has x bananas

Then, First bunch has $\frac{x}{4}+x=\frac{5x}{4}$ bananas

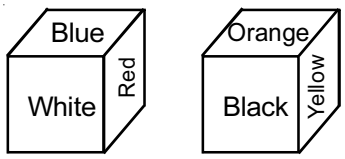
A.T.C

$x=\frac{5x}{4}-3$

$\Rightarrow$ x = 12

Bananas in the first bunch $=\frac{5\times12}{4}=15$ bananas

19. Six sides of a cube are coloured in the following manner



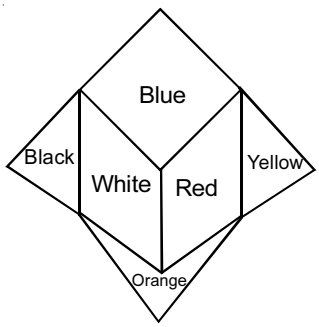
Blue and orange are opposite and Red is on the top which colour will be at the bottom?

(1) Black (2) White

(3) Orange (4) Yellow

Answer (1)

Sol.



Direction (Q.20 to Q.23) : *There are eight persons namely A, B, C, D, E, F, G and H lives on eight different floors from one to eight. Ground floor is number 1 and top floor is number eight but persons do not necessarily live in the same order. Only three persons live below the floor on which E lives. Two persons live between the floor on which E and H live. More than one person live between the floor on which E and A lives. C lives immediately above G. C lives on odd numbered floor. Only one person lives between B and F. B lives one of the above floor on which F lives. D lives on even numbered floor but not on 2nd floor.*

20. Who lives on floor number eight?

(1) B (2) C

(3) A (4) D

Answer (3)

Sol. According to the given information

Floor Number-1 → H

Floor Number-2 → G

Floor Number-3 → C

Floor Number-4 → E

Floor Number-5 → F

Floor Number-6 → D

Floor Number-7 → B

Floor Number-8 → A

21. How Many persons live between F and A?

(1) One (2) Three

(3) Five (4) Two

Answer (4)

Sol. According to the given information

Floor Number-1 → H

Floor Number-2 → G

Floor Number-3 → C

Floor Number-4 → E

Floor Number-5 → F

Floor Number-6 → D

Floor Number-7 → B

Floor Number-8 → A

22. Who lives immediate below G?

(1) B (2) H

(3) A (4) E

Answer (2)

Sol. According to the given information

Floor Number-1 → H
Floor Number-2 → G
Floor Number-3 → C
Floor Number-4 → E
Floor Number-5 → F
Floor Number-6 → D
Floor Number-7 → B
Floor Number-8 → A

23. Who lives on third floor?

(1) C (2) F
(3) E (4) D

Answer (1)

Sol. According to the given information

Floor Number-1 → H
Floor Number-2 → G
Floor Number-3 → C
Floor Number-4 → E
Floor Number-5 → F
Floor Number-6 → D
Floor Number-7 → B
Floor Number-8 → A

24. Which of the following Venn diagrams indicates the best relation between Travellers, Train and Bus?

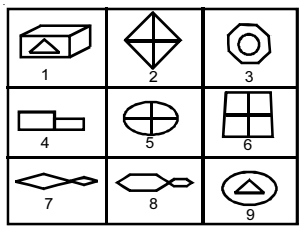
(1)  (2) 

(3)  (4) 

Answer (3)

Sol. Bus and train are different from each other but some travellers travel by bus and some by train.

25. Group the given 9 figures into three classes using each figure only once



(1) 1, 3, 9; 2, 5, 6; 4, 7, 8
(2) 1, 3, 9; 2, 7, 8; 4, 5, 6
(3) 1, 2, 4; 3, 5, 7; 6, 8, 9
(4) 1, 3, 6; 2, 4, 8; 5, 7, 9

Answer (1)

Sol. 1, 3, 9 have one element placed inside a different element.

2, 5, 6 contain two mutually perpendicular lines dividing the figure into four parts

4, 7, 8 have two similar elements (unequal in size) attached to each other.

26. Find the odd one out

331, 482, 551, 263, 383, 362, 284

(1) 263 (2) 383
(3) 331 (4) 551

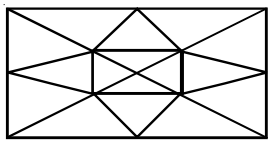
Answer (2)

Sol. Product of the digits is a perfect square.

for eg:- 331 = 3 × 3 × 1 = 9, 263 = 2 × 6 × 3 = 36

383 = 3 × 8 × 3 = 72 (which is not a perfect square)

27. Find the number of triangles in the below figure?



(1) 20 (2) 22
(3) 16 (4) 28

Answer (4)

Sol. There are two rectangles each contain 8 triangles and 12 triangles in between two rectangles

$\Rightarrow$ 8 + 8 + 12 = 28.

28. The words in the bottom row are related in the same way as the words in the top row. For each item, find the word that completes the bottom row of words

ant	fly	bee
hamster	squirrel	?

(1) Spider (2) Mouse
(3) Rodent (4) Cat

Answer (2)

Sol. The three in the above line are Arthropoda. The hamster and squirrel are rodents, so the correct choice is mouse because the mouse is also a rodent. The other three choices are not rodents

29. In the question below an equation becomes incorrect due to the interchange of two signs. One of the four alternatives under it specifies the interchange of signs in the equation, Which when made will make the equation correct.

Find the correct alternative:

5 + 6 ÷ 3 – 12 × 2 = 17

(1) ÷ and × (2) + and ×
(3) + and ÷ (4) + and –

Answer (1)

Sol. $5 + 6 \div 3 - 12 \times 2 \neq 17$

On interchanging ÷ and ×

$5 + 6 \times 3 - 12 \div 2 = 17$

30. Today is Monday. After 61 days it will be

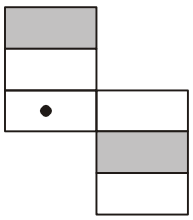
(1) Tuesday (2) Monday

(3) Sunday (4) Saturday

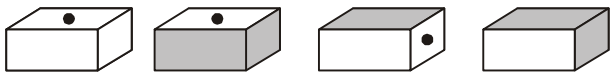
Answer (4)

Sol. If today is Monday then 57th day is also Monday and the day after 61 days is Saturday

31. The figure (x) is folded to form a box. Choose from the alternative (i), (ii), (iii) and (iv) the boxes that is similar to the box formed.



(x)



(I) (ii) (iii) (iv)

(1) (ii) and (iii) only

(2) (i), (iii) and (iv) only

(3) (ii) and (iv) only

(4) (i) and (iv) only

Answer (2)

32. **Direction:** Study the following information and answer the question given below it.

There is a group of five persons K, G, H, R and J.

(i) K, G and H are intelligent.

(ii) K, R and J are hard-working.

(iii) R, H and J are honest.

(iv) K, G and J are ambitious.

Which of the following person is neither hard-working nor ambitious?

(1) K (2) G

(3) H (4) R

Answer (3)

Sol. For neither working, there are two options —G, H and after adding neither hard working condition answer is H.

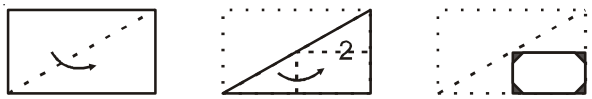
33. In a school 80 students have registered for a singles carrom tournament. Each match eliminates one player. How many matches are to be organised to determine the champion?

(1) 40 (2) 41

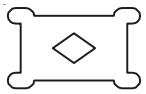
(3) 79 (4) 80

Answer (3)

34. Choose a figure which would most closely resemble the unfolded form of figure (Z).

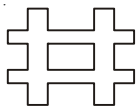


(X) (Y) (Z)

(1) 

(2) 

(3) 

(4) 

Answer (3)

35. If Z = 52 and ACT = 48 then BAT will be equal to

(1) 39 (2) 41

(3) 44 (4) 46

Answer (4)

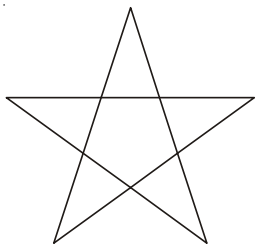
Sol. $Z = 52 = 26 \times 2$

$ACT = 2 \times 2 + 3 \times 2 + 20 \times 2$

$= 48$

So $BAT = 2 \times 2 + 1 \times 2 + 20 \times 2 = 46$

36. How many triangles are there in the following figure?



(1) 10 (2) 6

(3) 8 (4) 5

Answer (1)

Sol. Total Triangles = 10

37. How many days are there in x weeks and x days?

(1) $7x^2$ (2) 8x

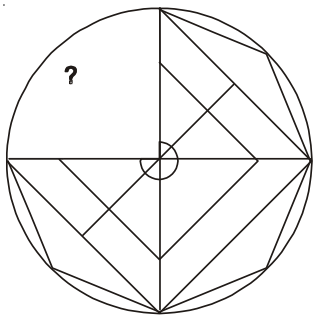
(3) 14x (4) 7

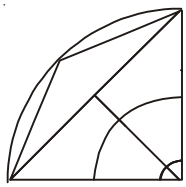
Answer (2)

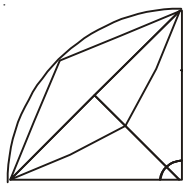
Sol. No. of days in x weeks = 7x

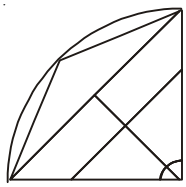
So total no. of days = 7x + x = 8x

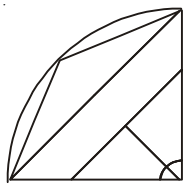
38. Choose the correct option which would complete the figure (x)



(1) 

(2) 

(3) 

(4) 

Answer (*)

39. At what time between 7 and 8 O'clock will the hands of a clock be in the same straight line but, not together?

(1) 5 min. past 7 (2) $5\frac{2}{11}$ min. Past 7

(3) $5\frac{3}{11}$ min. Past 7 (4) $5\frac{5}{11}$ min. Past 7

Answer (4)

Sol. Use formula of required time M = $\frac{2}{11}(30T_1 \pm \theta)$

$T_1 > 6$, use negative sign.

$T_1 < 6$, use positive sign.

40. In the given table numbers are written according to some pattern and one number is missing. Find the missing number that replaces the question mark.

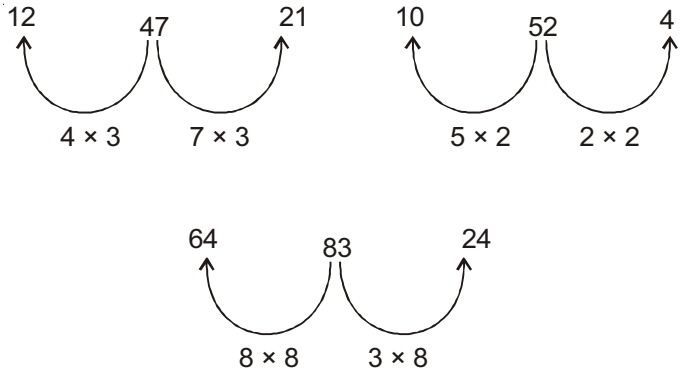
12	47	21
10	52	4
64	?	24

(1) 16 (2) 40

(3) 62 (4) 83

Answer (4)

Sol.



41. If B5D means B is the father of D.

B9D means B is the sister of D.

B4D means B is the brother of D.

B3D means B is the wife of D.

Which of the following means F is the mother of K?

(1) F3M5K

(2) F5M3K

(3) F9M4N3K

(4) F3M5N3K

Answer (1)

Sol. Use given conditions

42. A clock is set right at 5 A.M. The clock loses 16 minutes in 24 hours. What will be the exact time when the clock indicates 10 P.M. on fourth day?

(1) 11 P.M. (2) 12 P.M.

(3) 1 P.M. (4) 2 P.M.

Answer (1)

Sol. Total hours = 89

We can say that 23 hours 44 min. of this clock is 24 hours of correct clock.

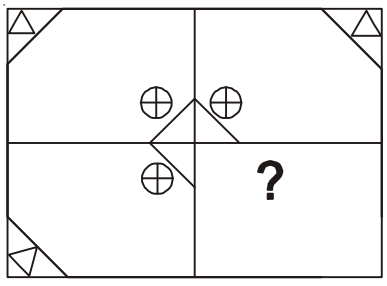
Therefore 89 hours of this clock

$= \frac{24 \times 15}{356} \times 89 = 90$ hours

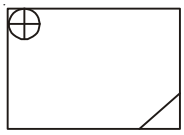
So correct time is 11:00 PM

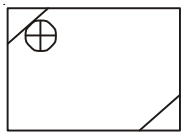
43. Select a figure from the given four alternatives, which placed in the (?) which complete the pattern

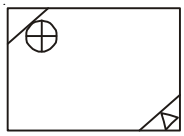
Problem Figures:

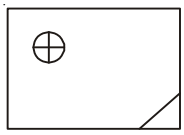


Answer Figures:

(1) 

(2) 

(3) 

(4) 

Answer (3)

44. Choose the pair that best represents a similar relationship to the expressed in the original pair or words

MONK : DEVOTION

(1) Maniac : Pacifism

(2) Explorer : Contentment

(3) Visionary : Complacency

(4) Rover : Wanderlust

Answer (4)

45. In the question given below, find out the alternative which will replace the question mark?

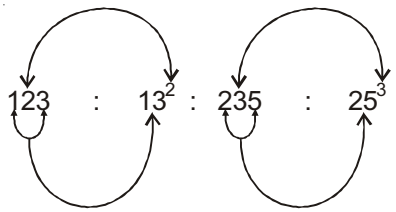
$123 : 13^2 : : 235 : ?$

(1) 23^2 (2) 35^2

(3) 25^3 (4) 25^2

Answer (3)

Sol.



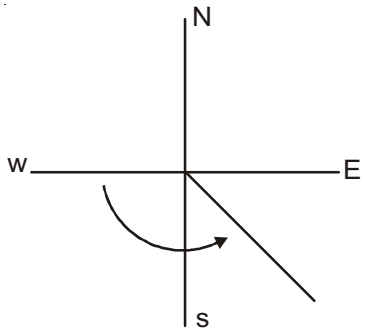
46. If South-East becomes North, and North– East becomes West, then West becomes:

(1) North – East (2) South – East

(3) North – West (4) South – West

Answer (2)

Sol. Each direction is rotated by angle of 135° in anticlockwise direction



47. If diamond is called gold, gold is called silver, silver is called ruby and ruby is called emerald, which is the cheapest jewel?

(1) Diamond

(2) Silver

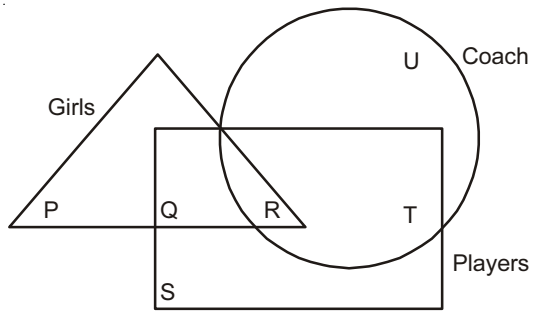
(3) Gold

(4) Ruby

Answer (4)

Sol. Cheapest jewel is silver so answer is ruby

48. In the following figure triangle represents 'girls', rectangle 'players' and circle 'coach'. Which part of diagram represents the girls who are player but not coach?



(1) P

(2) Q

(3) R

(4) S

Answer (2)

49. If A$B means A is the father of B; A#B means A is the sister of B; A*B means A is the daughter of B and A@B means A is the brother of B. Which of the following indicates that M is wife of Q ?

(1) Q$R#T@M

(2) Q$R@T#M

(3) Q$R*T#M

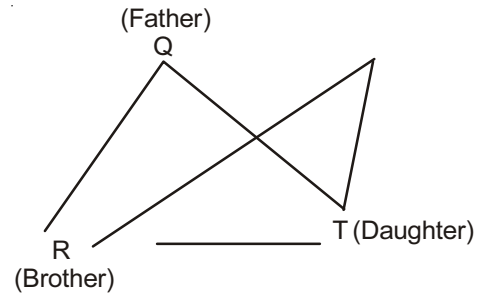
(4) Q$R@T*M

Answer (4)

Sol. Q $ R ⟶ Q is father of R

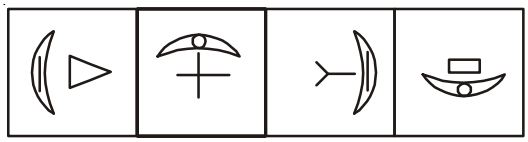
R @ T ⟶ R is brother of T

T * M ⟶ T is daughter of M

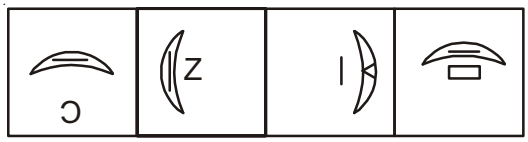


Direction: (Q.50 & 51) *Which one of the answer figure would occupy the next position in the problem figure, if the change continue in same order*

50. Question Figures :



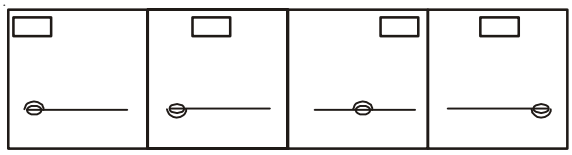
Answer Figures:



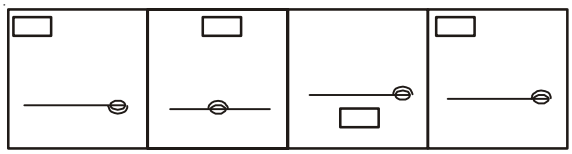
(1) (2) (3) (4)

Answer (2)

51. Question Figures :



Answer Figures:



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

Answer (4)

52. In the question below, two words are given. These words are related to each other in some way. You are required to find out the relationship between the first 2 words and choose the word from the given alternative, which bears the same relationship to the third word.

Malaria : Disease : : Spear : ?

(1) Wound (2) Sword

(3) Weapon (4) War

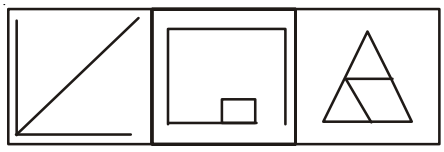
Answer (3)

Sol. Malaria is a disease and spear is a weapon.

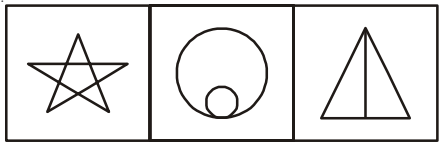
53. Choose the set of figures which follows the given rule.

Rule : Any figure can be traced by a single unbroken line without retracting.

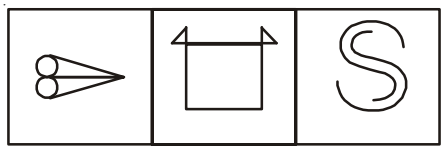
(1)



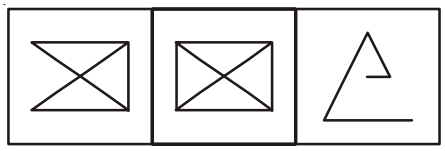
(2)



(3)

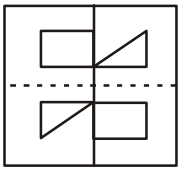


(4)

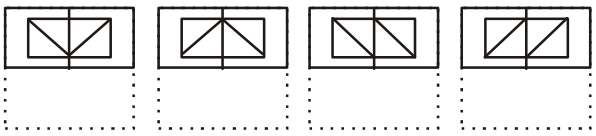


Answer (2)

54. Find out from amongst the four alternatives as to how the pattern would appear when the transparent sheet is folded at the dotted line.



(X)



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

Answer (1)

55. In a certain code BOXER, is written as AQWGQ. How VISIT is written in that code ?

(1) UKRKU (2) UKRKS

(3) WKRKU (4) WKRKS

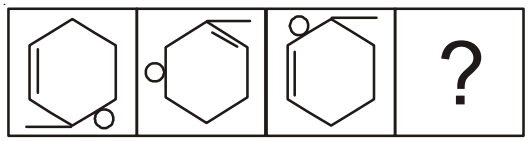
Answer (2)

Sol.

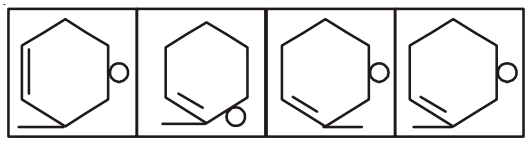
B	O	X	E	R		V	I	S	I	T
−1 ↓	+2 ↓	−1 ↓	+2 ↓	−1 ↓		−1 ↓	+2 ↓	−1 ↓	+2 ↓	−1 ↓
A	Q	W	G	Q		U	K	R	K	S

56. The first unit contains two figures and the second unit contains one figure and a question mark. Find out which one of the answer figure should be placed at question mark ?

Problem Figures :



Anwer Figures :



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

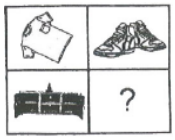
Answer (4)

57. If : 3 + 9 = 31
15 + 27 = 95
18 + 9 = 36
then, 12 + 27 = ?
(1) 94 (2) 14
(3) 49 (4) 53

Answer : (1)

Solution : $3 + 9 = 31 \Rightarrow 3 \times 1 + 3 \times 3 \Rightarrow 31$
$15 + 27 = 95 \Rightarrow 3 \times 5 + 3 \times 9 \Rightarrow 95$
$18 + 9 = 36 \Rightarrow 3 \times 6 + 3 \times 3 \Rightarrow 36$
$12 + 27 = \Rightarrow 3 \times 4 + 3 \times 9 \Rightarrow 94$

58. Choose the pircture that would go in the empty box so that the two bottom pictures are related in the same way as the top two are related -



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

Answer (2)

59. ***Statement*** **:** Some keys are staplers. Some staplers are stickers. All the stickers are pens.

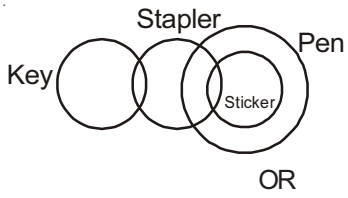
Conclusions **:**

I. Some pens are staplers.
II. Some stickers are keys.
III. No sticker is key.
IV. Some staplers are keys.

(1) Only (I) and (II)
(2) Only (II) and (IV)
(3) Only (II) and (III)
(4) Only (I) and (IV) and either (II) or (III)

Answer (4)

Sol.



60. If 'nso ptr kli chn' stands for 'sharma get marriage gift', 'ptr lnm wop chm' stands for 'wife gives marriage gift', 'tti wop nhi' stands for 'he gives nothing' what would means 'gives'?

(1) chn (2) nhi
(3) ptr (4) wop

Answer (4)

Sol.

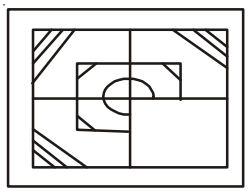
'ptr lnm wop chm' $\rightarrow$ 'wife gives marriage gift'

'tti wop nhi' $\rightarrow$ 'he gives nothing'

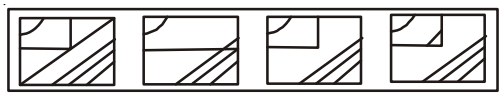
Both of the above has 'gives' common in RHS and 'wop' in LHS. So 'gives' means 'wop'

61. Select a figure from the given four alternatives, which placed in the (?)

Problem Figures **:**



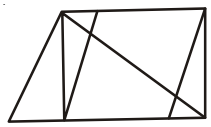
Answer Figures **:**



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

Answer (4)

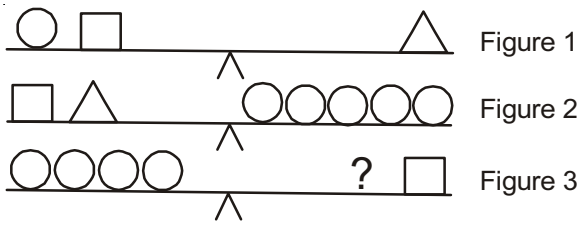
62. How many quadrilaterals are there in the given figure?



(1) 10 (2) 11
(3) 12 (4) 13

Answer (4)

63. Figure below represents a balance, which symbol replaces (?)



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

Answer (4)

Sol.

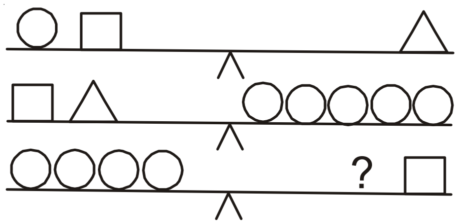


Figure 1

Figure 2

Figure 3

Let Circle = C, Square = S, Triangle = T

From Figure 1 : C + S = T ....(1)

From Figure 2 : S + T = 5C ....(2)

From Figure 3:

4C = k(Let unknown) + S ....(3)

From (1), (2) and (3)

k = S

i.e. 1 square □

64. In a certain code, RIPPLE is written as 613382 and LIFE is written as 8192. How is PILLER written in that code?

(1) 318826 (2) 318286

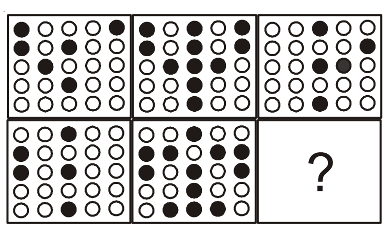
(3) 618826 (4) 338816

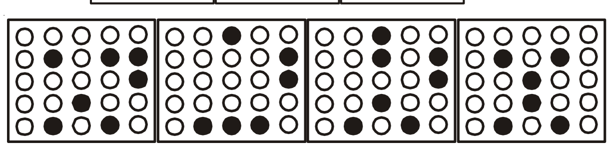
Answer (1)

Sol. R I P P L E → 6 1 3 3 8 2   L I F E → 8 1 9 2

P I L L E R → 3 1 8 8 2 6

65. Which option replaces the question mark (?) in the figure given below?





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

Answer (1)

Sol. Figure (I) and figure (III) is combined to form the figure (II) in each row.

66. There are two statements given below as premises, which support the conclusion suggested in the answer options. You may select the conclusion that makes the whole argument valid.

Statements :

I. No film actors are cricketers.

II. Some cricketers are poets.

Therefore :

(1) Some poets are film actors.

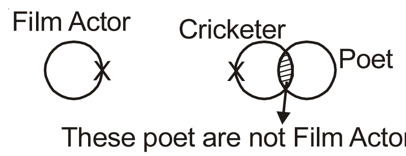
(2) Some poets are not film actors.

(3) All poets are film actors.

(4) All film actors are poets.

Answer (2)

Sol.



67. Pick the odd one out among the following options

(1) Quiet – Calm (2) Seldom – Never

(3) Peace – Tranquil (4) Rapid – Slow

Answer (4)

Sol. Rapid and slow are opposite, rest are not.

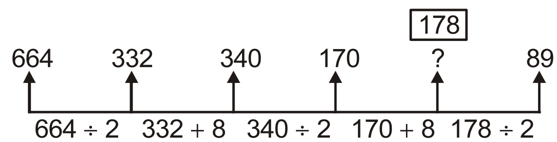
68. Look at this series: 664, 332, 340, 170, ?, 89, ... What number should be placed at (?)

(1) 85 (2) 97

(3) 109 (4) 178

Answer (4)

Sol.



69. Choose the alternative which is closely resembles the mirror image of the given combination.

QUALITY

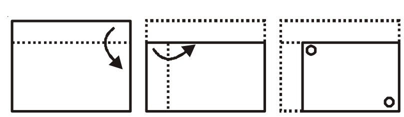
(1) QUⱯLITY (2) YTILAUQ

(3) YTIJAUQ (4) YTIJAՈQ

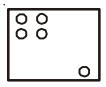
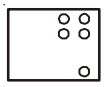
Answer (3)

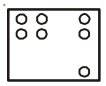
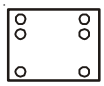
Sol. QUALITY | YTIJAUQ

70. In this question there is a set of three figures X, Y and Z showing a sequence of folding of a piece of paper. Figure (Z) shows the manner in which the folded paper has been cut. These three figures are followed by four answer figures from which you have to choose a figure which would most closely resemble the unfolded form of Fig. (Z)



X Y Z

(1)  (2) 

(3)  (4) 

Answer (1)

71. In the following problem of substraction find out the number which does not stand for CARE

$$\begin{array}{r} CAR \\ -\,ARE \\ \hline 222 \end{array}$$

(1) 8640 (2) 6420

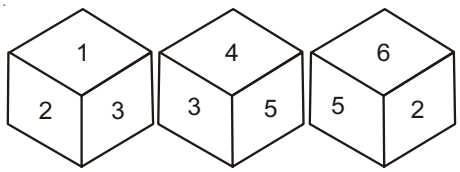
(3) 7531 (4) 9753

Answer (1)

Sol.

	CARE 8640	CARE 6420	CARE 7531	CARE 9753
CAR	864	642	753	975
-ARE	-640	-420	-531	-753
222	224	222	222	222

72. A dice with six faces is marked with six numbers 1, 2, 3, 4, 5 and 6 respectively. This dice is rolled three times and three positions are shown as :



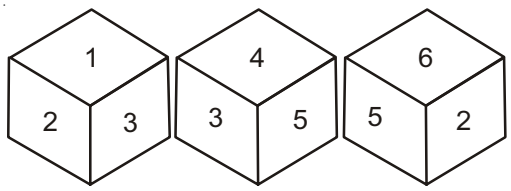
Find the number opposite to 1

(1) 2 (2) 6

(3) 5 (4) 4

Answer (3)

Sol.



Opposite to 3 $\rightarrow$ 1, 2, 4, 5 can't come

Opposite to 3 = 6

Opposite to 2 $\rightarrow$ 1, 3, 5, 6 can't come

$\therefore$ Opposite to 2 = 4

$\therefore$ Opposite to 1 = 5

73. If the position of the first and the sixth letters of the word 'UNIFORMITY' are interchanged, similarly the position of 2nd with 7th letter 3rd with 8th letter, 4th with 9th and 5th with 10th letter are interchanged. Which letter will be 4th from the right end after arrangement?

(1) I (2) U

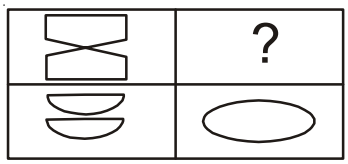
(3) M (4) N

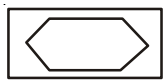
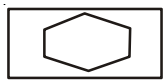
Answer (4)

Sol.

(4th from right after arrangement)

74. Select a suitable figure from the four alternatives that would complete the figure matrix.



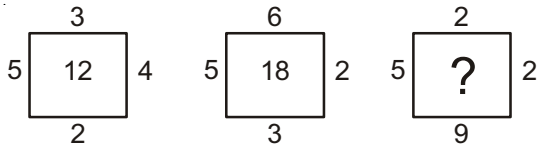
(1)  (2) 

(3)  (4) 

Answer (2)

Sol. The two parts of the first figure are rearranged and joined along longer sides. The common side is then lost to form the second figure.

Direction **: (Q. No. 75 & 76)** In the following questions which number will replaces question mark?

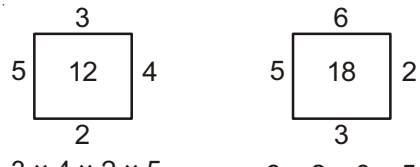
75. 

(1) 15 (2) 18

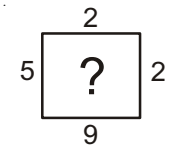
(3) 17 (4) 16

75. **Answer (2)**

Sol.



$\frac{3 \times 4 \times 2 \times 5}{10} = 12$ $\frac{6 \times 2 \times 3 \times 5}{10} = 18$



$\frac{9 \times 2 \times 2 \times 5}{10} = 18$

76. 6 18 15

3 2 5

4 3 ?

8 27 9

(1) 2 (2) 11

(3) 3 (4) 6

Answer (3)

Sol. Row 1 × Row 3 = Row 2 × Row 4

6 × 4 = 8 × 3 = 24

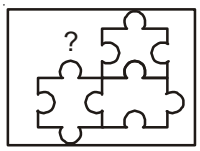
18 × 3 = 27 × 2 = 54

? × 15 = 9 × 5 = 45

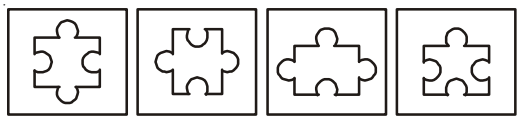
? = 3

77. In the question below select a figure from amongst the four alternatives, which when placed in the (?) of figure (x) would complete the pattern.

Identify the figure that completes the pattern.



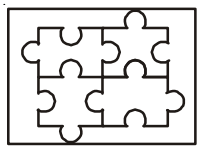
(X)



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

Answer (2)

Sol.



78. What number will come next in the given series?

36, 34, 30, 28, 24, ?

(1) 20

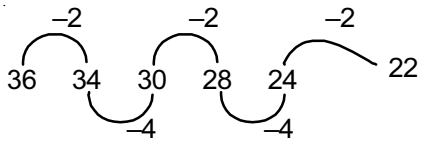
(2) 22

(3) 23

(4) 26

Answer (2)

Sol.



79. If M%N means M is the son of N. M@N means M is the sister of N. M$N means M is the father of N. Than which of the following shows the relation that C is granddaughter of E?

(1) C % B $ F $ E

(2) B $ F $ E % C

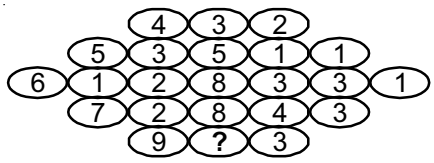
(3) C @ B % F % E

(4) E % B $ F $ C

Answer (3)

Sol. C is sister of B → B is son of F → F is son of E

80. By using your numerical and logical reasoning skills please try to find out which number is missing in the question below. The numbers around will give you the clues you need to solve the puzzle -

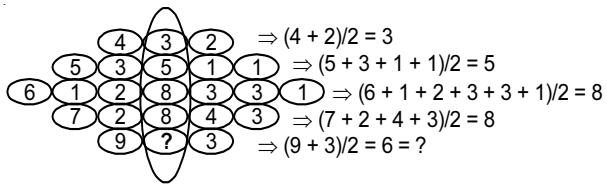


(1) 9 (2) 4

(3) 5 (4) 6

Answer (4)

Sol.



Direction : **(Q. No. 81 to 83)** Seven villages A, B, C, D, E, F and G are situated as follows:

E is 2 km to the west of B. F is 2 km to the north of A. D is 2 km to the south of G. C is 1 km to the west of A. G is 2 km to the east of C. D is exactly in the middle of B and E.

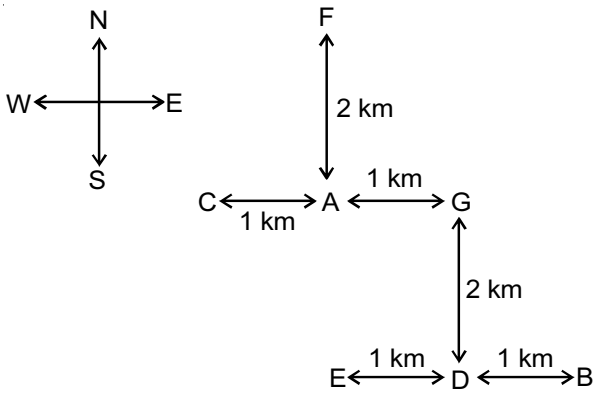
81. How far is E from F (in km)?

(1) 5 km (2) 6 km

(3) 4 km (4) 4.5 km

Answer (3)

Sol.



82. Which two village are the farthest from one another?

(1) D and C (2) F and E

(3) F and B (4) G and E

Answer (3)

83. A is in the middle of two villages:

(1) C and F (2) B and D

(3) C and G (4) C and B

Answer (3)

84. On what dates of April, 2001 did Wednesday fall?

(1) 1^{st} 8^{th} 15^{th} 22^{nd} 29^{th}

(2) 3^{rd} 10^{th} 17^{th} 24^{th}

(3) 2^{nd} 9^{th} 16^{th} 23^{rd} 30^{th}

(4) 4^{th} 11^{th} 18^{th} 25^{th}

Answer (4)

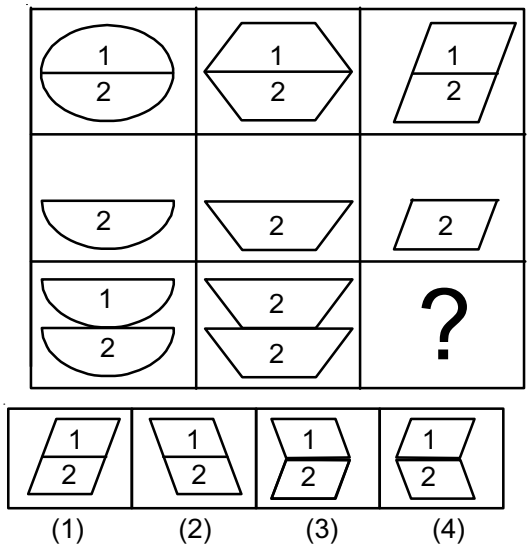
Sol. Number of odd days

$$\frac{2000}{0}+\frac{\text{Jan 2001}}{3}+\frac{\text{Feb 2001}}{0}+\frac{\text{March}}{03}$$

= 6, so 1 April is Sunday.

$$\frac{1}{\text{Sun}},\frac{2^{nd}}{\text{Mon}},\frac{3^{rd}}{\text{Tues}},\frac{4^{th}}{\text{Wed}},\frac{11^{th}}{\text{Wed}},\frac{18^{th}}{\text{Wed}},\frac{25^{th}}{\text{Wed}}$$

85. Select a suitable figure from the four alternatives that would complete the figure matrix -



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

Answer (3)

86. Ten years ago, the age of mother was three times the age of her son. After ten years, mother's age will be twice that of his son. Find the ratio of their present ages

(1) 11 : 7 (2) 9 : 5

(3) 7 : 4 (4) 7 : 3

Answer (4)

Sol. Let age of mother = y

age of son = x

ATQ $y - 10 = 3(x - 10)$

$y + 10 = 2(x + 10)$

$-20 = x - 50$

$x = 30,\ y = 70$

$$\text{Ratio} = \frac{y}{x} = \frac{70}{30} = \frac{7}{3}$$

Direction : **(Q. No. 87 & 88)** Choose the correct alternative that will continue the same pattern and replace the question mark in the given series:

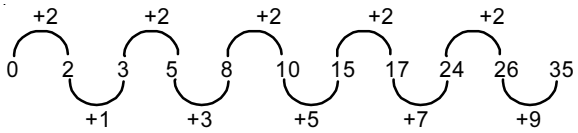
87. 0, 2, 3, 5, 8, 10, 15, 17, 24, 26, ?

(1) 28 (2) 30

(3) 32 (4) 35

Answer (4)

Sol.



88. 2, 2, 5, 13, 28, ?

(1) 49 (2) 50

(3) 51 (4) 52

Answer (4)

Sol. $2 + (1^2 - 1) = 2$

$2 + (2^2 - 1) = 5$

$5 + (3^2 - 1) = 13$

$13 + (4^2 - 1) = 28$

$28 + (5^2 - 1) = 52$

89. In an examination, a student scores 4 marks for every correct answer and loses 1 mark for every wrong answer. IF he attempts all 75 question and secures 125 marks, the number of question he attempted correctly, is

(1) 35 (2) 40

(3) 42 (4) 46

Answer (2)

Sol. Let x attempted correct and y questions done wrong

$x + y = 75$

$4x - y = 125$

$5x = 200$

$x = 40,\ y = 35$

90. Below you are served with four different type of venn diagrams that indicate a definite relationship between Tennis, Rugby and Soccer. You need to find out the diagram which is the most relevant -

(1) 

(2) 

(3) 

(4) 

Answer (2)

91. Seema started early in the morning on the road towards the Sun. After some time she turned to her left. Again after some time she turned to her right. After moving some distance she again turned to her right and began to move. At this time, in what direction was she moving?

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

Answer (1)

Sol. East
L
R
R
?
Sun (East)
(Final step)
[South direction it is]

92. How many numbers from 1 to 50 are there each of which is not only exactly divisible by 4 but also contain 4 as a digit in it?

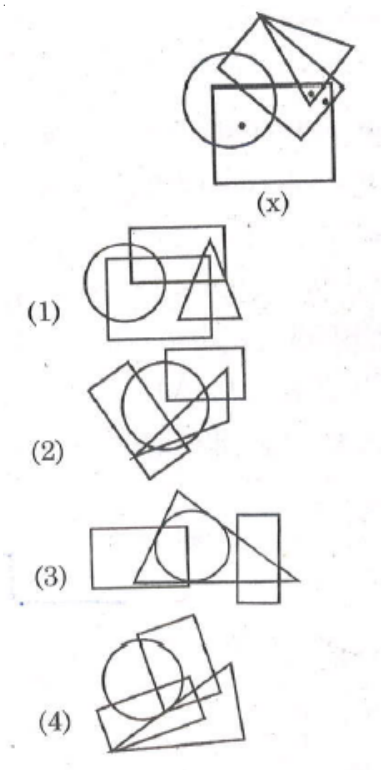
(1) 5 (2) 4
(3) 7 (4) 8

Answer (1)

Sol. The numbers are 4, 24, 40, 44, 48

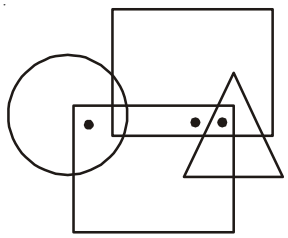
There are 5 numbers.

93. The given figure (x) has dots that fulfil same conditions. Find out a figure from the alternatives where if dots are placed they will fulfil the same conditions



Answer (1)

Sol.



94. Arrange the words given below in a meaningful sequence.

1. Probation 2. Interview
3. Selection 4. Appointment
5. Advertisement 6. Application

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

Answer (3)

Sol. Advertisement
↓
Application
↓
Interview
↓
Selection
↓
Appointment
↓
Probation

95. A word given in capital letters is followed by four answer words. Out of these only one cannot be formed by using the given words. Find out this word?

NECESSARY

(1) NICE (2) ESSAY
(3) EASY (4) RACE

Answer (1)

Sol. Nice

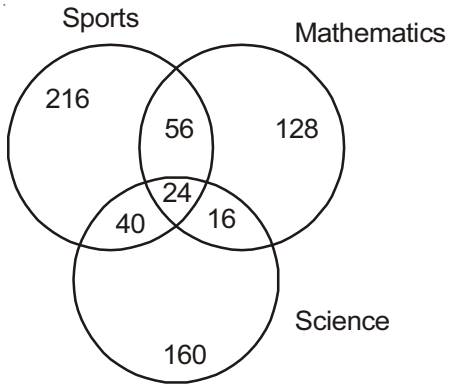
(NICE is the work which cannot be formed for NECESSARY due to absence of I.

96. The percentage of participants who did not choose any subject is :

(1) 23.59
(2) 30.25
(3) 37.46
(4) 27.27

Answer (4)

Sol.



Total 880

Participants who did not chose anything.

880 – (216 + 56 + 24 + 16 + 40 + 160 + 128)

880 – 640 = 240

Percentage who did not choose anything

$= \frac{240}{880} \times 100$

$\Rightarrow$ 27.27

97. Of those participating, the percentage who choose only one subject is :

(1) 60

(2) More than 60

(3) Less than 60

(4) More than 75

Answer (4)

Sol. More than 75

Any choose one subject = 215 + 128 + 160 = 504

$\% = \frac{504}{640} X100 = 78.75\%$

98. If '×' stands for 'addition', '<' stands for 'subtraction', '+' stands for 'division', '>' stands for 'multiplication' '–' stands for 'equal to', '÷' stands for ' greater than' and = stands for 'less than', state which of the following is true?

(1) $3 \times 2 < 4 \div 16 > 2 + 4$ (2) $5 > 2 + 2 = 10 < 4 \times 8$

(3) $3 \times 4 > 2 - 9 + 3 < 3$ (4) $5 \times 3 < 7 \div 8 + 4 \times 1$

Answer (2)

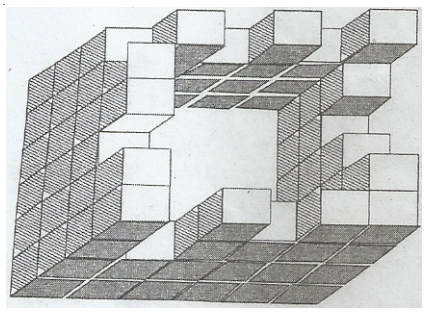
Sol. 5 > 2 + 2 = 10 < 4 × 8

5 × 2 ÷ < 10 – 4 + 8

5 × 1 < 14

5 < 14 $\rightarrow$ This is true.

99. Count the number of cubes in following figure -



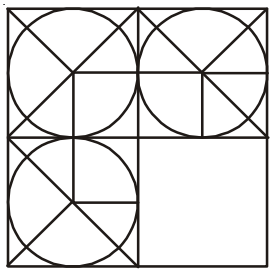
(1) 68 (2) 69

(3) 70 (4) 71

Answer (2)

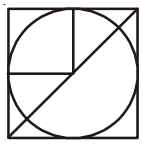
Sol. Counting the cubes manually by counting 69.

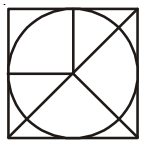
100. Select a figure from the given four alternatives, which placed in the (?)

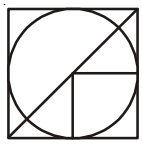


(x)

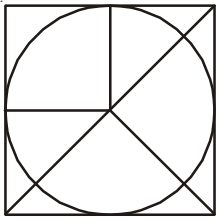
(1) 

(2) 

(3) 

(4) 

Answer (3)

Sol. 

PAPER-II : SCHOLASTIC APTITUDE TEST (SAT)

1. 25 g of water contain -
   (1) 12×10^{23} atom of Hydrogen and 6×10^{23} atom of oxygen
   (2) 5×10^{24} atoms of Hydrogen and 2.5×10^{24} atoms of oxygen
   (3) 2.72×10^{23} atoms of Hydrogen and 8.372×10^{23} atoms of oxygen
   (4) 16.722×10^{23} atoms of Hydrogen and 8.362×10^{23} atoms of oxygen

Answer (4)

Sol. Number of moles in 25 g of $H_2O = \frac{25}{18}$

= 1.388 moles.

Number of H-atoms = Number of moles of H_2O × Avogadro's number × 2

$= 1.388 \times 2 \times 6.023 \times 10^{23}$

$= 16.722 \times 10^{23}$ atoms of Hydrogen

Number of oxygen – atom = number of moles of H_2O × Avogadro's number

$= 1.388 \times 6.023 \times 10^{23}$

$= 8.362 \times 10^{23}$ atoms of oxygen

2. Which of the following contain five molecule of water of crystallization?
   (1) Blue Vitriol (2) White Vitriol
   (3) Epsom Salt (4) Green Vitriol

Answer (1)

Sol. Blue vitriol – $CuSO_4 \cdot 5H_2O$

3. Digestive fluids in stomach has approximate pH of -
   (1) 0 (2) 2
   (3) 4 (4) 6

Answer (2)

Sol. Digestive fluids in stomach has approximate pH = 2.

4. When water gas mixed with half its volume of hydrogen and the mixture is compressed to 300 atm pressure and passed over ZnO-Cr_2O_3 catalyst a colourless liquid is obtained which is used as solvent for paints & Varnishes. The liquid will be -
   (1) Methanol (2) Ethanol
   (3) Ether (4) Acetone

Answer (1)

Sol. $CO + 2H_2 \xrightarrow[300\ atm]{ZnO - Cr_2O_3} \underset{(Methanol)}{CH_3OH}$

5. Which of the following arrangement represent increasing oxidation number of central atom (Mn, Cr, Cl)?
   (1) $MnO_4^-, CrO_4^{2-}, ClO_3^-, CrO_2^-$
   (2) $ClO_3^-, CrO_4^{2-}, MnO_4^-, CrO_2^-$
   (3) $CrO_2^-, ClO_3^-, CrO_4^{2-}, MnO_4^-$
   (4) $CrO_4^{2-}, MnO_4^-, CrO_2^-, ClO_3^-$

Answer (3)

Sol. Oxidation number

MnO_4^- : $x + 4(-2) = -1$

$x = +7$

CrO_4^{2-} : $x + 4(-2) = -2$

$x = +6$

ClO_3^- : $x + 3(-2) = -1$

$x = +5$

CrO_2^- : $x + 2(-2) = -1$

$x = +3$

Increasing oxidation number:

$CrO_2^- < ClO_3^- < CrO_4^{2-} < MnO_4^-$

6. Which of the following is an oxide ore?
   (1) Calcite (2) Zincite
   (3) Magnesite (4) Calamine

Answer (2)

Sol. Oxide ore: Zincite – ZnO

→ Calcite : $CaCO_3$

→ Calamine : $ZnCO_3$

→ Magnesite : $MgCO_3$

7. Which of the following statements are **incorrect** regarding Mandleev's periodic table?
   (a) Mandleev considered compounds formed by element with oxygen and hydrogen.
   (b) In the table Ni is placed before Co.
   (c) Eka-silicon in Mandleev's periodic table is gallium.
   (d) The properties of elements are the periodic function of their atomic masses.
   (1) Only (b) (2) Only (c)
   (3) Both (b) & (c) (4) Both (a) & (d)

Answer (3)

Sol. Incorrect statement regarding mendleev's periodic table.

→ In Mandleev's periodic table Co is placed before Ni.

→ Eka – silicon in Mandleev's periodic table is Germanium not Gallium

8. Consider the two statements below one labelled as Assertion (A) and other as Reason (R). Examine these two statements carefully and decide if Assertion (A) and Reason (R) individually true and if so (R) is a correct explanation of (A). Select your answer using the code below :

Assertion (A) : Magnesium imparts characteristic colour to the flame.

Reason (R) : Due to small size and high effective nuclear charge ionization enthalpy of magnesium is high.

(1) Both A & R are true and R is a correct explanation of A.

(2) Both A & R are true but R is not correct explanation of A.

(3) A is true R is false.

(4) A is false R is true.

Answer (4)

Sol. Magnesium imparts no characteristic colour to the flame due to high ionization enthalpy. So, assertion is false and reason is true.

9. **Incorrect** statement in regard to halogens is -

HI > HBr > HCl > HF

(1) Chlorine has the highest electron affinity in the group.

(2) Ionization energies of halogen are very low.

(3) Except fluorine they show an oxidation sate of –1 or +1.

(4) Acidic strength of hydrogen halides decrease in the order.

Answer (2)

Sol. Ionisation energies of halogens is high due to small size and high effective nuclear charge

10. Reaction with sodium hydrogen carbonate can be used to distinguish between -

(1) Ethanoic acid & Methanoic acid

(2) Ethanol and Methanol

(3) Ethanol and Ethanoic acid

(4) Ethylacetate and Ethanol

Answer (3)

Sol. Reaction of sodium hydrogen carbonate is used to distinguish Ethanol and Ethanoic acid, Ethanoic acid gives brisk effervescence with $NaHCO_3$ while Ethanol does not produce.

$$CH_3COOH + NaHCO_3 \longrightarrow \underset{\text{(Brisk effervescence)}}{CH_3COONa + CO_2\uparrow} + H_2O$$

11. Rekha dropped a metal piece A in the solution of another metal B. After some time a new colourless compound C is formed. A, B, C respectively can be-

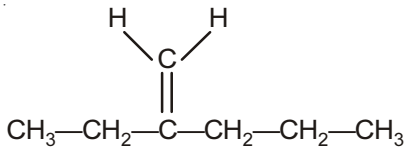
(1) Cu, $ZnSO_4$, $CuSO_4$ (2) Mg, NaCl, $MgCl_2$

(3) Mg, $CuSO_4$, $MgSO_4$ (4) Fe, $ZnSO_4$, $FeSO_4$

Answer (3)

Sol. $Mg + CuSO_4 \longrightarrow \underset{\text{(Colourless)}}{MgSO_4} + Cu$

12. IUPAC Name of following compound will be :

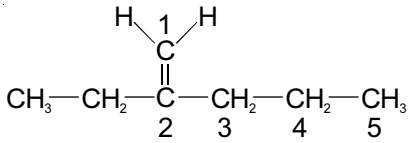


(1) 3-Methylene hexane (2) 2-Propyle-1-butene

(3) 4-Ethyl-4-pentene (4) 2-Ethyl-1-pentene

Answer (4)

Sol.



2-Ethyl-1-pentene.

13. In balanced chemical equation

a Cu + b HNO_3 (dil) →

c $Cu(NO_3)_2$ + d H_2O + e NO

Which of the following alternative are **correct**?

(1) a = 1 b = 4 c = 1 d = 2 e = 2

(2) a = 3 b = 4 c = 3 d = 1 e = 1

(3) a = 1 b = 4 c = 1 d = 4 e = 2

(4) a = 3 b = 8 c = 3 d = 4 e = 2

Answer (4)

Sol. a Cu + b HNO_3(dil) ⟶ c $Cu(NO_3)_2$ + d H_2O + e NO

a = 3 b = 8, c = 3, d = 4, e = 2

14. Which of the following does not relate to the Non cooperation movement (1919) in India?

(1) Renouncement of titles.

(2) To quit govt. schools and colleges by the students.

(3) Disobeying govt. laws.

(4) Boycott of judicial courts by advocates.

Answer (3)

15. What does the novel 'Sevasadan' by Munshi Premchand mainly relate to?
(1) Attrocities under colonial rule.
(2) Social problems like child marriage and dowry.
(3) Life of an orphan.
(4) Misries of a poor peasant.

Answer (2)

16. Which the following statements are correct regarding liberal Nationalism in 19th century Europe?
(1) Right of Liberty and Equality.
(2) Formation of people's govt.
(3) Ownership of private property.
(4) Complete control of govt. on al public and private property.
(1) I, II, III (2) IV, III, I
(3) III, IV, II (4) I, II, IV

Answer (1)

17. Which of the following statements are correct on Gandhiji's breaking the salt law to start civil disobedience movements?
(I) Salt was the need of rich and poor all.
(ii) British govt. levied tax on the salt.
(iii) Only govt. agencies were allowed to make salt.
(iv) Lord Irwin abolished tax on salt.
(1) I, II, III (2) II, III, IV
(3) III, IV, I (4) I, III, IV

Answer (1)

18. Which of the following statements are correct in relation to the great depression of 1929 in India? It led to
(1) Decline in trade
(2) Steep hike in wheat prices.
(3) Growth in industrial investment.
(4) Fall in jute prices.
(1) II, III, IV (2) I, II, III
(3) I, III, IV (4) I, II, IV

Answer (4)

Direction : (Q. No. 19 to 22)

Read the statements and select the correct answer from the options given below.

(1) Statement I is true.
Statement II is false.
(2) Statement I is false.
Statement II is true.
(3) Both statements are true and statement II provides explanation to statement I.
(4) Both statements are true but statement II does not provide explanation of statement I.

19. **Statement I :** Long years of war and the cost of extravagant court of the king drained the financial resources of France.
Statement II : Only the members of the third estate had to pay taxes to the state.

Answer (4)

20. **Statement I :** Russia's army lost badly in Germany and Austria in 1914-1916. All able bodied men were called to the war which led to scarcity of bread.
Statement II : Tsarist autocracy collapsed in 1917.

Answer (4)

21. **Statement I :** Railways were essential for colonial trade and for the movement of imperial troops.
Statement II : The forests around the railway tracks fast started disappearing.

Answer (3)

22. **Statement I :** Simon commission was opposed by all the political parties in India.
Statement II : Lord Irwin announced inclusion of 80% Indian members into the Simon Commission.

Answer (1)

23. Arrange the following historical developments in a chronological sequence.
(I) Unification of Germany.
(II) Unification of Italy.
(III) The French Revolution.
(IV) Treaty of Vienna
(1) I, II, III, IV (2) III, IV, II, I
(3) II, IV, III, I (4) IV, I, III, II

Answer (2)

24. Arrange the following historical developments in a chronological sequence
(I) Poona Act.
(II) Lahore congress : demand of 'Purna Swaraj'.
(III) Establishment of oppressed class Association by Sh. B. R. Ambedkar.
(IV) Second round table conference.
(1) I, II, III, IV (2) III, IV, II, I
(3) II, III, IV, I (4) IV, II, III, I

Answer (3)

25. What does Mahatma Gandhiji's popular image in short dhoti and a spinning wheel depicts?
(1) Self relience and resistance to use of British mill made cloth.
(2) Easy and convenient way of living.
(3) Living like a poor farmer in India.
(4) Depiction of an indigenous image.

Answer (1)

26. Certain minerals may occur as alluvial deposits in sands of valley floors and the base of hills. By which name these are known?
(1) Placer deposits (2) Manganese nodules
(3) Bromine (4) Malleable

Answer (1)

27. Other than current fallow land is known as
(1) Left without cultivation for one or less than one agricultural year.
(2) Left uncultivated for the past 1 to 5 agricultural year.
(3) Area sore than once in an agricultural year.
(4) None of the above.

Answer (2)

28. Which one of the following are not used into rain fed storage structures that allowed the water to stand?
(1) Khadins (2) Johads
(3) Pit (4) Palar Pani

Answer (4)

29. These are species whose population has declined are know as:
(1) Vulnerable species (2) Endangered species
(3) Extinct species (4) None of the above

Answer (2)

30. To which one of the following types of vegetation does rubber belongs to ?
(1) Tundra (2) Himalayan
(3) Mangrove Forest
(4) Tropical Evergreen Forests

Answer (4)

31. In which of the following state is the Manas Bio-reserve located?
(1) Punjab (2) Assam
(3) Kerala (4) Orisa

Answer (2)

32. The movement of the plates results in the building up of stresses within the plates and the continental rocks leading to
(1) Erosion (2) Weathering
(3) Folding (4) All above

Answer (3)

33. Which name is given to the periodic development of a warm ocean current along the coast of Peru as a temporary replacement of the cold Peruvian current?
(1) Kaal Baisakhi (2) El Nino
(3) Monsoon (4) None of the above

Answer (2)

34. Which one of the following statement is ***not*** true ?
(1) Coal that has been burried deep and subjected to increases temperatures is bituminous coal.
(2) Large reserves of natural gas have been discovered in the krishana Godavri basin.
(3) The monazite sands of Tamil Nadu is also rich in Thorium.
(4) Photovoltaic technology converts sunlight directly into electricity.

Answer (3)

35. In India this primitive form of cultivation is called by different names. Select the ***correct*** answer using the code given below -

(1) Madhya Pradesh	(i) Pama Dabi or Koman
(2) Odisa	(ii) Bewar of Dahiya
(3) In Western Ghats	(iii) Jhumming
(4) North-East region	(iv) Kumari

(1) 1–ii, 2–i, 3–iv, 4–iii (2) 1–i, 2–ii, 3–iii, 4–iv
(3) 1–ii, 2–iii, 3–iv, 4–i (4) 1–iii, 2–ii, 3–i, 4–iv

Answer (1)

36. The following waterways have been declared as the National waterways by the Govt. Select the ***correct*** answer using the code given below -

(1) Allahabad and Haldia	(i) National Waterways No. 3
(2) Kottapuram-Kollam	(ii) N.W. No.-4
(3) Kakinada-Puducherry stretch of canals	(iii) N.W. No.-2
(4) Sadiya and Dhubri waterways	(iv) N.W. No. 1

(1) 1–iv, 2–i, 3–ii, 4–iii (2) 1–i, 2–ii, 3–iii, 4–iv
(3) 1–ii, 2–iii, 3–iv, 4–i (4) 1–iii, 2–iv, 3–ii, 4–i

Answer (1)

37. Match the following :

	The major iron-ore belts in India		States
(1)	Odisa-Jharkhand Belt	(i)	Karnataka
(2)	Durg-Bastar-Chanderpur Belt	(ii)	Goa and Maharashtra
(3)	Ballari Chitradurga Chikkamangluru Tumakuru Belt	(iii)	Chattisgarh
(4)	Maharashtra-Goa Belt	(iv)	Odisa

(1) 1–iv, 2–iii, 3–ii, 4–i (2) 1–i, 2–ii, 3–iii, 4–iv
(3) 1–ii, 2–iv, 3–iii, 4–i (4) 1–iv, 2–iii, 3–i, 4–ii

Answer (4)

38. Chose in ***correct*** statement from the following
(1) Election of Indian president is direct
(2) Election of the prime-minister is direct
(3) Ministers are appointed by the President on the advice of Prime-Minister.
(4) President presides over to cabinet meeting.

Answer (3)

39. Which of the following is ***not*** a permanent member of security council?
(1) Britain (2) U.S.A.
(3) China (4) Germany

Answer (4)

40. Indian Parliament's consists of -
(1) President, Vice President and Rajya Sabha
(2) President, Lok Sabha and Rajya Sabha
(3) President and Rajya Sabha
(4) President, Vice President and Lok Sabha

Answer (2)

41. Choose the odd pair of personalities from the following -
(1) Mrs. Indira Gandhi and Narendra Modi
(2) Balram Jakhar and Shivraj Patil
(3) Narendra Modi and Sumitra Mahajan
(4) Dr. Rajendra Prasad and Dr. V.V. Giri

Answer (3)

42. Which of the following statement is ***not*** correct
(1) Telengana is created from Orissa
(2) Uttrakhand is created from U.P.
(3) Jharkhand is created from Bihar
(4) Chhattisgarh is created from M.P.

Answer (2)

43. Who presides the Joint session of Parliament?
(1) President
(2) Vice President
(3) Speaker of Lok Sabha
(4) Prime Minister

Answer (3)

44. Which of the following is ***not*** a Political Party?
(1) INC
(2) BJP
(3) AAP
(4) RSS

Answer (4)

45. Which of the following is ***not*** a correct match?
(1) U Thant - Burma
(2) Kofi Annan - Ghana
(3) Boutros Boutros Ghali - Iran
(4) Kurt Waldheim - Austria

Answer (3)

46. An industrialist Mr. Bajaj has made an investment of Rs. 10 lacs on education, Rs. 10 lacs on training and Rs. 5 lacs on medical care of the employees of his company. His efforts are towards strengthening to
(1) Working capital
(2) Human capital
(3) Fixed capital
(4) Capital growth

Answer (2)

47. If a farmer's cost of production to produce one quintal of wheat is Rs. 1800, then Govt. of India has adopted a principle to have at least MSP as below-
(1) Rs. 2700
(2) Rs. 1800
(3) Rs. 3600
(4) Rs. 2000

Answer (1)

48. Assume, there are three families lives in a village. In family of Mr. Ramlal Elder son Mr. Anil work on their fields and younger son Mr. Sunil is lawyer in district court. In family of Mr. Shayamlal only and son Mr. Dinesh work in a nearby factory of making spare parts of motorcycle as an engineer. In family of Mr. Mohanlal-has two daughters-Elder Monika is a insurance agent and younger Seema runs her internet cafe. Thus, what is the ratio of economic sectors in which people of this village are engaged

(1) Primary-20%, Secondary-60%, Tertiary-20%

(2) Primary-60%, Secondary-20%, Tertiary-20%

(3) Primary-20%, Secondary-20%, Tertiary-60%

(4) Primary-20%, Secondary-20%, Tertiary-40%

Answer (3)

49. XYZ Bank has Rs. 10000 crores public deposits and interested to utilize 7500 crores of its funds. In your opinon, which of the following activity do you find more better option for bank

(1) by renovating all existing branches

(2) by deposit it to central bank

(3) by opening many new branches

(4) by extending loans

Answer (2)

50. Following are some activities

(A) Giving seeds and fertilizers subsidy to the farmers

(B) Cultivating wheat

(C) Making atta from wheat

(D) Providing storage facility for the wheat

Out of the above, which activity/activities relates to primary sector-

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

(3) B (4) B, D

Answer (2)

51. Income alone is not a completely adequate indicator of development of a country. Which one of the following statement is *incorrect* in this regard?

(1) Money cannot ensure a pollution free environment for individual

(2) Some people earn more than others do

(3) Money does ensure respect and dignity for the individuals.

(4) Money helps us buy material goods and services only.

Answer (3)

52. Match Column I with the statement of Column II

Column I	Column II
A. Right to inform	i. When I buy an electric iron and suffered electric shock while using it.
B. Right to Choose	ii . When I parceled a packet from post office but not delivered yet.
C. Right to Safety	iii. When I buy a shirt from company outlet, instructions for washing it was tagged on it.
D. Right to seek redressal	iv. When I have taken a gas connection, dealer insisted me to buy stove from them with the connection but I denied

(1) A – i, B – ii, C – iii, D – iv

(2) A – ii, B – iv, C – i, D – iii

(3) A – iv, B – iii, C – ii, D – i

(4) A – iii, B – iv, C – i, D – ii

Answer (4)

53. There are a variety of ways in which the MNCs are spreading their production and interacting with local producers in various countries across the world.

Which one is ***not*** feasible ?

(1) By setting up partnership with local companies

(2) By using the local companies for supplies

(3) By imposing restriction on trade of local companies

(4) By closely competing with local companies or buying them.

Answer (3)

54. In Δ ABC, $\angle$ABC = 90° and $\angle$BAC = 60°. If bisector of $\angle$BAC meets BC at D, Then BD : DC is -

(1) 1 : 2

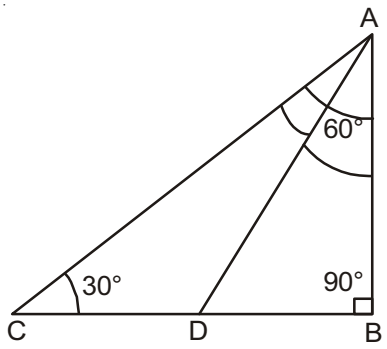
(2) 1 : $\sqrt{3}$

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

(4) 1 : 1

Answer (1)

Sol.



$\sin 30° = \frac{AB}{AC} = \frac{1}{2}$

By angle bisector theorem,

$\frac{CD}{BD} = \frac{AC}{AB}$

$\Rightarrow \quad \frac{BD}{CD} = \frac{AB}{AC} = \frac{1}{2}$

55. a and b are roots of the quadratic equation $x^2 + 5x + d = 0$ and a and c are roots of the quadratic equation $x^2 + 6x + 2d = 0$. If there is only one common root of the above two equations, then the possible value of d is -

(1) 2 (2) –2

(3) 4 (4) –4

Answer (3)

Sol. If one root is common then

$(c_1a_2 - a_1c_2)^2 = (a_1b_2 - b_1a_2)(b_1c_2 - c_1b_2)$

$a_1 = 1,\ a_2 = 1,\ b_1 = 5,\ b_2 = 6,\ c_1 = d,\ c_2 = 2d$

$\Rightarrow \quad (d - 2d)^2 = (6 - 5)(10d - 6d)$

$d^2 = 4d$

$\Rightarrow \quad d = 4$

56. Sum of the lengths of all edges of a cube is x metres. If the surface area of the cube is x sq.metres, then its volume (in cubic metres) is -

(1) x^3 (2) 8

(3) x (4) 2

Answer (2)

Sol. Let length of each edge = a

Given $12a = x \Rightarrow a = \frac{x}{12}$

surface area = $6a^2 = 6\left(\frac{x^2}{144}\right)$

A.T.Q,

$6\left(\frac{x^2}{144}\right) = x \qquad \Rightarrow \boxed{x = 24}$

Then edge = $a = \frac{x}{12} = 2$

Volume = $(a)^3 = (2)^3 = 8$

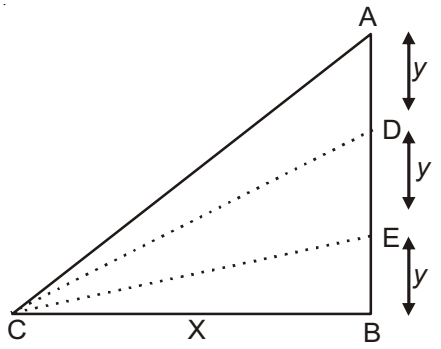
57. ABC is a right angled triangle, right angled at $\angle B$. If side AB is divided into three equal parts by points D and E such that D is nearer to A, than $\frac{AC^2 - EC^2}{DC^2 - BC^2}$ is equal to

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

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

Answer (4)

Sol.



Let $BC = x$

$BE = ED = AD = y$

$AC^2 = x^2 + 9y^2$

$DC^2 = x^2 + 4y^2$

$EC^2 = x^2 + y^2$

$BC^2 = x^2$

$\frac{AC^2 - EC^2}{DC^2 - BC^2} = \frac{8y^2}{4y^2} = 2$

58. There are 15APs whose common differences are 1, 2, 3, ..., 15 respectively, the first term of each being 1. Then sum of their 15th terms is

(1) 1695 (2) 1792

(3) 1800 (4) 1924

Answer (1)

Sol. We know general term of A.P.

$t_n = a + (n - 1)d \quad \Rightarrow t_{15} = a + 14d$

$\therefore$ We need to find

Sum = [1 + 14(1)] + [1 + 14(2)] + [1 + 14(3)]+... +[1 + 14(15)]

Sum = 15 + 14 (1 + 2 + 3 +... 15)

$= 15 + 14 \times \frac{15(15+1)}{2} = 15 + 14 \times \frac{15 \times 16}{2} = 1695$

59. ABC is a triangle in which AB = 10cm, AC = 24cm and BC = 26cm. If AD is its median, then length of AD is -

(1) 12 cm (2) 12.5 cm

(3) 13 cm (4) 14.75 cm

Answer (3)

Sol. Length of median is given by

$$= \frac{1}{2}\sqrt{2b^2 + 2c^2 - a^2}$$

$$= \frac{1}{2}\sqrt{2(24)^2 + 2(10)^2 - (26)^2} = 13\,\text{cm}$$

60. The decimal expansion of the number $\frac{14588}{8750}$ will

(1) terminate after two decimal places

(2) terminate after three decimal places

(3) terminate after four decimal place

(4) not terminate

Answer (3)

Sol. $\frac{14588}{8750} = 1.6672$

61. All the zeroes of the polynomial $x^3 + 2x^2 + a$ are also zeroes of the polynomial $x^5 - x^4 - 4x^3 + 3x^2 + 3x + b$. Then, the values of a and b are respectively-

(1) –1 and 2 (2) –1 and –2

(3) 1 and –2 (4) 1 and 2

Answer (2)

Sol. Dividing $x^5 - x^4 - 4x^3 + 3x^2 + 3x + b$ by $x^3 + 2x^2 + a$ (quotient $x^2 - 3x + 2$):

$$x^5 - x^4 - 4x^3 + 3x^2 + 3x + b$$
$$x^5 + 2x^4 + 0x^3 + ax^2$$
$$-3x^4 - 4x^3 + (3-a)x^2 + 3x + b$$
$$-3x^4 - 6x^3 + 0x^2 - 3ax$$
$$2x^3 + (3-a)x^2 + (3+3a)x + b$$
$$2x^3 + 4x^2 + 0x + 2a$$
$$(-1-a)x^2 + (3+3a)x + (b-2a)$$

Remainder = 0

$\therefore$ $\boxed{a = -1}$ also $b = 2a$ $\Rightarrow b = -2$

62. Present age of a father is six times his son's age. After four years, the age of the father will be four times his son's age. The present ages (in years of the father and son are respectively -

(1) 24 and 4 (2) 30 and 5

(3) 36 and 6 (4) 28 and 7

Answer (3)

Sol. Let present age of son be = x

Present age of father = $6x$

After 4 yrs,

Son's age = $x + 4$

Father's age = $6x + 4$

A.T.Q,

$6x + 4 = 4(x + 4)$

$\Rightarrow 6x + 4 = 4x + 16$

$\Rightarrow 2x = 12 \quad \Rightarrow x = 6$

$\therefore$ Son's age = 6 yrs
Father's age = 36 yrs

63. The largest number which divides 72 and 127 leaving remainders 7 and 10 respectively is -

(1) 845 (2) 458

(3) 65 (4) 13

Answer (4)

Sol. Now 72 – 7 = 65
127 – 10 = 117

HCF of 65 and 117 will be 13

$\therefore$ largest number is 13.

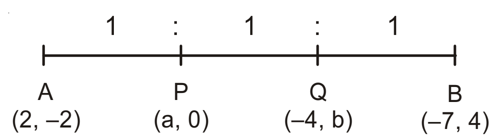
64. The line segment joining the points A(2, –2) and B(–7, 4) is trisected at the points P and Q (P is nearer to A). If coordinates of P and Q are (a, 0) and (–4, b) respectively, then the values of a and b are respectively-

(1) 1 and 2 (2) –1 and 2

(3) 1 and –2 (4) –1 and –2

Answer (2)

Sol.



$m : n$

AP : PB = 1 : 2

$$P(x) = \frac{-7+4}{3} = \frac{-3}{3} = -1 = a$$

PQ : QB = 1 : 1

$$Q(y) = \frac{0+4}{2} = 2 = b$$

65. $\frac{\cos\theta - \sin\theta + 1}{\cos\theta + \sin\theta - 1}$ is equal to

(1) $\sec\theta + \tan\theta$ (2) $\sec\theta - \tan\theta$

(3) $\csc\theta - \cot\theta$ (4) $\csc\theta + \cot\theta$

Answer (4)

Sol. $\frac{\cos\theta-\sin\theta+1}{\cos\theta+\sin\theta-1}$

$\frac{\frac{\cos}{\sin\theta}-\frac{\sin\theta}{\sin\theta}+\frac{1}{\sin\theta}}{\frac{\cos\theta}{\sin\theta}+\frac{\sin\theta}{\sin\theta}-\frac{1}{\sin\theta}}$

$\frac{\cot\theta-1+\operatorname{cosec}\theta}{\cot\theta+1-\operatorname{cosec}\theta}$

$\frac{\cot\theta+\operatorname{cosec}\theta-(\operatorname{cosec}^2\theta-\cot^2\theta)}{\cot\theta+1-\operatorname{cosec}\theta}$

$\frac{(\cot\theta+\operatorname{cosec}\theta)-(\cot\theta+\operatorname{cosec}\theta)(-\cot\theta+\operatorname{cosec}\theta)}{\cot\theta+1-\operatorname{cosec}\theta}$

$\frac{(\cot\theta+\operatorname{cosec}\theta)(1+\cot\theta-\operatorname{cosec}\theta)}{\cot\theta+1-\operatorname{cosec}\theta}$

$\operatorname{cosec}\theta+\cot\theta$

66. From the top of a 60 m high tower, the angles of depression of the top and bottom of pillar are 30° and 60° respectively. Then the height of the pillar is

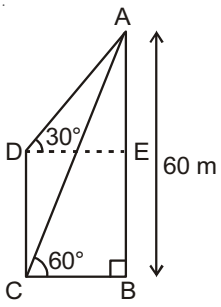
(1) 20 m (2) $20\sqrt{3}$ m

(3) 40 m (4) $40\sqrt{3}$ m

Answer (3)

Sol. In ΔABC, than $60°=\frac{AB}{BC}$

$\sqrt{3}=\frac{60}{BC}$



$BC=\frac{60}{\sqrt{3}}m$

$DE=BC=\frac{60}{\sqrt{3}}m$

In ΔAED

$\tan 30°=\frac{AE}{DE}$

$\frac{1}{\sqrt{3}}=\frac{AE\sqrt{3}}{60}$

$60 = 3AE$

$AE = 20$ m

$DC = AB - AE = (60 - 20)$ m

$= 40$ m

$\therefore$ Height of pillar is 40 m.

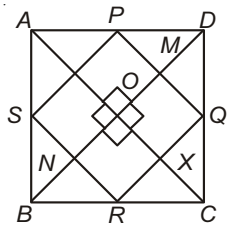
67. The diagonals of a quadrilateral ABCD are perpendicular to each other. Then the quadrilateral formed by joining the mid-points of its sides (in order) is a

(1) kite (2) rectangle

(3) rhombus (4) square

Answer (2)

Sol.



Let AC = d_1

BD = d_2

PQ = $\frac{d_1}{2}$ (By mid-point theorem)

SR = $\frac{d_1}{2}$ (By mid-point theorem)

SP = $\frac{d_2}{2}$ (By mid-point theorem)

PQ = $\frac{d_2}{2}$ (By mid-point theorem)

So, *PQRS* is a parallelogram.

RS || *PQ*, So *RS* || *AC*

and *NR* || *OX*

$\angle NOX = 90°$

($\angle NOX + \angle ONR = 180°$ (*NR* || *OX*),

$90° + \angle ONR = 180°$,

$\angle ONR = 90°$)

Similarly:

ON || *RX*

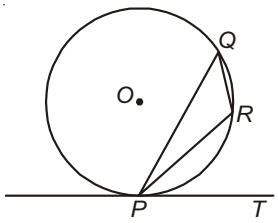
$\angle ONR + \angle NRX = 180°$

$90° + \angle NRX = 180°$

$\angle NRX = 90°$

Similarly, all angles of the quadrilateral *PQRS* is 90°, therefore, *PQRS* is a rectangle.

68. In figure, PQ is a chord of a circle with centre O and PT is its tangent at P. If $\angle QPT = 60°$, then $\angle PRQ$ is

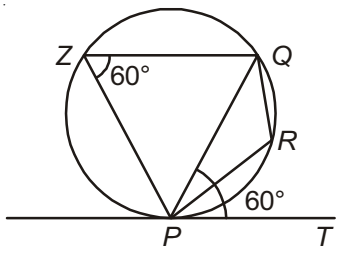


(1) 105° (2) 115°

(3) 120° (4) 135°

Answer (3)

Sol.



$\angle QPT = 60^\circ$

$\angle PZQ = 60^\circ$ (Alternate segment theorem)

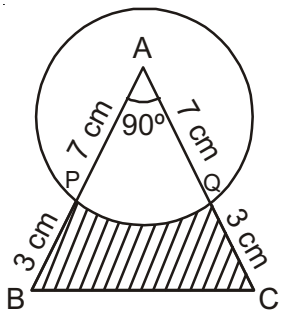
So, $\angle PZQ + \angle QRP = 180^\circ$

(Cyclic quadilateral PZQR)

$60^\circ + \angle QRP = 180^\circ$

$\angle QRP = 120^\circ$

69. A momento is made as shown in the figure. Its base PBCQ is silver plated from the front side



The silver plated area is $\left(\text{use } \pi = \frac{22}{7}\right)$

(1) 11 cm^2 (2) 11.5 cm^2

(3) 12.5 cm^2 (4) 18 cm^2

Answer (2)

Sol. Area of $APQ = \frac{1}{2}\times 10\times 10$

$= 50\ cm^2$

Area of APQ sector $= \frac{90}{360}\times\frac{22}{7}\times 7\times 7$

$= \frac{77}{2} = 38.5\ cm^2$

Area of shaded portion = 50 – 38.5 = 11.5 cm^2.

70. A bucket is in the form of a frustum of a cone and it can holds 28.49 litres of water. The radii of the top and bottom of the bucket are 28 cm and 21 cm respectively. Then slant height of the bucket is

$\left(\text{use } \pi = \frac{22}{7}\right)$

(1) 15 cm (2) $\sqrt{246}$ cm

(3) $\sqrt{253}$ cm (4) $\sqrt{274}$ cm

Answer (4)

Sol. Volume of frustum =

$$28490 = \frac{1}{3}\times\frac{22}{7}\left((21)^2 + (28)^2 + 21\times 28\right)\times h$$

$$28490 = \frac{22}{3}(21\times 3 + 28\times 4 + 3\times 28)\times h$$

h = 15 cm

$l = \sqrt{h^2 + (r_1 - r_2)^2}$

$= \sqrt{15^2 + (28-21)^2}$

$= \sqrt{274}$ cm

71. Two dice are thrown at the same time. The probability that, the sum of two numbers appearing on the top of the dice is greater than 6 but less than 9, is

(1) $\frac{11}{36}$ (2) $\frac{1}{3}$

(3) $\frac{5}{6}$ (4) $\frac{4}{9}$

Answer (1)

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

P (greater than 6, but less than 9) = $\frac{11}{36}$

72. A person can row a boat at 10 km/h in still water. He takes two and half hours to row from A to B and back. If the distance between A and B is 12 km, then the speed of the stream is

(1) 3 km/h (2) $2\frac{1}{2}$ km/h

(3) 2 km/h (4) $1\frac{1}{2}$ km/h

Answer (3)

Sol. Let speed of stream be x km/hr

Total Distance = 12km

Time = $2\frac{1}{2}$ hrs. = $\frac{5}{2}$ hrs.

Speed of boat = 10 km/hr.

$$\frac{12}{10+x} + \frac{12}{10-x} = \frac{5}{2}$$

$$12\left(\frac{1}{10+x} + \frac{12}{10-x}\right) = \frac{5}{2}$$

$$12\left(\frac{10-x+10+x}{100-x^2}\right) = \frac{5}{2}$$

$$12\times 20\times 2 = 5(100 - x^2)$$

$480 = 500 - 5x^2$

$5x^2 = 20$

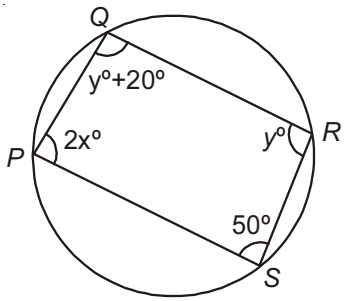
$x^2 = 4$

$x = \pm 2$

Since speed can't be negative,

$\therefore$ Speed of stream = 2 km/hr.

73. In the figure, points P, Q, R and S lie on a circle. Then the values of x and y are respectively.

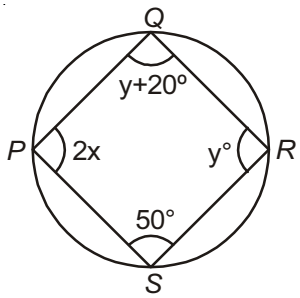


(1) 40° and 100° (2) 35° and 110°

(3) 50° and 80° (4) 30° and 120°

Answer (2)

Sol.



PQRS is a cycle quardilateral

$2x + y = 180°$ ...(i)

$y + 20 + 50 = 180°$ ...(ii)

$y = 180° - 70°$

$y = 110°$ ...(iii)

Putting (iii) in (i)

$2x + 110° = 180°$

$2x = 70°$

$x = 35°$

74. Difference between systolic and diastolic blood pressure is known as -

(1) Blood pressure (2) Cardiac output

(3) Pulse pressure (4) Heart beat

Answer (3)

Sol. Pulse pressure is defined as difference between systolic pressure and diastolic pressure.

If blood pressure is 120/80 mm Hg then pulse pressure is 120 – 80 = 40 mm Hg.

75. About what percentage of living species are in danger of extinction ?

(1) 20% (2) 10%

(3) 30% (4) 1%

Answer (3)

Sol.* 30% of living species are in danger of extinction

76. Entry of water into root hairs is an example of -

(1) Diffusion (2) Imbibition

(3) Osmosis (4) Plasmolysis

Answer (3)

Sol. Osmosis is a special case of diffusion. Osmosis is defined as movement of solvent molecules from higher concentration to lower concentration through semi permeable membrane.

In soil, there is high concentration of water molecules so it enters into root hairs by osmosis.

77. Tendons & ligaments are types of tissue -

(1) Muscular tissue (2) Epithelial tissue

(3) Nervous tissue (4) Fibrous tissue

Answer (4)

Sol. Tendons and ligaments are the dense regular connective tissue which contains more fibres and less matrix.

78. The organ which spider use to prepare web is -

(1) Spinnerates (2) Spicules

(3) Spiracles (4) Carapace

Answer (1)

Sol. Spinnerate is a silk spinning organ of spider or larva of an insect. Spinnerate are on the underside of a spider's abdomen.

79. Variations are important as they produce -

(1) Adaptations (2) Elimination

(3) Evolution (4) Selection

Answer (1)

Sol. Variations produce adaptation for survival which ultimately result in evolution.

80. Mode of nutrition in cuscuta is -

(1) Saprophytic (2) Autotrophic

(3) Parasitic (4) Insectivorous

Answer (3)

Sol. *Cuscuta* is also known as dodder plant or Amarbel which is parasitic in nutrition and enters inside xylem and phloem of host plant to acquire nutrition.

81. Structural and functional unit of kidney is -

(1) Nephron (2) Ureter

(3) Neuron (4) Urethra

Answer (1)

Sol. Nephron is the structural and functional unit of kidney which actually produces urine in process of removing waste substance from blood.

82. Lateral ventricles are found in

(1) Cerebellum (2) Cerebral hemisphere

(3) Diencephalon (4) Medulla oblongata

Answer (2)

Sol. Lateral ventricles are two largest cavities of ventricular system of human brain. Each cerebral hemisphere contains a lateral ventricle known as left and right ventricle respectively

83. Cessation of menstrual cycle is called -

(1) Puberty (2) Menarche

(3) Pregancy (4) Menopause

Answer (4)

Sol. Menarche is the starting phase of menstural cycle and cessation or ending phase of menstural cycle is menopause.

84. Exchange of gases in human occurs in -

(1) Trachea (2) Pleura

(3) Bronchi (4) Alveoli

Answer (4)

Sol. Alveoli are the tiny air sacs of lungs which allow for rapid gaseous exchange.

85. Which of the following disease is only due to external causes ?

(1) Diabetes (2) Arthritis

(3) Jaundice (4) Cataract

Answer (3)

Sol. Jaundice is a disease caused by the contaminated food and water and this majorly affects liver. It is caused by accumulation of bilirubin in blood.

86. High yielding varieties of wheat were initially developed by an Indian scientist by cross breeding the traditional varieties with -

(1) Mexican Varieties (2) Europian Varieties

(3) American Varieties (4) African Varieties

Answer (1)

Sol. High yielding varieties of wheat were developed by Indian scientist by cross breeding traditional varieties with varieties of Mexico. Sonora - 64 and Lerma Rojo 64 were brought to modified through gamma mutations.

87. ILS-82 and B-77 breeds are of following -

(1) Cow (2) Fowl

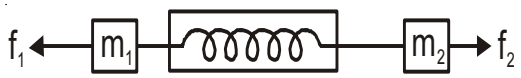
(3) Pig (4) Buffalo

Answer (2)

Sol. ILS-82 and B-77 are breeds of present day chickens for egg and meat production.

88. A dynamometer D is attached to two masses m_1 = 3 kg & m_2 = 5 kg. Forces of f_1 = 9N & f_2 = 25N are applied to the masses as shown :

The dynamometer will read -

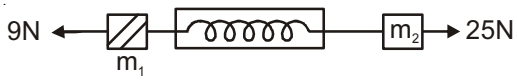


(1) 10 N (2) 15 N

(3) 14 N (4) 6 N

Answer (2)

Draw FBD of system



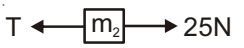
$\Rightarrow$ Net force = mass × acceleration

$\Rightarrow$ $25 - 9 = (m_1 + m_2)a$

$\Rightarrow$ $16 = (3 + 5)a$

$\Rightarrow$ $a = 2\ m/s^2$

Now, FBD of Block m_2 (T =Tension in spring)



$\therefore$ Net force = m_2a

(Spring reading is equal to tension)

$\Rightarrow$ $(25 - T) = 5 \times 2$

$\Rightarrow$ $25 - 10 = T$

$\Rightarrow$ $T = 15$ N

89. A packet of weight W was allowed to fall freely in a water tank with acceleration '*a*' (<g). The magnitude of resistive force offered by water is -

(1) $w\frac{g}{a}$ (2) $w\frac{a}{g}$

(3) $w\left(1-\frac{a}{g}\right)$ (4) $w\left(1+\frac{a}{g}\right)$

Answer (3)

Sol. Draw FBD of Packet in water

W = weight of plank

F = Buoyant (upthrust)

by liquid

Net force $\Rightarrow$ $W - F = ma$

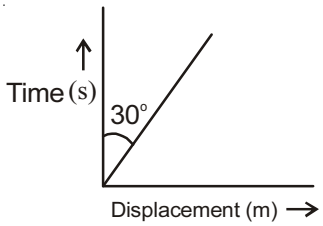
$F = W - ma$

$\Rightarrow F = W\left(1-\frac{ma}{W}\right)$

$\Rightarrow F = W\left(1-\frac{ma}{mg}\right)$

$F = W\left(1-\frac{a}{g}\right)$

90. The displacement time graph of a body in motion is given as below



Velocity of body is (in m/s)

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

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

Answer (4)

Sol. Slope angle = 60°

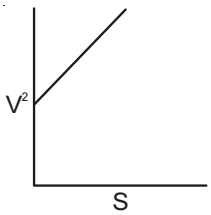
$\therefore$ Slope of graph = $\sqrt{3}$

$\Rightarrow \frac{t}{s} = \sqrt{3}$

$\Rightarrow \frac{1}{v} = \sqrt{3}$

$\Rightarrow v = \frac{1}{\sqrt{3}}$

91. $V^2 - S$ graph of moving body in straight line is as shown in figure. Which one among the following is ***not*** true?



(1) Motion is uniformly accelerated

(2) Corresponding s-t graph will be parabola

(3) Initial velocity of particle is zero

(4) Velocity is time varying

Answer (3)

Sol. Equation of line

$v^2 = ms + c$

At $S = 0$, $V \neq 0$

Hence body has some initial velocity.

92. The velocity of sound wave in a given medium is V when its frequency is ν. The velocity, when frequency changes to 5ν is

(1) 5 V (2) $\frac{V}{5}$

(3) 25V (4) V

Answer (4)

Sol. Speed of sound depends on nature of medium, temperature.

Since neither of them is changing so the speed will remain same

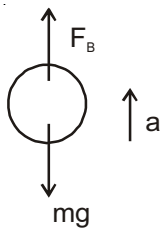
93. A small block of material having relative density $\frac{1}{3}$ is immersed in liquid and released. The block starts moving upwards with an acceleration 'a'. The value of 'a' is (g is acceleration due to gravity)

(1) g (2) 2g

(3) 3g (4) 4g

Answer (2)

Sol.



$a = \frac{F_B - mg}{m} = \frac{V_0\rho_w g - V_0\rho_0 g}{V_0\rho_0}$

$= \left(\frac{\rho_w - \rho_0}{\rho_0}\right)g = \left(\frac{\rho_w}{\rho_0} - 1\right)g = (3-1)g$

$= 2g$

94. A wooden plank of length 'L' rests on a frictionless floor. A boy of mass 'M' now runs over the plank starting from its one end. If mass of wooden plank is $\frac{M}{5}$, the distance covered by the boy relative to the ground will be -

(1) $\frac{L}{6}$ (2) $\frac{5L}{6}$

(3) $\frac{L}{5}$ (4) $\frac{4L}{5}$

Answer (1)

Sol. Since net force on system (wooden plank + boy) is zero.

Hence the centre of mass of the system will remain at rest.

Let boy moves *x* distance w.r.t. ground. Hence distance travelled by plank w.r.t. ground will be (L – x)

$$Mx = \frac{M}{5}(L-x)$$

$$x = \frac{1}{5}(L-x)$$

$$x = \frac{L}{6}$$

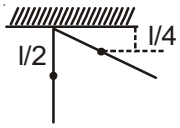
95. A rod of length '*l*' and mass '*m*' fixed at one end, is hanging vertically. The other end is now raised so that the rod makes an angle 30° with horizontal line. The work done in this process will be -

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

(3) $\frac{mgl}{3}$ (4) $\frac{mgl}{4}$

Answer (4)

Sol.



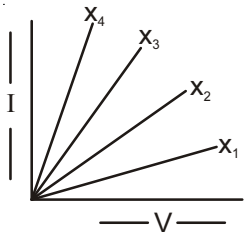
Centre of mass of rod moves upward by

$\frac{l}{4}$

then work done = change in P.E. (ΔU)

$$= mg\frac{l}{4}.$$

96. Graph shows V-I Characteristics of two resistances, their series combination & parallel combination. Identify the resistances, values & graphs -



	Resistance-1	Resistance-2	Series	Parallel
(1)	x_1	x_2	x_3	x_4
(2)	x_2	x_3	x_4	x_1
(3)	x_3	x_2	x_1	x_4
(4)	x_4	x_1	x_2	x_3

Answer (3)

Sol. Slope of I-V graph gives $\frac{1}{R}$

$$\tan\theta = \frac{1}{R}$$

So as $\theta \uparrow \Rightarrow \tan\theta \uparrow \Rightarrow R\downarrow$

$x_1 > x_2 > x_3 > x_4$

As we know that R_{eq} in series combination is most and R_{eq} in parallel combination will be least.

So R_{eq} in parallel = x_4

R_{eq} in series = x_1

97. Two plane mirrors P & Q are kept at? with respect to each other. Light falls on P is reflected and then fall on Q and is reflected. The emergent ray is opposite to incident ray direction. The ? is equal to

(1) 40° (2) 30°

(3) 60° (4) 90°

Answer (4)

Sol. Angle of deviation = $360 - 2\theta$

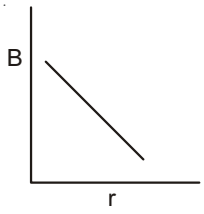
(θ is angle between the mirrors)

$180 = 360 - 2\theta$

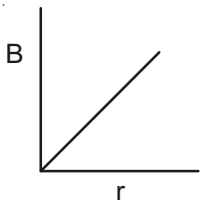
$\theta = 90°$

98. The magnetic field intensity (B) at a distance '*r*' from a long straight conductor carrying a steady current varies with '*r*' as shown in figure -

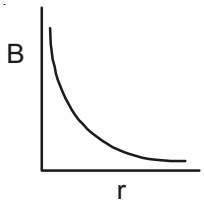
(1)



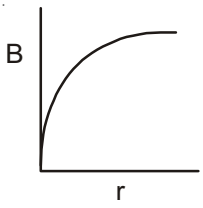
(2)



(3)



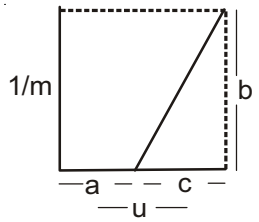
(4)



Answer (3)

Sol. $B \propto \frac{1}{r}$ for a straight wire.

99. The graph in figure shows how the inverse of magnification (1/m) produced by a thin convex lens varies with object distance '*u*' the power of lens will be



(1) $\frac{b}{c}$ (2) $\frac{b}{ca}$

(3) $\frac{bc}{a}$ (4) $\frac{c}{b}$

Answer (1)

Sol. From lens formula

$$\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$$

$$\frac{u}{v} - 1 = \frac{u}{f}$$

$$\frac{u}{v} = 1 + \frac{u}{f}$$

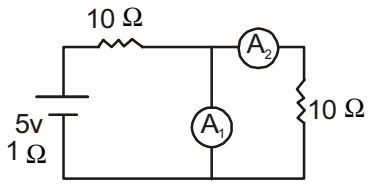
$$\frac{1}{m} = 1 + \frac{u}{f}$$

Comparing with the graph

$$\text{slope} = \frac{1}{f} = \frac{b}{c}$$

$$\text{Power} = \frac{b}{c}$$

100. In the circuit shown all the measuring instruments are ideal. The reading in ammeter A_2 will be



(1) $\frac{1}{4}$ A

(2) 1A

(3) < $\frac{1}{4}$ A

(4) Zero

Answer (4)

Sol. Resistance of ideal ammeter is zero. Hence all the current will pass through ammeter A_1.

Hence current in A_2 is zero.

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