

GATE 2022

Civil Engineering

**General Aptitude
(Question with Solution
Set-1 & 2)**



Set-1

1. You should _____ when to say _____.
- A. no / no B. no / know
C. know / know D. know / no

Ans. D

Sol. You should **know** when to say **no**.

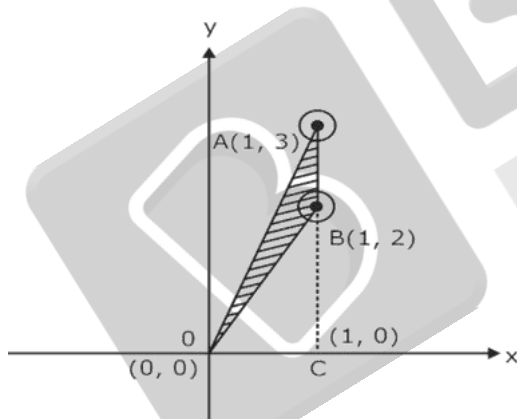
2. Two straight lines pass through the origin $(x_0, y_0) = (0, 0)$. One of them passes through the point $(x_2, y_2) = (1, 3)$ and the other passes through the point $(x_2, y_2) = (1, 2)$.

What is the area enclosed between the straight lines in the interval $[0, 1]$ on the x-axis?

- A. 0.5 B. 1.0
C. 1.5 D. 2.0

Ans. A

Sol.



Area enclosed = Area of the shaded region
= Area of ΔDAB
 $= \frac{1}{2} \times \text{base} \times \text{height}$
 $= \frac{1}{2} \times AB \times OC$
 $= \frac{1}{2} \times 1 \times 1$
 $= 0.5 \text{ sq. units}$

3. If
 $p : q = 1 : 2$
 $q : r = 4 : 3$
 $r : s = 4 : 5$
and u is 50% more than s , what is the ratio $p : u$?
- A. 2: 15 B. 16: 15
C. 1 : 5 D. 16 : 45

Ans. D

Sol. Given:

$p : q = 1 : 2, q : r = 4 : 3, r : s = 4 : 5$

or, $\frac{r}{s} = \frac{12}{15}, \frac{q}{r} = \frac{16}{12}$ and $\frac{p}{q} = \frac{8}{16}$

Let, $p = 8k, q = 16k, r = 12k$ and $s = 15k$

$u = \left(1 + \frac{50}{100}\right)s$

$= 1.5s$

$= 1.5 \times 15k = 22.5k$

$p : u = 8k : 22.5k$

$= 16 : 45$

4. Given the statements:

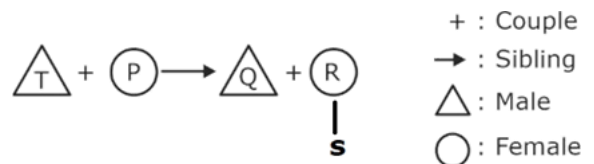
- P is the sister of Q.
- Q is the husband of R.
- R is the mother of S.
- T is the husband of P.

Based on the above information, T is _____ of S.

- A. the grandfather B. an uncle
C. the father D. a brother

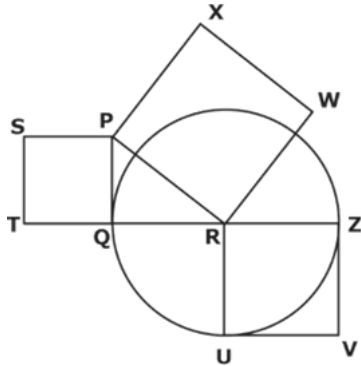
Ans. B

Sol. The family tree is as shown below:



T is the uncle of S

5. In the following diagram, the point R is the center of the circle. The lines PQ and ZV are tangential to the circle. The relation among the areas of the squares, PXWR, RUVZ and SPQT is



- A. Area of SPQT = Area of RUVZ = Area of PXWR
 B. Area of SPQT = Area of PXWR - Area of RUVZ
 C. Area of PXWR = Area of SPQT - Area of RUVZ
 D. Area of PXWR = Area of RUVZ - Area of SPQT

Ans. B

Sol. Area of square SPQT = PQ^2 ... (1)
 Area of square PXWR = PR^2 ... (2)
 Area of square RUVZ = $RZ^2 = QR^2$ [RZ = QR = radius] ... (3)

In ΔPQR , $\angle PQR = 90^\circ$ as PQ is tangent to the circle

$$PR^2 = PQ^2 + QR^2 \dots (4)$$

From (1), (2), (3) and (4) we can write.

$$\text{Area of square PXWR} = \text{Area of square SPQT} + \text{Area of square RUVZ}$$

$$\Rightarrow \text{Area of square SPQT} = \text{Area of square PXWR} - \text{Area of square RUVZ}$$

6. Healthy eating is a critical component of healthy ageing. When should one start eating

healthy? It turns out that it is never too early. For example, babies who start eating healthy in the first year are more likely to have better overall health as they get older.

Which one of the following is the CORRECT logical inference based on the information in the above passage?

- A. Healthy eating is important for those with good health conditions, but not for others
 B. Eating healthy can be started at any age, earlier the better
 C. Eating healthy and better overall health are more correlated at a young age, but not older age
 D. Healthy eating is more important for adults than kids

Ans. B

Sol. The conclusion is that eating healthy and better overall health are more co-related at a young age but not older age.

7. P invested ₹ 5000 per month for 6 months of a year and Q invested ₹ x per month for 8 months of the year in a partnership business. The profit is shared in proportion to the total investment made in that year.

If at the end of that investment year, Q

receives $\frac{4}{9}$ of the total profit, what is the

value of x (in ₹)?

- A. 2500 B. 3000
 C. 4687 D. 8437

Ans. B

Sol. The ratio of the profits = $5000 \times 6 : 8x$

$$= \frac{15000}{4x}$$

$$\% \text{ share of the profit of } Q = \frac{4x}{4x + 15000}$$

From the question

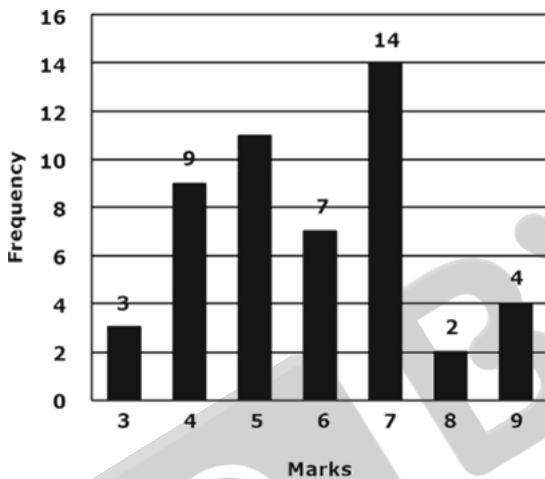
$$\frac{4x}{4x + 15000} = \frac{4}{9}$$

$$\Rightarrow 9x = 4x + 15000$$

$$\Rightarrow 5x = 15000$$

$$\boxed{x = 3000}$$

8. The above frequency chart shows the frequency distribution of marks obtained by a set of students in an exam.



From the data presented above, which one of the following is CORRECT?

- A. mean > mode > median
- B. mode > median > mean
- C. mode > mean > median
- D. median > mode > mean

Ans. B

Sol. Mean = $\frac{\sum f_i x_i}{\sum f_i}$

$$= \frac{3 \times 3 + 9 \times 4 + 11 \times 5 + 7 \times 6 + 14 \times 7 + 2 \times 8 + 4 \times 9}{3 + 9 + 11 + 7 + 14 + 2 + 4}$$

$$= \frac{9 + 36 + 55 + 42 + 98 + 16 + 36}{50}$$

$$= \frac{292}{50} = 5.84$$

Calculation of median:

No. of variates, $N = \sum f_i = 50$ (even)

Median = mean of $\frac{N^{\text{th}}}{2}$ & $\left(\frac{N}{2} + 1\right)^{\text{th}}$ variate

= mean of 25th & 26th variate

$$= \frac{6 + 6}{2} = 6$$

Mode = Marks corresponding to maximum frequency = 7

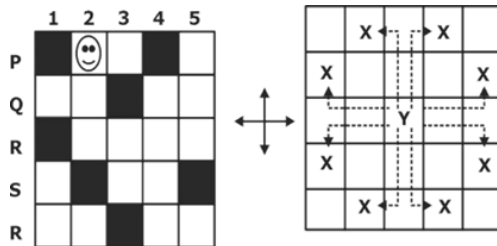
Hence, mode > median > mean

9. In the square grid shown on the left, a person standing at P2 position is required to move to P5 position.

The only movement allowed for a step involves "two moves along one direction followed by one move in a perpendicular direction". The permissible directions for movement are shown as dotted arrows in the right.

For example, a person at a given position Y can move only to the positions marked X on the right.

Without occupying any of the shaded squares at the end of each step, the minimum number of steps required to go from P2 to P5 is

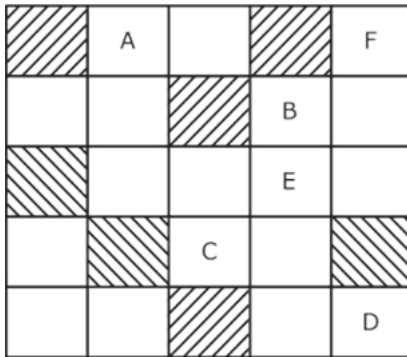


Example : Allowed steps for a person at Y

- A. 4
- B. 5
- C. 6
- D. 7

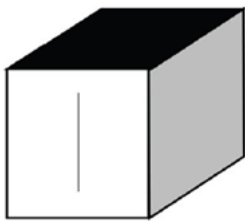
Ans. B

Sol. Moves will be A - B - C - D - E = F



i.e., A to B, B to C, C to D, D to E and E to F
Minimum no. of steps = 5

- 10.** Consider a cube made by folding a single sheet of paper of appropriate shape. The interior faces of the cube are all blank. However, the exterior faces that are not visible in the above view may not be blank.

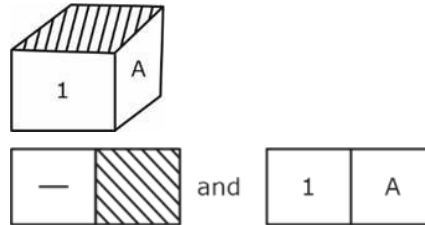


Which one of the following represents a possible unfolding of the cube?

- A.
- B.
- C.
- D.

Ans. D

Sol. On unfolding, the given alignment will always be followed:



Which is only shown in option D.

Set-2

- 1.** The movie was funny and I.....
A. could help laughing
B. couldn't help laughed
C. couldn't help laughing
D. could helped laughed

Ans. C

Sol. The movie was funny and I **couldn't help laughing.**

- 2.** $x : y : z = \frac{1}{2} : \frac{1}{3} : \frac{1}{4}$

What is the value of $\frac{x+z-y}{y}$?

- A. 0.75 B. 1.25
C. 2.25 D. 3.25

Ans. B

Sol. $x : y : z = \frac{1}{2} : \frac{1}{3} : \frac{1}{4}$

$$\Rightarrow \frac{x}{y} = \frac{1/2}{1/3} = \frac{3}{2}$$

$$\Rightarrow \frac{y}{z} = \frac{1/3}{1/4} = \frac{4}{3}$$

$$\frac{x+z-y}{y} = \frac{x}{y} + \frac{z}{y} - 1$$

$$= \frac{3}{2} + \frac{3}{4} - 1 = \frac{5}{4} = 1.25$$

3. Both the numerator and the denominator of $\frac{3}{4}$ are increased by a positive integer, x , and those of $\frac{15}{17}$ are decreased by the same integer. This operation results in the same value for both the fractions. What is the value of x ?

- A. 1 B. 2
C. 3 D. 4

Ans. C

Sol. $\frac{3+x}{4+x} = \frac{15-x}{17-x}$

$\Rightarrow (x+3)(x-17) = (x-15)(x+4)$

$\Rightarrow x^2 - 14x - 51 = x^2 - 11x - 60$

$\Rightarrow 3x - 9 = 0$

$x = 3$

4. A survey of 450 students about their subjects of interest resulted in the following outcome:

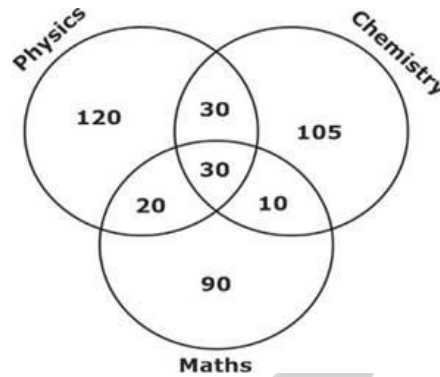
- 150 students are interested in Mathematics.
- 200 students are interested in Physics.
- 175 students are interested in Chemistry.
- 50 students are interested in Mathematics and Physics.
- 60 students are interested in Physics and Chemistry.
- 40 students are interested in Mathematics and Chemistry.
- 30 students are interested in Mathematics, Physics and Chemistry.
- Remaining students are interested in Humanities.

Based on the above information, the number of students interested in Humanities is

- A. 10 B. 30
C. 40 D. 45

Ans. D

Sol. The given data can be shown in the venn diagram as below:-



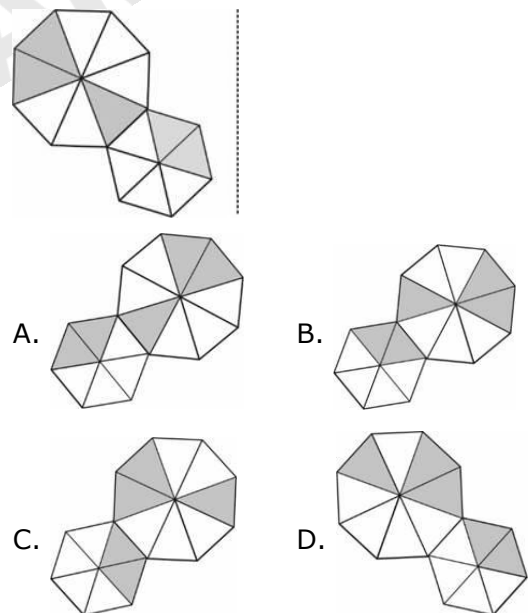
Total no. of students interested in physics, chemistry and maths all together

$= 120+20+30+30+105+10+90 = 405.$

Total no. of students = 450

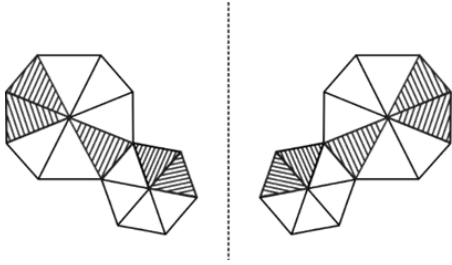
\therefore No. of students interested in humanities = $450-405 = 45$

5. For the picture shown above, which one of the following is the correct picture representing reflection with respect to the mirror shown as the dotted line?



Ans. A

Sol. The image will be symmetrical about the dotted line so that on folding about the dotted line, both pictures overlap each other.



6. In the last few years, several new shopping malls were opened in the city. The total number of visitors in the malls is impressive. However, the total revenue generated through sales in the shops in these malls is generally low.

Which one of the following is the CORRECT logical inference based on the information in the above passage?

- A. Fewer people are visiting the malls but spending more
- B. More people are visiting the malls but not spending enough
- C. More people are visiting the malls and spending more
- D. Fewer people are visiting the malls and not spending enough

Ans. B

Sol. The inference drawn from the passage is that more people are visiting the malls but not spending enough.

7. In a partnership business the monthly investment by three friends for the first six months is in the ratio 3: 4: 5 . After six months, they had to increase their monthly investments by 10%, 15% and 20%, respectively, of their initial monthly investment. The new investment ratio was kept constant for the next six months.

What is the ratio of their shares in the total profit (in the same order) at the end of the

year such that the share is proportional to their individual total investment over the year?

- A. 22 : 23 : 24
- B. 22 : 33 : 50
- C. 33 : 46 : 60
- D. 63 : 86 : 110

Ans. D

Sol. Let the initial investments be $3x$, $4x$ and $5x$, respectively.

Now, after increasing their monthly investment by 10%, 15% and 20%, respectively, the monthly instalment will be: $3.3x$, $4.6x$ and $6x$, respectively

Ratio of their profits at the end of year

= Ratio of their investments

$$= (3x + 3.3x) : (4x + 4.6x) : (5x + 6x)$$

$$= 6.3x : 8.6x : 11x$$

$$= 63 : 86 : 110$$

8. Consider the following equations of straight lines:

Line L1: $2x - 3y = 5$

Line L2: $3x + 2y = 8$

Line L3: $4x - 6y = 5$

Line L4: $6x - 9y = 6$

Which one among the following is the correct statement?

- A. L1 is parallel to L2 and L1 is perpendicular to L3
- B. L2 is parallel to L4 and L2 is perpendicular to L1
- C. L3 is perpendicular to L4 and L3 is parallel to L2
- D. L4 is perpendicular to L2 and L4 is parallel to L3

Ans. D

Sol.

$$L_1 : 2x - 3y = 5 \Rightarrow \text{slope} = 2/3$$

$$L_2 : 3x + 2y = 8 \Rightarrow \text{slope} = -3/2$$

$$L_3 : 4x - 6y = 5 \Rightarrow \text{slope} = 4/6 = 2/3$$

$$L_4 : 6x - 9y = 6 \Rightarrow \text{slope} = 6/9 = 2/3$$

Slope of $L_1 = \text{slope of } L_3 = \text{slope of } L_4$
 $\Rightarrow L_1, L_3 \text{ and } L_4 \text{ are parallel to each other}$

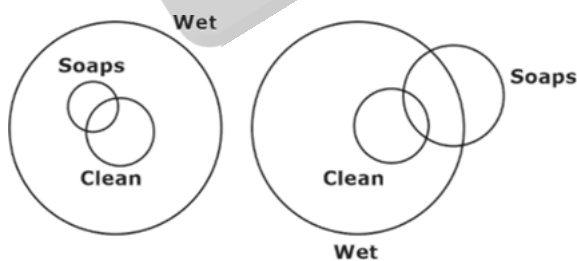
$$\text{slope of } L_4 \times \text{slope of } L_2 = \frac{2}{3} \times \left(\frac{-3}{2}\right) = -1$$

$\Rightarrow L_2 \text{ and } L_4 \text{ are perpendicular to each other}$

- 9.** Given below are two statements and four conclusions drawn based on the statements.
 Statement 1: Some soaps are clean.
 Statement 2: All clean objects are wet.
 Conclusion I: Some clean objects are soaps.
 Conclusion II: No clean object is a soap.
 Conclusion III: Some wet objects are soaps.
 Conclusion IV: All wet objects are soaps.
 Which one of the following options can be logically inferred?
- A. Only conclusion I is correct
 B. Either conclusion I or conclusion II is correct
 C. Either conclusion III or conclusion IV is correct
 D. Only conclusion I and conclusion III are correct

Ans. D

Sol. The possible representations are:-



We can observe that:-

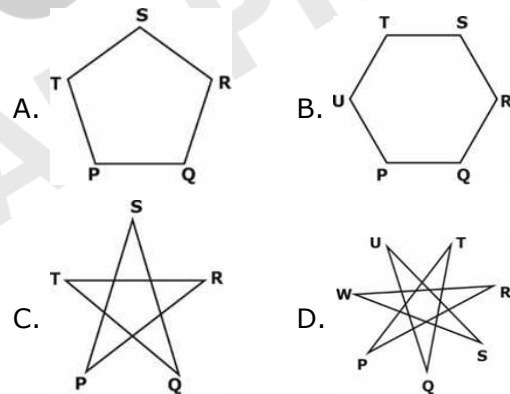
- Some clean objects are soaps
- Some wet objects are soaps

The above two criteria are fulfilled in both the diagrams, i.e. only conclusions I and III are correct.

- 10.** An ant walks in a straight line on a plane leaving behind a trace of its movement. The initial position of the ant is at point P facing east.
 The ant first turns 72° anticlockwise at P, and then does the following two steps in sequence exactly FIVE times before halting.
1. moves forward for 10 cm.
 2. turns 144° clockwise.



The pattern made by the trace left behind by the ant is



Ans. C

Sol. The path is shown below:

