NIMCET 2017 Previous Year Paper

120 Questions

Que. 1 A and B are independent witnesses in a case, the chance that A speaks truth is x and B speaks truth is y, If A and B agree on certain statements, the probability that the statement is true is

1. $\frac{xy}{xy + (1-x)(1-y)}$
2. $\frac{xy}{(1-x)(1-y)}$
3. $\frac{(1-x)(1-y)}{xy + (1-x)(1-y)}$
4. $\frac{x+y}{xy + (1-x)(1-y)}$

Testbook Solution Correct Option **- 1**

Concept:

Let $A_1, A_2, \ldots, A_n$ be n mutually exclusive and exhaustive events of the sample space S and A is event which can occur with any of the events then

- $P\left(\frac{A_i}{A}\right) = \frac{P(A_i)P\left(\frac{A}{A_i}\right)}{\sum_{i=1}^{n} P(A_i)P\left(\frac{A}{A_i}\right)}$
-

Calculations:

Consider, Let K be the event that both A and B agree,

T be the event that they both A and B speak the truth

$\Rightarrow P(T) = xy$

L be the event that they both A and B lie.

$\Rightarrow P(L) = (1 - x)(1 - y)$

To find :The probability that the statement is true = $P(\frac{T}{L})$

Let K be the event that both of them agree

$$P(\frac{T}{L}) = \frac{P(T)P(\frac{K}{T})}{P(T)P(\frac{K}{T}) + P(L)P(\frac{K}{L})}$$

$$\Rightarrow P(\frac{T}{L}) = \frac{xy}{xy + (1-x)(1-y)}$$

Que. 2 The harmonic mean of two number is 4, Their arithmetic mean A and the geometric mean G satisfy the relation $2A + G^2 = 27$, then the two numbers are

1. 4 and 2
2. 6 and 3
3. 5 and 7
4. 4 and 1

Testbook Solution Correct Option **- 2**

Concept:

Let x and y be the two numbers. The the arithmetic mean A, geometric mean G and the harmonic mean H of x and y is given by,

$\Rightarrow A = \frac{x + y}{2}$

$\Rightarrow G^2 = xy$

$\Rightarrow H = \frac{2xy}{x + y}$

Calculations:

Consider, the two numbers are x and y.

Given, the arithmetic mean and geometric mean of the x and y is A and G.

$\Rightarrow A = \frac{x + y}{2}$ ....(1)

$\Rightarrow G^2 = xy$ ....(2)

The harmonic mean of two number x and y is 4.

$\Rightarrow \frac{2xy}{x + y} = 4$

$\Rightarrow 2xy = 4(x + y)$

$\Rightarrow xy = 2(x + y)$

$\Rightarrow G^2 = 4A$ ($\because x + y = 2A$)

$\Rightarrow G^2 = 4A$ ....(3)

Given, Their arithmetic mean A and the geometric mean G satisfy the relation $2A + G^2 = 27$.

$\Rightarrow 2A + G^2 = 27$

$\Rightarrow 6A = 27$

$\Rightarrow A = \frac{9}{2}$

From equation (1), (2) and (3), we have

$x + y = 9$ and $xy = 18$

$\Rightarrow x = 6$ and $y = 3$

Hence, the harmonic mean of two number is 4, Their arithmetic mean A and the geometric mean G satisfy the relation $2A + G^2 = 27$, then the two numbers are 6 and 3.

Que. 3 In an entrance test there are multiple choice questions, with four possible answer to each question of which one is correct, The probability that a student knows the answer to a question is 90%, If the student gets the correct answer to a question, then the is probability that he was guessing is

1. 37/40
2. 1/37
3. 36/37
4. 1/9

Testbook Solution Correct Option **- 2**

Concept:

Bayes' Theorem:

Let $E_1, E_2, \ldots, E_n$ be n mutually exclusive and exhaustive events associated with a random experiment and let S be the sample space.

Let A be any event which occurs together with any one of E_1 or E_2 or … or E_n such that $P(A) \neq 0$.

Then $P(E_i \mid A) = \frac{P(E_i) \times P(A \mid E_i)}{\sum_{i=1}^{n} P(E_i) \times P(A \mid E_i)}, \ i = 1, 2, \ldots, n$

Calculation:

Let E_1: He knows the answer

E_2: He does not know the answer

X: He gets the correct answer.

Therefore, $P(E_1) = 90\% = \frac{9}{10}$

$P(E_2) = 1 - \frac{9}{10} = \frac{1}{10}$

$P(X \mid E_1) = 1$

$P(X \mid E_2) = \frac{1}{4}$

As we know that according to Bayes' theorem:

$P(E_i \mid A) = \frac{P(E_i) \times P(A \mid E_i)}{\sum_{i=1}^{n} P(E_i) \times P(A \mid E_i)}, \ i = 1, 2, \ldots, n$

$\therefore P(E_2 \mid X) = \frac{\frac{1}{10} \cdot \frac{1}{4}}{\left[\frac{9}{10} \cdot 1 + \frac{1}{10} \cdot \frac{1}{4}\right]} = \frac{1}{37}$

Que. 4 A man is known to speak the truth 2 out of 3 times. He threw a dice cube with 1 to 6 on its faces and reports that it is 1. Then the probability that it is actually 1 is

1. 1/2
2. 1/7
3. 2/7
4. 5/6

Testbook Solution Correct Option **- 1**

Concept:

Calculations:

Given, A man is known to speak the truth 2 out of 3 times.

A : Probability that man speaks the truth =P(A) = $\frac{2}{3}$

A' : The probability that man lies =P(A') = $\frac{1}{3}$

B : Probability of getting as 1on die face = P(B) = $\frac{1}{6}$

B' : Probability of not getting as 1on die face = P(B') = $\frac{5}{6}$

To find The probability that it is actually 1, Applying Baye's theorem, we get

$P(A|B) = \frac{P(A)P(B|A)}{P(A)P(B|A) + P(\text{not } A)P(B|\text{not } A)}$

P(A|B) = $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$

Que. 5 Let A and B be two events such that ?

$P(\overline{A \cup B}) = \frac{1}{6}, P(A \cap B) = \frac{1}{4}$ and $P(A) = \frac{1}{4}$ where $\bar{A}$ stands for complement of event A. Then the events A and B are

1. independent but not equally likely
2. mutually exclusive and independent
3. equally likely and mutually excllisive
4. equally likely but not independent

Testbook Solution Correct Option **- 1**

Concept:

P(A ∪ B) = P(A) + P(B) – P(A ∩ B)

The probability of the complement of an event is one minus the probability of the event. P ($\bar{A}$) = 1 - P (A)

To determine the probability of two **independent events** we multiply the probability of the first event by the probability of the second event. P(A ∩ B) = P(A).P(B)

Two events are **mutually exclusive** when two events cannot happen at the same time. P(A ∩ B) = 0

In **equally likely events**, the probabilities of each event are equal.

Calculation:

Here, $P(\overline{A \cup B}) = \frac{1}{6}, P(A \cap B) = \frac{1}{4}$ and $P(A) = \frac{1}{4}$

P(A) = 1 - P($\bar{A}$) = 1 - 1/4 = 3/4

$P(A \cup B) = 1 - P(\overline{A \cup B}) = 1 - \frac{1}{6} = \frac{5}{6}$

P(A ∪ B) = P(A) + P(B) – P(A ∩ B)

⇒ P(B) = 5/6 - 3/4 + 1/4 = 5/6 - 1/2

= 2/6

P(B) = 1/3

Here, P(A ∩ B) = P(A).P(B) and P(A) ≠ P(A) so the events are independent but not equally likely.

Hence, option (1) is correct.

Que. 6 The mean and variance of a random variable X having a binomial distribution are 4 and 2 respectively, The P(X = 1) is?

1. 1/32
2. 1/16
3. 1/8
4. 1/4

Testbook Solution Correct Option **- 1**

Concept:

The binomial distribution of a random variable X is given by,

$P(X = k) = {}^{n}C_k p^k q^{n-k}$

Mean = np

Variance = npq

Calculations:

Given, the mean and variance of a random variable X having a binomial distribution are 4 and 2 respectively,

⇒ mean = np = 4 ....(1)

⇒ variance = npq = 2 ....(2)

From equation (1) and (2), we have

$\Rightarrow q = \frac{1}{2}$

We know, p = 1 - q

$\Rightarrow p = \frac{1}{2}$

From equation (1), we have

n = 8

The binomial distribution of a random variable X is given by,

$P(X = k) = {}^{n}C_k p^k q^{n-k}$

$\Rightarrow P(X = 1) = {}^{8}C_1 p^1 q^{8-1}$

$\Rightarrow P(X = 1) = 8.\frac{1}{2}.\frac{1}{2^7}$

$\Rightarrow P(X = 1) = \frac{1}{32}$

Que. 7 If $\bar{X}$ is the mean of a distribution of X, then under usual notation $\sum_{i=1}^{n} f_i(x_i - \bar{x})$ is?

1. Mean deviation about mean
2. Standard deviation
3. 1
4. 0

Testbook Solution Correct Option **- 4**

Concept:

$\bar{x} = \frac{\sum(f_i x_i)}{\sum f_i}$

Calculation:

$\bar{x} = \frac{\sum(f_i x_i)}{\sum f_i}$

$\bar{x}\sum f_i = \sum(f_i x_i) \cdots (1)$

$\sum_{i=1}^{n} f_i(x_i - \bar{x}) = \sum f_i x_i - \sum f_i \bar{x}$

$= \bar{x}\sum f_i - \bar{x}\sum f_i$

= 0

Hence, option (4) is correct.

Que. 8 If E_1 and E_2 are two events associated with a random experiment such that $P(E_2) = 0.35$, $P(E_1 \text{ or } E_2) = 0.85$ and $P(E_1 \text{ and } E_2) = 0.15$ then $P(E_1)$ is ?

1. 0.25
2. 0.35
3. 0.65
4. 0.75

Testbook Solution Correct Option **- 3**

Concept:

P(A ∪ B) = P(A) + P(B) - P(A ∩ B)

Calculation:

Here, $P(E_2) = 0.35$, $P(E_1 \cup E_2) = 0.85$ and $P(E_1 \cap E_2) = 0.15$

$P(E_1 \cup E_2) = P(E_1) + P(E_2) - P(E_1 \cap E_2)$

$\Rightarrow 0.85 = P(E_1) + 0.35 - 0.15$

$\Rightarrow 0.85 - 0.20 = P(E_1)$

$\Rightarrow P(E_1) = 0.65$

Hence, option (3) is correct.

Que. 9 Find a matrix X such that 2A + B + X = 0 , where $A = \begin{bmatrix} -1 & 2 \\ 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & -2 \\ 1 & 5 \end{bmatrix}$?

1. $\begin{bmatrix} 1 & 2 \\ 7 & 13 \end{bmatrix}$
2. $\begin{bmatrix} -1 & -2 \\ -7 & -13 \end{bmatrix}$
3. $\begin{bmatrix} 13 & 2 \\ 7 & 1 \end{bmatrix}$
4. $\begin{bmatrix} -13 & -2 \\ -7 & -1 \end{bmatrix}$

Testbook Solution Correct Option **- 2**

Concept:

Two **matrices** may be added or subtracted only if they have the same dimension; that is, they must have the same number of rows and columns.

Addition or subtraction is accomplished by adding or subtracting corresponding elements.

Calculations:

Given, $A = \begin{bmatrix} -1 & 2 \\ 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & -2 \\ 1 & 5 \end{bmatrix}$

Consider, 2A + B + X = 0

$\Rightarrow 2\begin{bmatrix} -1 & 2 \\ 3 & 4 \end{bmatrix} + \begin{bmatrix} 3 & -2 \\ 1 & 5 \end{bmatrix} + X = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$

Two **matrices** may be added or subtracted only if they have the same dimension; that is, they must have the same number of rows and columns. **Addition** or subtraction is accomplished by adding or subtracting corresponding

elements.

$$\Rightarrow \begin{bmatrix} 1 & 2 \\ 7 & 13 \end{bmatrix} + X = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$$\Rightarrow X = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix} - \begin{bmatrix} 1 & 2 \\ 7 & 13 \end{bmatrix}$$

$$\Rightarrow X = \begin{bmatrix} -1 & -2 \\ -7 & -13 \end{bmatrix}$$

Que. 10 If in a triangle ABC, the altitudes from the vertices A, B, C on opposite sides are in HP, then sin A, sin B, sin C are in ?

1. HP
2. Arithmetico-Geometric progression
3. AP
4. GP

Testbook Solution Correct Option **- 1**

Concept:

Area of $\triangle ABC = A = \frac{1}{2} \times$ Base $\times$ Height

Let a, b and c be the sides of the triangle.

If $\frac{1}{a}, \frac{1}{b}$ and $\frac{1}{c}$ are in HP then a, b and c are in AP.

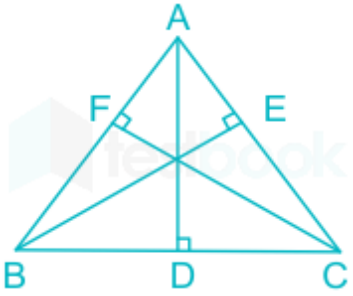
If a, b and c are in AP then 2b = a + c.

The **Law of Sines** says that in any given triangle, the ratio of any side length to the sine of its opposite angle is the same for all three sides of the triangle.

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} = k$$

Calculations:

Given, in a triangle ABC, the altitudes from the vertices A, B, C on opposite sides are in HP



In triangle ABC, the altitudes from the vertices A to BC, B to AC and C to AB.

$\Rightarrow$ AD, BE, and CF are the altitudes and they are in HP.

$$\Rightarrow \text{Area of } \triangle ABC = A = \frac{1}{2} \times AD \times BC$$

$$\Rightarrow AD = \frac{2A}{a}$$

Similarly, $BE = \frac{2A}{b}$ and $CF = \frac{2A}{c}$

$\Rightarrow \frac{2A}{a}, \frac{2A}{b}$ and $\frac{2A}{c}$ are in HP.

$\Rightarrow \frac{1}{a}, \frac{1}{b}$ and $\frac{1}{c}$ are in HP.

$\Rightarrow$ a, b and c are in AP

$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} = k$ (sine rule)

$\Rightarrow a = k \sin A, b = k \sin B$ and $c = k \sin C$

As we know, If a, b and c are in AP then $2b = a + c$

$\Rightarrow 2k \sin B = k \sin A + k \sin C$

$\Rightarrow 2\sin B = \sin A + \sin C$

Hence sin A, sin B, sin C are in AP

Que. 11 If α, β are the roots of an equation $x^2 - 2x \cos \theta + 1 = 0$ then the equation having α^n and β^n is ?

1. $x^2 - (2\cos n\theta)x + 1 = 0$
2. $2x^2 - (2 \cos n\theta) x - 1 = 0$
3. $x^2 + (2 \cos n\theta) x + 1 = 0$
4. $x^2 + (2 \cos n\theta) x - 1 = 0$

Testbook Solution Correct Option **- 1**

Concept:

If α, β are the roots of an equation $x^2 - 2x \cos \theta + 1 = 0$ then the equation having α^n and β^n is $x^2 - (\alpha^n + \beta^n)x + (\alpha^n . \beta^n) = 0$

If $\alpha = \cos \theta + i\sin \theta$ then by De - Moivers Theorem, we have

$\alpha^n = \cos n\theta + i\sin n\theta$

Calculations:

Consider, the equation $x^2 - 2x \cos \theta + 1 = 0$.

$\Rightarrow x = \frac{2\cos \theta \pm \sqrt{4\cos^2 \theta - 4(1)(1)}}{2(1)}$

$\Rightarrow x = \cos \theta \pm i\sin \theta$

Given, α, β are the roots of an equation $x^2 - 2x \cos \theta + 1 = 0$.

$\Rightarrow \alpha = \cos \theta + i\sin \theta$ and $\beta = \cos \theta - i\sin \theta$

$\Rightarrow \alpha^n = (\cos \theta + i\sin \theta)^n$ and $\beta^n = (\cos \theta - i\sin \theta)^n$

$\Rightarrow \alpha^n = \cos n\theta + i\sin n\theta$ and $\beta^n = \cos n\theta - i\sin n\theta$

$\Rightarrow \alpha^n + \beta^n = 2\cos n\theta$

and $\alpha^n . \beta^n = 1$

Required equation is $x^2 - (\alpha^n + \beta^n)x + (\alpha^n . \beta^n) = 0$

$\Rightarrow x^2 - 2\cos n\theta\, x + 1 = 0$

Que. 12 The equation $(x - a)^3 + (x - b)^3 + (x - c)^3 = 0$ has

1. All three real roots
2. One real and two imaginary root
3. Three real roots, namely x = a, y = b, z = c

4. None of these

Testbook Solution Correct Option **- 2**

Concept:

Nature of roots of a cubic polynomial:

- If the maximum and minimum are of opposite signs, the **cubic** has three real **roots**.
- If one of them is zero, two of the three **roots** are equal.
- If both of them are zero, all three **roots** are equal.
- If the maximum and minimum are of the same sign, the **cubic** has one real and two unreal imaginary **roots**.

Calculations:

Given equation is $(x - a)^3 + (x - b)^3 + (x - c)^3 = 0$

Consider, $f(x) = (x - a)^3 + (x - b)^3 + (x - c)^3$

Differentiating on both side, we get

$f'(x) = 3(x - a)^2 + 3(x - b)^2 + 3(x - c)^2$

$f'(x) > 0$

$\Rightarrow$ f is increasing function

To find the maximum and minimum of function, put $x = \infty$ in f(x)

Now, $f(\infty) = \infty$

$f(-\infty) = \infty$

Here, the maximum and minimum of the function are of the same sign.

Hence, The equation $(x - a)^3 + (x - b)^3 + (x - c)^3 = 0$ has one real and two imaginary root.

Que. 13 Three positive number whose sum is 21 are in arithmetic progression, If 2, 2,14 are added to them added to them respectively then resulting number are in geometric progression .Then which of the following is not among the three number ?

1. 25
2. 13
3. 1
4. 7

Testbook Solution Correct Option **- 1**

Concept:

If a, b, c are in GP then $\frac{b}{a} = \frac{c}{b}$

Calculations:

Consider, three positive number a - d, a, a+ d are in AP

Three positive number whose sum is 21.

$\Rightarrow$a - d + a + a+ d = 21

$\Rightarrow$ a = 7

Hence, three positive number becomes 7 - d, 7, 7+ d.

It is given, If 2, 2,14 are added to them respectively then resulting number are in geometric progression.

$\Rightarrow$ 9 - d, 9, 21+ d are in GP.

$\Rightarrow \frac{9}{9 - d} = \frac{21 + d}{9}$

$\Rightarrow 81 = (21 + d)(9 - d)$

$\Rightarrow d^2 + 12d - 108 = 0$

$\Rightarrow (d + 18)(d - 6) = 0$

$\Rightarrow d = -18$ and $d = 6$

When $d = -18$, the three numbers are 25, 7, -11.

When $d = 6$, the three numbers are 1, 7, 13.

Que. 14 If $\sin^{-1}\frac{2a}{1+a^2} + \sin^{-1}\frac{2b}{1+b^2} = 2\tan^{-1} n$ then?

1. $n = \frac{a-b}{1+ab}$
2. $n = \frac{(ab)}{(a-a)}$
3. $n = \frac{(a+b)}{(1-ab)}$
4. $n = \frac{(1-ab)}{(1+ab)}$

Testbook Solution Correct Option **- 3**

Concept:

Double angle formula:

$\sin 2x = \frac{2\tan x}{1+\tan^2}$

Addition formula:

$\tan(x+y) = \frac{\tan x + \tan y}{1 - \tan x \tan y}$

Calculation:

The given identity is $\sin^{-1}\left(\frac{2a}{1+a^2}\right) + \sin^{-1}\left(\frac{2b}{1+b^2}\right) = 2\tan^{-1} n$.

Let $a = \tan y_1$ and $b = \tan y_2$.

Therefore, the given equation becomes:

$\sin^{-1}\left(\frac{2a}{1+a^2}\right) + \sin^{-1}\left(\frac{2b}{1+b^2}\right) = 2\tan^{-1} n$

$\sin^{-1}\left(\frac{2(\tan y_1)}{1+(\tan y_1)^2}\right) + \sin^{-1}\left(\frac{2(\tan y_2)}{1+(\tan y_2)^2}\right) = 2\tan^{-1} n$

$\sin^{-1}(\sin 2y_1) + \sin^{-1}(\sin 2y_2) = 2\tan^{-1} n$

$2y_1 + 2y_2 = 2\tan^{-1} n$

$y_1 + y_2 = \tan^{-1} n$

$\tan(y_1 + y_2) = n$

$\frac{\tan y_1 + \tan y_2}{1 - \tan y_1 \tan y_2} = n$

$\frac{a+b}{1-ab} = n$

Therefore, $n = \frac{a+b}{1-ab}$.

Que. 15 The value of A that satisfies the equation a sin A + b cos A = c is equal to?

1. $\tan^{-1}\left(\frac{a}{b}\right) \pm \cos^{-1}\left(\frac{c}{\sqrt{a^2+b^2}}\right)$
2. $\tan^{-1}\left(\frac{c}{b}\right) \pm \sin^{-1}\left(\frac{a}{\sqrt{a^2+b^2}}\right)$
3. $\tan^{-1}\left(\frac{a}{b}\right) \pm \sin^{-1}\left(\frac{a}{\sqrt{a^2+b^2}}\right)$
4. None

Testbook Solution Correct Option **- 1**

Calculation:

Given: a sin A + b cos A = c

Divide both sides by $\frac{1}{\sqrt{a^2+b^2}}$, we get

$\Rightarrow \frac{a}{\sqrt{a^2+b^2}} \sin A + \frac{b}{\sqrt{a^2+b^2}} \cos A = \frac{c}{\sqrt{a^2+b^2}}$

Let $\sin \alpha = \frac{a}{\sqrt{a^2+b^2}}$ and $\cos \alpha = \frac{b}{\sqrt{a^2+b^2}}$

$\Rightarrow \sin A \sin \alpha + \cos A \cos \alpha = \frac{c}{\sqrt{a^2+b^2}}$

$\Rightarrow \cos (A - \alpha) = \frac{c}{\sqrt{a^2+b^2}}$

$\Rightarrow A - \alpha = \cos^{-1} \frac{c}{\sqrt{a^2+b^2}}$

$\Rightarrow A = \text{scos}^{-1} \frac{c}{\sqrt{a^2+b^2}} + \alpha$

Now, $\tan \alpha = \frac{\sin \alpha}{\cos \alpha} = \frac{a}{b}$

$\therefore \alpha = \tan^{-1} \frac{a}{b}$

So, $A = \cos^{-1} \frac{c}{\sqrt{a^2+b^2}} + \tan^{-1} \frac{a}{b} = \tan^{-1}\left(\frac{a}{b}\right) + \cos^{-1}\left(\frac{c}{\sqrt{a^2+b^2}}\right)$

Que. 16 If $\tan x = \frac{-3}{4}$ and $\frac{3\pi}{2} < x < 2\pi$, then the value of sin 2x is

1. 7/25
2. -7/25
3. 24/25
4. -24/25

Testbook Solution Correct Option **- 4**

Concept:

$\tan^2 x + 1 = \sec^2 x$

tan x = sin x /cos x

sin 2x = 2 sin x cos x

The table below shows the sign of trigonometric ratios in different quadrants:

T – Ratio's	Quadrant I	Quadrant II	Quadrant III	Quadrant IV

Sin	+	+	-	-
Cos	+	-	-	+
Cosec	+	+	-	-
Sec	+	-	-	+
Tan	+	-	+	-
Cot	+	-	+	-

Calculation:

Here, $\tan x = \frac{-3}{4}$

Squaring and adding 1 to both the sides, we get

$\tan^2 x + 1 = (-\frac{3}{4})^2 + 1$

$\sec^2 x = \frac{25}{16}$

$\sec x = \pm\frac{5}{4}$

x is in fourth quadrant so, sec x= 5/4 and cos x = 4/5 $\quad .....(\frac{3\pi}{2} < x < 2\pi)$

Now

$\frac{\sin x}{\cos x} = \frac{-3}{4}$

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

Now, sin 2x = 2sin x cos x

$= 2 \times \frac{-3}{5} \times \frac{4}{5}$

$= \frac{-24}{25}$

Hence, option (4) is correct.

Que. 17 Fine the principal value of $\cot^{-1}(-\sqrt{3})$?

1. $\frac{\pi}{2}$
2. $\frac{\pi}{6}$
3. $\frac{7\pi}{6}$
4. $\frac{5\pi}{6}$

Testbook Solution Correct Option **- 4**

Concept:

$\cot^{-1}(-x) = \pi - \cot^{-1} x$

Calculation:

$\cot^{-1}(-\sqrt{3}) = \pi - \cot^{-1}(\sqrt{3})$

Let, $\cot^{-1}(\sqrt{3}) = \theta$

$\Rightarrow \cot \theta = \sqrt{3}$

$\Rightarrow \cot (\pi/6) = \sqrt{3}$

$\Rightarrow \cot^{-1}(\sqrt{3}) = \frac{\pi}{6}$

$\cot^{-1}(-\sqrt{3}) = \pi - \frac{\pi}{6}$

$= \frac{5\pi}{6}$

Hence, option (4) is correct.

Que. 18 If $\cos\theta = \frac{4}{5}$ and $\cos\phi = \frac{12}{13}$, with θ and ϕ both in the fourth quadrant, the value of cos(θ + ϕ) is ?

1. $-\frac{16}{65}$
2. $-\frac{33}{65}$
3. $\frac{33}{65}$
4. $\frac{16}{65}$

Testbook Solution Correct Option **- 3**

Concept:

cos(A + B) = cos A cos B − sin A sin B

$\sin^2 x + \cos^2 x = 1$

In the fourth quadrant, the values for cos are positive only.

Calculation:

Here, $\cos\theta = \frac{4}{5}$ and $\cos\phi = \frac{12}{13}$

$\sin^2\theta = 1 - \cos^2\theta$

$= 1 - (\frac{4}{5})^2$

$= \frac{9}{25}$

sinθ = ± 3/5

= -3/5 .....(∵ θ is in the fourth quadrant)

$\sin^2\phi = 1 - \cos^2\phi$

$= 1 - (\frac{12}{13})^2$

$= \frac{25}{169}$

sinϕ = ± 5/13

= -5/13 .....(∵ ϕ is in the fourth quadrant)

Now, cos(θ + ϕ) = cos θ cos ϕ - sin θ sin ϕ

$= \frac{4}{5} \times \frac{12}{13} \times -(\frac{-3}{5} \times \frac{-5}{13})$

$= \frac{33}{65}$

Hence, option (3) is correct.

Que. 19 The value of sin 36° is?

1. $\frac{\sqrt{10+2\sqrt{5}}}{4}$
2. $\frac{\sqrt{10-2\sqrt{5}}}{4}$
3. $\frac{(\sqrt{5}+1)}{4}$
4. $\frac{(\sqrt{5}-1)}{4}$

Testbook Solution Correct Option **- 2**

Concept:

- $\cos 3\theta = 4\cos^3\theta - 3\cos\theta$
- $\sin 2\theta = 2\sin\theta\cos\theta$
- $\cos 2\theta = \cos^2\theta - \sin^2\theta = 1 - 2\sin^2\theta$

Calculation:

Let us consider B = 18°

So, 5B = 90°

⇒ 2B + 3B = 90°

⇒ 2B = 90° - 3B

By taking sine on both sides, we get

Sin 2B = sin (90° - 3B) = cos 3B

⇒ 2 sin B cos B = 4 $\cos^3$ B - 3 cos B

⇒ 2 sin B cos B - 4 $\cos^3$ B + 3 cos B = 0

⇒ cos B (2 sin B - 4 $\cos^2$ B + 3) = 0

Dividing both sides by cos B = cos 18° ≠ 0, we get

⇒ 2 sin B - 4 (1 - $\sin^2$ B) + 3 = 0

⇒ 4 $\sin^2$ B + 2 sin B - 1 = 0

This is a quadratic equation in Sine,

So, $\sin B = \frac{-2 \pm \sqrt{4+16}}{2\times 4} = \frac{-1\pm\sqrt{5}}{4}$

Now since 18° is first quadrant so sin 18° is positive

Therefore, $\sin B = \frac{-1+\sqrt{5}}{4}$

Now, cos 36° = cos (2 × 18°)

$\Rightarrow \cos 36^\circ = 1 - 2\sin^2 18^\circ$

$\Rightarrow \cos 36^\circ = 1 - 2\left(\frac{\sqrt{5}-1}{4}\right)^2 = \left(\frac{16 - 2\times(5+1-2\sqrt{5}}{16}\right) = \frac{4+4\sqrt{5}}{16}$

$\cos 36^\circ = \frac{\sqrt{5}+1}{4}$

As we know, $\sin^2\theta + \cos^2\theta = 1$

$\Rightarrow \sin\theta = \sqrt{1-\cos^2\theta}$

Now, $\sin 36^\circ = \sqrt{1-\left(\frac{\sqrt{5}+1}{4}\right)^2}$

$= \frac{\sqrt{10-2\sqrt{5}}}{4}$

Que. 20 Express (cos 5x - cos 7x) as a product of sines or cosines or sines and cosines.

1. 2 cos 4x cos x
2. 2 sin 4x sin x
3. 2 sin 6x sin x
4. 2 cos 6x cos x

Testbook Solution Correct Option **- 3**

Concept:

cos A - cos B = 2 sin $(\frac{B+A}{2})$ sin $(\frac{B-A}{2})$

Calculations:

To express (cos 5x - cos 7x) as a product of sines or cosines or sines and cosines

we know the trigonometric formula,

cos A - cos B = 2 sin $(\frac{B+A}{2})$ sin $(\frac{B-A}{2})$

Here, A = 5x and B = 7x

(cos 5x - cos 7x) = 2 sin $(\frac{7x+5x}{2})$ sin $(\frac{7x-5x}{2})$

(cos 5x - cos 7x) = 2 sin 6x sin x

Que. 21 If non zero number a, b, c are in H.P, then the straight line $\frac{x}{a} + \frac{y}{b} + \frac{1}{c} = 0$ always passes through a fixed point, then the point is

1. (1, -2)
2. $\left(1, \frac{1}{2}\right)$
3. (-1, 2)
4. None

Testbook Solution Correct Option **- 1**

Concept:

The non zero number a, b, c are in H.P then $\frac{1}{a}, \frac{1}{b}, \frac{1}{c}$ are in AP

If a, b, c are in A.P then 2b = a + c

Calculations:

Given, The non zero number a, b, c are in H.P.

$\Rightarrow \frac{1}{a}, \frac{1}{b}, \frac{1}{c}$ are in AP

Now,

$\Rightarrow \frac{2}{b} = \frac{1}{a} + \frac{1}{c}$

$\Rightarrow \frac{1}{a} + \frac{1}{c} - \frac{2}{b} = 0$ ....(1)

Also, given $\frac{x}{a} + \frac{y}{b} + \frac{1}{c} = 0$ ....(2)

From equation (1) and (2), we have

x = 1, y = -2

Hence, if non zero number a, b, c are in A.P, then the straight line $\frac{x}{a} + \frac{y}{b} + \frac{1}{c} = 0$ always passes through a fixed point, then the point is (1, - 2)

Que. 22 If the lines x + (a - 1)y + 1 = 0 and $2x + a^2y - 1 = 0$ are prepedicular, then the condition satisfied by a is

1. |a| = 2
2. 0 < a < 1
3. -1 < a < 0
4. a = -1

Testbook Solution Correct Option **- 4**

Concept:

The lines $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ are perpendicular then product of slope is -1.

$\Rightarrow a_1\, a_2 + b_1\, b_2 = 0$

Calculations:

Given, the lines x + (a - 1)y + 1 = 0 and $2x + a^2y - 1 = 0$ are perpendicular.

$\Rightarrow 1 \times 2 + (a - 1) \times a^2 = 0$

$\Rightarrow a^3 - a^2 + 2 = 0$

$\Rightarrow a^3 + a^2 - 2a^2 - 2a + 2a + 2 = 0$

$\Rightarrow a^2(a + 1) - 2a(a + 1) + 2(a + 1) = 0$

$\Rightarrow (a + 1)(a^2 - 2a + 2) = 0$

$\Rightarrow (a + 1) = 0$

$\Rightarrow a = -1$

Que. 23 In a triangle ABC, Let $C = \frac{\pi}{2}$, If r is the inradius and R is circumradius of the triangle ABC, then 2(r + R) equals

1. a + b
2. a + b + c
3. a + c
4. b + c

Testbook Solution Correct Option **- 1**

Concept:

Sine law:

$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} = 2R$, Where a,b,c are sides and R is circumradius.

Inradius:

$r = (s - a)\tan(\frac{A}{2}) = (s - b)\tan(\frac{B}{2}) = (s - c)\tan(\frac{C}{2})$, Where a,b,c are sides, r is inradius, s is semiperimeter = $\frac{a+b+c}{2}$

Calculation:

Here, in triangle ABC, Let $C = \frac{\pi}{2}$,

$\frac{c}{\sin C} = 2R$

$\Rightarrow 2R = \frac{c}{\sin(\pi/2)} = c$

$R = \frac{C}{2}$

Now, inradius r = (s - c) $\tan(\frac{C}{2})$

= (s - c) $\tan(\frac{\pi}{4})$

= (s - c)

So, 2(r + R) = 2 (s - c + $\frac{C}{2}$) = 2 (s - $\frac{C}{2}$)

= a + b + c - c

= a + b

Hence, option (1) is correct.

Que. 24 If $x^2 + 3xy + 2y^2 - x - 4y - 6 = 0$ represents a pair of straight lines, their point if intersection is

1. (0, 0)
2. (8, 5)
3. (8, -5)
4. (-2, 5)

Testbook Solution Correct Option **- 3**

Concept:

A **partial derivative** of a function of several variables is its **derivative** with respect to one of those variables, with the others held constant.

Example: partial differentiate w.r.t. x then y will be constant and vice versa.(for function containing x and y variables).

Calculation:

Let, ϕ (x, y) = $x^2 + 3xy + 2y^2 - x - 4y - 6 = 0$

Taking partial derivative w.r.t. x, we get

$\frac{d\phi}{dx} = 2x + 3y - 1 = 0 \cdots (1)$

Taking partial derivative w.r.t. x, we get

$\frac{d\phi}{dy} = 3x + 4y - 4 = 0 \cdots (2)$

Multiplying (1) by 3 and (2) by 2, we get

$6x + 9y - 3 = 0 \cdots (3)$ and $6x + 8y - 8 = 0 \cdots (4)$

Now , subtracting (4) from (3), we get

y + 5 = 0 $\Rightarrow$ y = -5

From (1), 2x + 3(-5) -1 = 0

$\Rightarrow$ x = 8

So, the point of intersection is (8, -5)

Hence, option (3) is correct.

Que. 25 The equation of the tangent line to the curve y = 2x sin x at the point $\left(\frac{\pi}{2}, \pi\right)$ is

1. $y = 2x + 2\pi$

2. $y = 2x$
3. $y = -2x + 2\pi$
4. $y = -2x$

Testbook Solution Correct Option **- 2**

Concept:

The equation of tangent at point (x_1, y_1) with slope m is given by

$(y - y_1) = m(x - x_1)$

Calculations:

Given curve is $y = 2x \sin x$

Taking derivative on both side, we get

$\frac{dy}{dx} = 2x \cos x + 2 \sin x$

Put $x = \frac{\pi}{2}$ to find the equation of tangent at the point $\left(\frac{\pi}{2}, \pi\right)$.

$\frac{dy}{dx} = 2\frac{\pi}{2} \cos \frac{\pi}{2} + 2 \sin \frac{\pi}{2}$

$\frac{dy}{dx} = 2$

The equation of tangent at point (x_1, y_1) with slope m is given by

$(y - y_1) = m(x - x_1)$

$(y - \pi) = 2(x - \frac{\pi}{2})$

$y = 2x$

Hence, the equation of the tangent line to the curve $y = 2x \sin x$ at the point $\left(\frac{\pi}{2}, \pi\right)$ is $2x$.

Que. 26 If the graph of $y = (x - 2)^2 - 3$ is shifted by 5 units up along y-axis and 2 unit to the right along the x-axis, then the equation of the resultant graph is ?

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

Testbook Solution Correct Option **- 4**

Concept:

Shifting up/down/left/right

- Movements up and down change the y-values of points.
  (e.g., to move up 2, you add 2 to the previous y-value)
- Movements left and right change the x-values of points.
  (e.g., to move left 2, you replace every x by x+2, NOT x−2)
- Shifting up/down/left/right does NOT change the shape of a graph.

Calculation:

Here, $y = (x - 2)^2 - 3$,

Shifing 5 unit up, we get

$y = (x - 2)^2 - 3 + 5$

And 2 units to the right,

$y = (x - 2 - 2)^2 - 3 + 5$

So, Equation of resultant graph will be $y = (x - 4)^2 + 2$

Hence, option (4) is correct.

Que. 27 The direction cosines of the vector $\vec{a} = (-2\hat{i} + \hat{j} - 5\hat{k})$ are?

1. -2, 1, -5
2. $\frac{1}{3}, \frac{-1}{6}, \frac{-5}{6}$
3. $\frac{2}{\sqrt{30}}, \frac{1}{\sqrt{30}}, \frac{5}{\sqrt{30}}$
4. $\frac{-2}{\sqrt{30}}, \frac{1}{\sqrt{30}}, \frac{-5}{\sqrt{30}}$

Testbook Solution Correct Option **- 3**

Concept:

The direction cosines of the vector is the corresponding coordinate of vector divided by the length/Magnitude of the vector.

Calculation:

Here, $\vec{a} = (-2\hat{i} + \hat{j} - 5\hat{k})$

$|\vec{a}| = \sqrt{(-2)^2 + 1^2 + (-5)^2} = \sqrt{30}$

The direction cosines of the given vactor = $\frac{-2}{\sqrt{30}}, \frac{1}{\sqrt{30}}, \frac{-5}{\sqrt{30}}$

Hence, option (3) is correct.

Que. 28 The equation of the hyperbola with center at the origin, length of the transverse axis is 6 and one focus at (0, 4) is ?

1. $\frac{y^2}{9} + \frac{x^2}{7} = 1$
2. $\frac{y^2}{9} - \frac{x^7}{7} = 1$
3. $\frac{y^2}{9} + \frac{x^2}{9} = 1$
4. $\frac{y^2}{7} + \frac{x^2}{9} = 1$

Testbook Solution Correct Option **- 2**

Concept:

The equation of the hyperbola is $\frac{y^2}{b^2} - \frac{x^2}{a^2} = 1$ with the foci $(0 , \pm c)$

Length of the transverse axis = $2a$

Calculations:

Since the coordinates of the one focus at (0, 4) = $(0 , \pm c)$, it is a case of vertical hyperbola

$\Rightarrow c = 2$

It is a case of vertical hyperbola

$\Rightarrow$ The equation of hyperbola is $\frac{y^2}{b^2} - \frac{x^2}{a^2} = 1$ ....(1)

Length of the transverse axis = 6

$\Rightarrow$ 2a=6

$\Rightarrow$ a = 3

Also $c^2 = a^2 + b^2$

$\Rightarrow 2^2 = 3^2 + b^2$

$\Rightarrow b^2 = 7$

Equation (1) becomes

$\frac{y^2}{9} - \frac{x^7}{7} = 1$

Hence, The equation of the hyperbola with center at the origin, length of the transverse axis is 6 and one focus at (0, 4) is $\frac{y^2}{9} - \frac{x^7}{7} = 1$

Que. 29 If $\vec{a}, \vec{b}, \vec{c}$ are vectors such that $\vec{a} + \vec{b} + \vec{c} = 0$ and $|\vec{a}| = 7, |\vec{b}| = 5, |\vec{c}| = 3$, then the angle between the vectors $\vec{b}$ and $\vec{c}$ is?

1. 60°
2. 30°
3. 45°
4. 90°

Testbook Solution Correct Option - **1**

Concept:

$\vec{a}.\vec{b} = |\vec{a}||\vec{b}| \cos\theta$

Calculation:

Here, $\vec{a} + \vec{b} + \vec{c} = 0$

$\Rightarrow \vec{b} + \vec{c} = -\vec{a}$

Taking magnitude and squaring both sides,

$\Rightarrow |\vec{b} + \vec{c}|^2 = |-\vec{a}|^2$

$\Rightarrow |\vec{b}|^2 + |\vec{c}|^2 + 2\vec{b}.\vec{c} = 49$

$\Rightarrow 2|\vec{b}|.|\vec{c}|\cos\theta = 49 - (25 + 9)$

$\Rightarrow \cos\theta = \frac{15}{2\times5\times3}$

$\Rightarrow \theta = \cos^{-1}(\frac{1}{2})$

$\theta = 60°$

Hence, option (1) is correct.

Que. 30 If $a\hat{i} + \hat{j} + \hat{k}, b\hat{i} + \hat{j} + \hat{k}, \hat{i} + \hat{j} + c\hat{k}$ $(a \neq b \neq c \neq 1)$ are co-plananr, then the value of $\frac{1}{1-a} + \frac{1}{1-b} + \frac{1}{1-c}$ is

1. -1
2. -1 / 2
3. 1 / 2

4. 1

Testbook Solution Correct Option **- 4**

Concept:

Let $\vec{a} = a_1\vec{i} + b_1\vec{j} + c_1\vec{k}$, $\vec{b} = a_2\vec{i} + b_2\vec{j} + c_2\vec{k}$ and $\vec{c} = a_3\vec{i} + b_3\vec{j} + c_3\vec{k}$ be the three vectors

Condition for coplanarity: $\vec{a} \cdot (\vec{b} \times \vec{c}) = \begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix} = 0$

Calculation:

Here, $a\hat{i} + \hat{j} + \hat{k}$, $b\hat{i} + \hat{j} + \hat{k}$, $\hat{i} + \hat{j} + c\hat{k}$ $(a \neq b \neq c \neq 1)$ are co-plananr

$$\begin{vmatrix} a & 1 & 1 \\ 1 & b & 1 \\ 1 & 1 & c \end{vmatrix} = 0$$

$c_1 \to c_1 - c_2 \quad c_2 \to c_2 - c_3$

$$\begin{vmatrix} a-1 & 0 & 1 \\ 1-b & b-1 & 1 \\ 0 & 1-c & c \end{vmatrix} = 0$$

$$c(a-1)(b-1) + (1-b)(1-c) = 0$$

$$\frac{1}{1-c} + \frac{1}{1-a} + \frac{1}{1-b} = 0$$

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

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

Hence, option (4) is correct.

Que. 31 Let $\vec{a}, \vec{b}$ and $\vec{c}$ be three vector having magnitudes 1, 1 and 2 respectively, If $\vec{a} \times (\vec{a} \times \vec{c}) - \vec{b} = 0$ then the acute angle between $\vec{a}$ and $\vec{c}$ is

1. $\pi / 4$
2. $\pi / 6$
3. $\pi / 3$
4. None

Testbook Solution Correct Option **- 2**

Concept:

Vector Triple Product: Vector Triple Product is a vector quantity.

Vector triple product of three vectors a, b, c is defined as the cross product of vector a with the cross product of vectors b and c, i.e. a × (b × c)

a × (b × c) = (a . c) b – (a . b) c

a.b = |a||b|cos θ

Calculation:

Here, |a| = 1, |b| = 1, |c| = 2

$\vec{a} \times (\vec{a} \times \vec{c}) - \vec{b} = 0$

$(\vec{a}.\vec{c})\vec{a} - (\vec{a}.\vec{a})\vec{c} - \vec{b} = 0$

$(\vec{a}.\vec{c})\vec{a} = (\vec{a}.\vec{a})\vec{c} + \vec{b}$

$(|a||c|\cos\theta)\vec{a} = (|a||a|\cos 0)\vec{c} + \vec{b}$

$2\cos\theta\,\vec{a} = \vec{c} + \vec{b}$

$2\cos\theta\,\vec{a} - \vec{c} = \vec{b}$

Taking magnitude both sides, we get

$4\cos^2\theta\,|a|^2 + |c|^2 - 2 \times 2\cos\theta\,\vec{a}\cdot\vec{c} = |b|^2$

$4\cos^2\theta + 4 - 2 \times 2\cos\theta \times |a||c|\cos\theta = 1$

$4\cos^2\theta + 4 - 8\cos^2\theta = 1$

$4\cos^2\theta = 3$

$\cos^2\theta = \frac{3}{4}$

$\cos\theta = \frac{\sqrt{3}}{2}$

$\therefore \theta = \pi / 6$

Hence, option (2) is correct.

Que. 32 Let $\vec{a}, \vec{b}, \vec{c}$ be vector such that $|\vec{a}| = 2, |\vec{b}| = 3, |\vec{c}| = 5$ and $\vec{a} + \vec{b} + \vec{c} = 0$. The value of $\vec{a}.\vec{b} + \vec{b}.\vec{c} + \vec{c}.\vec{a}$ is?

1. 38
2. -38
3. 19
4. -19

Testbook Solution Correct Option - **4**

Concept:

$(\vec{a} + \vec{b} + \vec{c})^2 = |a|^2 + |b|^2 + |c|^2 + 2(\vec{a}.\vec{b} + \vec{b}.\vec{c} + \vec{c}.\vec{a})$

Calculation:

Here, $|\vec{a}| = 2, |\vec{b}| = 3, |\vec{c}| = 5$

$\vec{a} + \vec{b} + \vec{c} = 0$

$|\vec{a} + \vec{b} + \vec{c}\,|^2 = 0$

$\Rightarrow a^2 + b^2 + c^2 + 2(\vec{a}.\vec{b} + \vec{b}.\vec{c} + \vec{c}.\vec{a}) = 0$

$\Rightarrow \vec{a}.\vec{b} + \vec{b}.\vec{c} + \vec{c}.\vec{a} = -\frac{(a^2+b^2+c^2)}{2}$

$= -\frac{4+9+25}{2}$

$= -19$

Hence, option (4) is correct.

Que. 33 If $\vec{a} = \left(\vec{i} + 2\vec{j} - 3\vec{k}\right)$ and $\vec{b} = \left(3\vec{i} - \vec{j} + 2\vec{k}\right)$ then the angle between $\left(\vec{a} + \vec{b}\right)$ and $\left(\vec{a} - \vec{b}\right)$ is?

1. $\pi / 3$
2. $\pi / 4$
3. $\pi / 2$
4. $2\pi / 3$

Testbook Solution Correct Option **- 3**

Concept:

a.b = |a||b|cosθ

Calculation:

Here, $\vec{a} = \left(\vec{i} + 2\vec{j} - 3\vec{k}\right)$ and $\vec{b} = \left(3\vec{i} - \vec{j} + 2\vec{k}\right)$

$\left(\vec{a} + \vec{b}\right) = (\vec{i} + 2\vec{j} - 3\vec{k}) + (\vec{3}i - \vec{j} + 2\vec{k})$

$= \vec{4}i + \vec{j} - \vec{k}$

$|(\vec{a} + \vec{b})| = \sqrt{4^2 + 1^2 + (-1)^2}$

$= \sqrt{18}$

$= 3\sqrt{2}$

$\left(\vec{a} - \vec{b}\right) = (\vec{i} + 2\vec{j} - 3\vec{k}) - (\vec{3}i - \vec{j} + 2\vec{k})$

$= -\vec{2}i + \vec{3}j - \vec{5}k$

$|(\vec{a} - \vec{b})| = \sqrt{(-2)^2 + 3^2 + (-5)^2}$

$= \sqrt{38}$

Now,

$\left(\vec{a} + \vec{b}\right) \cdot \left(\vec{a} - \vec{b}\right) = (\vec{4}i + \vec{j} - \vec{k}) \cdot (-\vec{2}i + \vec{3}j - \vec{5}k) = -8 + 3 + 5$

$|\left(\vec{a} + \vec{b}\right)||\left(\vec{a} - \vec{b}\right)|\cos\theta = 0$

$\Rightarrow \theta = \frac{\pi}{2}$

Hence, option (3) is correct.

Que. 34 The number of element in the power set P(S) of set S = {2, {1, 4}} is ?

1. 2
2. 4
3. 8
4. 10

Testbook Solution Correct Option **- 2**

Concept:

The number of elements in the power set of any set A is $\mathbf{2^n}$ where n is the number of elements of the set A.

Calculation:

Given, set S = {2, {1, 4}},

Number of elements in set S = 2

∴The number of element in the power set P(S) = $2^2 = 4$

Hence, option (2) is correct.

Que. 35 If $(1 - x + x^2)^n = a_0 + a_1x + a_2x^2 + ... + a_{2n}x^{2n}$, then $a_0 + a_2 + a_4 + ... a_{2n}$ is?

1. $\frac{3^n+1}{2}$
2. $\frac{3^n-1}{2}$
3. $\frac{1-3^n}{2}$
4. $3^n + \frac{1}{2}$

Testbook Solution Correct Option **- 1**

Calculation:

Given, $(1 - x + x^2)^n = a_0 + a_1x + a_2x^2 + ... + a_{2n}x^{2n}$

Put, x = 1,

$(1 - 1 + 1^2)^n = a_0 + a_1 + a_2 + ... + a_{2n}$

$\Rightarrow 1 = a_0 + a_1 + a_2 + ... + a_{2n}$ .....(1)

Now, put x = -1

$(1 - (-1) + (-1)^2)^n = a_0 - a_1 + a_2 - ... + a_{2n}$

$(3)^n = a_0 - a_1 + a_2 - ... + a_{2n}$ .....(2)

Add (1) and (2)

$1+3^n = 2(a_0 + a_2 + a_4 + ... a_{2n})$

$a_0 + a_2 + a_4 + ... a_{2n} = \frac{3^n+1}{2}$

Hence, option (1) is correct.

Que. 36 m dustinct animals of a circus have to be placed in m cages, one in each cage. There are n small cages and p small animals (n < p < m). The large anumals are so large that they do not fit in small cage, However, small animals can be put in any cage, The number of ways of putting the animals into cages is:

1. $\{^{m-n}P_p\}\{^{m-n}P_{m-p}\}$
2. $^{m-n}C_p$
3. $\{^{m-n}C_p\}\{^{m-n}C_{m-p}\}$
4. $^{m-n}P_p$

Testbook Solution Correct Option **- 1**

Concept:

Number of ways **to choose** r things out of n things is given by $^{n}C_{r}$

Number of ways **to arrange** r things out of n things is given by $^{n}P_{r}$

Calculation:

Number of large cages = m - n

Number of big animals = p

Here, ways to arrange big animals(p) in m, n cages = $^{m-n}P_p$

Number of remaining cages = n - p

Now, remaining animals can be arranged as, $^{n-p}P_{m-p}$

So, total number of ways = $\{^{m-n}P_p\}\{^{m-n}P_{m-p}\}$

Hence, option (1) is correct.

Que. 37

Let A and B two sets containing four and two elements respectively, The number of subsets of the set A × B, each having at least three elements is:

1. 270
2. 239
3. 219
4. 256

Testbook Solution Correct Option **- 3**

Concept:

Selection r things out of n things is denoted by ${}^{n}C_{r}$

${}^{n}C_{r} = \frac{n!}{(n-r)!r!}$

Calculation:

Set A has 4 elements

Set B has 2 elements

Total number of element in (A × B) = 4 × 2 = 8

Total number of subsets of (A × B) = $2^8 = 256$

Number of subsets having 0 element = ${}^{8}C_{0} = 1$

Number of subsets having 1 element = ${}^{8}C_{1} = 8$

Number of subsets having 2 elements = ${}^{8}C_{2} = (8 \times 7)/2 = 28$

Number of subsets having at least 3 elements

= 256 – 28 – 8 – 1 = 219

Hence, option (3) is correct.

Que. 38 The slope of the function

$$f(x) = \begin{cases} x^2 \sin\left(\frac{1}{x}\right), & x \neq 0 \\ 0, & x = 0 \end{cases} ?$$

1. 1
2. 0
3. -1
4. None

Testbook Solution Correct Option **- 2**

Concept:

The derivative of a function gives us the **slope** of the **line tangent** to the function at any point on the graph.

$\frac{dy}{dx} = \lim_{x \to 0} \frac{f(x)-f(a)}{x-a}$

Calculation:

Here, $f(x) = \begin{cases} x^2 \sin\left(\frac{1}{x}\right), & x \neq 0 \\ 0, & x = 0 \end{cases}$

Slope = m = $\frac{dy}{dx} = \lim_{x \to 0} \frac{f(x)-f(0)}{x-0}$

$\lim_{x\to 0} \frac{x^2 \sin(\frac{1}{x})-0}{x}$

$\lim_{x\to 0} x \sin(\frac{1}{x})$

As we know, $-1 \le \sin(\frac{1}{x}) \le 1$

Multiplying by x, we get

$\Rightarrow -x \le x \sin(\frac{1}{x}) \le x$

$\Rightarrow \lim_{x\to 0}(-x) \le \lim_{x\to 0} x \sin\left(\frac{1}{x}\right) \le \lim_{x\to 0} x$

$\Rightarrow 0 \le \lim_{x\to 0} x^2 \sin\left(\frac{1}{x}\right) \le 0$

$\therefore \lim_{x\to 0} x^2 \sin\left(\frac{1}{x}\right) = 0$

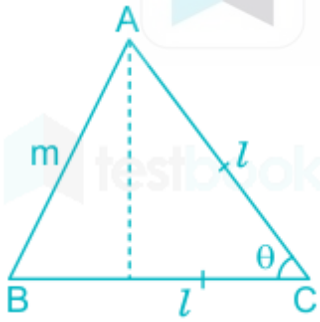
Hence, option (2) is correct.

Que. 39 What is the largest area of an isosceles tringle with two edges of length 3 ?

1. 3
2. 3 / 2
3. 9
4. 9 / 2

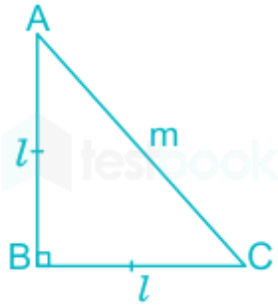
Testbook Solution Correct Option - **4**

Concept:



Area of isosceles triangle = $\frac{1}{2} \times 1 \times l \times \sin\theta$ where, θ is vertex angle of the isosceles triangle.

Calculation:



Here length = 3

The area is given by $\frac{1}{2} \times 3 \times 3 \times \sin\theta$ where θ is the vertex angle of the isosceles triangle.

Here, we required maximum area so θ = 90

∴ Area = $\frac{1}{2} \times 9 = 9/2$

Hence, option (4) is correct.

Que. 40 The value of $\int_0^{\pi} x^3 \sin x dx$ is

1. $\pi^3 - 6\pi$
2. $-\pi^3 - 6\pi$
3. $-\pi^3 + 6\pi$
4. $\pi^3 + 6\pi$

Testbook Solution Correct Option **- 1**

Concept:

Integration by parts: Integration by parts is a method to find integrals of products

- The formula for integrating by parts is given by,
- $\int u\, v\, dx = u\int v\, dx - \int u' (\int v\, dx)\, dx$

Where u is the function u(x) and v is the function v(x)

ILATE Rule: Usually, the preference order of this rule is based on some functions such as Inverse, Logarithm, Algebraic, Trigonometric and Exponent.

Calculation:

Let I = $\int_0^{\pi} x^3 \sin x dx$

Apply by parts rule, we get

$= x^3 \int_0^{\pi} \sin x dx - \int_0^{\pi} 3x^2(-\cos x)dx$

$= [x^3(-\cos x)]_0^{\pi} + 3[x^2 \int_0^{\pi} \cos x dx - \int_0^{\pi} 2x(\sin x)dx]_0^{\pi}$

$= \pi^3 + 0 - 6\int_0^{\pi} x(\sin x)dx$

$= \pi^3 - 6[x\int_0^{\pi} \sin x dx - \int_0^{\pi}(-\cos x)dx]$

$= \pi^3 - 6[\pi - 0]$

$= \pi^3 - 6\pi$

Hence, option (1) is correct.

Que. 41 Let f(x) be a polynomial of degree four, having extreme value at x = 1 and x = 2.

If $\lim_{x\to 0}\left[1 + \frac{f(x)}{x^2}\right] = 3$ then f(2) is?

1. 0
2. 4
3. -8
4. -4

Testbook Solution Correct Option **- 1**

Concept:

To find extreme values of a function f , set f'(x)=0 and solve.

Calculation:

Consider a polynomial $f(x) = ax^4 + bx^3 + cx^2 + dx + e$

$\lim_{x\to0}\left[1+\frac{f(x)}{x^2}\right]=3$

$\Rightarrow \lim_{x\to0}\frac{f(x)}{x^2}=2$

$\Rightarrow \lim_{x\to0}\frac{ax^4+bx^3+cx^2+dx+e}{x^2}=2$

$\Rightarrow \lim_{x\to0} ax^2+bx+c+\frac{d}{x}+\frac{e}{x^2}=2$

Now, let d = e = o

So,

$\lim_{x\to0} ax^2+bx+c=2$

$\Rightarrow c=2$

$f(x)=ax^4+bx^3+2x^2$

$f'(x)=4ax^3+3bx^2+4x$

Here, extreme values are 1 and 2, so f'(1) = f'(2) = 0

f'(1) = 4a + 3b + 4= 0

Multiply above equation by 4, we get

16a + 12b + 16 = 0 ....(1)

And f'(2) = 32a + 12b + 8 =0 .....(2)

Subtract (1) from (2)we get

16a - 8 = 0

$\Rightarrow$ a = 1/2

Put a = 1/2 in (1), we get

8 + 12b + 16 = 0

$\Rightarrow$ b = -2

$f(x)=\frac{1}{2}x^4-2x^3+2x^2$

f(2) =

$=\frac{1}{2}(2)^4-2(2)^3+2(2)^2$

$=8-16+8$

$=0$

Hence, option (1) is correct.

Que. 42 The maximum value of $4\sin^2+3\cos^2 x+\sin\frac{x}{2}+\cos\frac{x}{2}$ is

1. 4
2. 3 + √2
3. 9
4. 4 + √2

Testbook Solution Correct Option - **4**

Concept:

$\sin^2x+\cos^2x=1$

Calculation:

Let, $f(x)=4\sin^2 x+3\cos^2 x+\sin\frac{x}{2}+\cos\frac{x}{2}$

$f(x)=4\sin^2 x+3\left(1-\sin^2 x\right)+\sin\frac{x}{2}+\cos\frac{x}{2}$

$= 4\sin^2 x + 3 - 3\sin^2 x + \sin\frac{x}{2} + \cos\frac{x}{2}$

$= \sin^2 x + 3 + \sin\frac{x}{2} + \cos\frac{x}{2}$

$= \sin^2 x + 3 + \sqrt{2}\left[\frac{1}{\sqrt{2}}\sin\frac{x}{2} + \cos\frac{x}{2}\cdot\frac{1}{\sqrt{2}}\right]$

$= 3 + \sin^2 x + \sqrt{2}\sin\left(\frac{\pi}{4} + \frac{x}{2}\right)$

$= 3 + 1 + \sqrt{2}(1)$ ($\because$ Max value of $\sin^2 x = 1$ and $\sin\left(\frac{\pi}{4} + \frac{x}{2}\right) = 1$)

So the maximum value of $4\sin^2 x + 3\cos^2 x + \sin\frac{x}{2} + \cos\frac{x}{2}$ is $4 + \sqrt{2}$

Hence, option (4) is correct.

Que. 43 The solution of $(e^x + 1)\,ydy = (y + 1)\,e^x dx$ is

1. $e^y = c(e^x + 1)(y + 1)$
2. $e^y = e^x + y + 1$
3. $y = (e^x + 1)(y + 1)$
4. None

Testbook Solution Correct Option **- 1**

Concept:

$\log x = y \Rightarrow x = e^y$

Calculation:

Given: $(e^x + 1)\,ydy = (y + 1)\,e^x dx$

$\Rightarrow \frac{ydy}{(y+1)} = \frac{e^x}{(e^x+1)}dx$

$\Rightarrow \frac{(y+1-1)dy}{(y+1)} = \frac{(e^x)}{(e^x+1)}dx$

$\Rightarrow dy - \frac{dy}{(y+1)} = \frac{e^x}{(e^x+1)}dx$

Integrating both sides, we get

$\Rightarrow y - \log|y + 1| = \log(e^x + 1) + \log c$

$\Rightarrow y = \log|(y + 1)\,(e^x + 1)| + \log c$

$\Rightarrow c(y + 1)\,(e^x + 1) = e^y$

$\therefore e^y = c(e^x + 1)(y + 1)$

Hence, option (1) is correct.

Que. 44 Evaluate $\int_0^1 x(1-x)^n dx$

1. $\frac{-1}{(n+1)(n+2)}$
2. $\frac{1}{(n+1)(n+2)}$
3. $(n + 1)(n + 2)$
4. $(n - 1)(n - 2)$

Testbook Solution Correct Option **- 2**

Concept:

$\int_0^a f(x)dx = \int_0^a f(a - x)dx$

Calculation:

Let,I = $\int_0^1 x(1-x)^n dx$

Using $\int_0^a f(x)dx = \int_0^a f(a-x)dx$

$I = \int_0^1 (1-x)(1-(1-x))^n dx$

$= \int_0^1 (1-x)x^n dx$

$= \int_0^1 x^n - x^{n+1} dx$

$= [\frac{x^{n+1}}{n+1} - \frac{x^{n+2}}{n+2}]_0^1$

$= \frac{1}{n+1} - \frac{1}{n+2}$

$= \frac{1}{(n+1)(n+2)}$

Hence, option (2) is correct.

Que. 45 The critical point and nature for the function $f(x, y) = x^2 - 2x + 2y^2 + 4y - 2$ is

1. (1, 1) Maximum
2. (1, -1) ,Maximum
3. (1, 1) Minimum
4. (1, -1) Minimum

Testbook Solution Correct Option - **4**

Concept:

A **critical point of a function** of f(x), is a value x_0 in the domain of f where it is not differentiable or its derivative is 0 ($f'(x_0) = 0$).

To find the **nature** of the critical points, we apply the **second derivative test.**

I. f''(x) is less than 0 then the given function is said to be maxima
II. If f''(x) Is greater than 0 then the function is said to be minima

Calculation:

Here, $f(x, y) = x^2 - 2x + 2y^2 + 4y - 2$

Partial derivatives,

f'(x) = 2x - 2 and f'(y) = 4y + 4

Now, for critical points, f'(x) = 0

⇒ 2x - 2 = 0

⇒x = 1,

Also, f'(y) = 0

⇒ 4y + 4 = 0

⇒y = -1,

So, critical points (1, -1)

f''(x) = 2 > 0 and f''(y) = 4 > 0

So, at (1, -1) minimum

Hence, option (4) is correct.

Que. 46 If $y = \cos^2 x^2$, find $\frac{dy}{dx}$

1. $4x^2 \sin x^2 \cos x^2$
2. $-4x \cos x^2 \sin x^2$
3. $2x \sin x^2 \cos x^2$
4. $-2x \cos x^2 \sin x^2$

Testbook Solution Correct Option **- 2**

Concept:

$\cos 2x = 2\cos^2 x - 1$

$\sin 2x = 2\sin x \cos x$

Calculation:

Here, $y = \cos^2 x^2$

Let, $x^2 = t$

Differentiating with respect to x, we get

$\Rightarrow 2xdx = dt$

$\Rightarrow dt/dx = 2x$ ....(1)

$y = \cos^2 t$

$= \frac{\cos 2t+1}{2} = \frac{\cos 2t}{2} + \frac{1}{2}$

$\frac{dy}{dx} = \frac{1}{2}\frac{d}{dt}(\cos 2t)\frac{dt}{dx} + 0$

$= \frac{1}{2}(-2\sin 2t)\frac{dt}{dx} \cdots (\text{from } (1))$

$= -\sin 2x^2 \times 2x$

$= -4x \cos x^2 \sin x^2$

Hence, option (2) is correct.

Que. 47 The derivatives of $(x^3 + e^x + 3^x + \cot x)$ with respect to x is

1. $3x^2 + e^x + 3^x (\log 3) - \text{cos ec}^2 x$
2. $3x^2 + e^x + 3^x (\log 3) + \text{cos ec}^2 x$
3. $3x^2 + e^x + 3^x (\log 3) - \sec^2 x$
4. $3x^2 + e^x + 3^x (\log 3) + \sec^2 x$

Testbook Solution Correct Option **- 1**

Concept:

$\frac{d}{dx}(a^x) = a^x \ln a$

$\frac{d}{dx}(\cot x) = -\text{cosec}^2 x$

Calculation:

$\frac{d}{dx}(x^3 + e^x + 3^x + \cot x)$

$= 3x^2 + e^x + 3^x \log 3 - \operatorname{cosec}^2 x$

Hence, option (1) is correct.

Que. 48 The solution of the equation $\frac{dy}{dx} = e^{x+y} + x^2 e^y$ is

1. $e^{x-y} + \frac{x^3}{3} + c$
2. $e^x + e^{-y} + \frac{x^3}{3} = c$
3. $e^x - e^{-y} = \frac{x^3}{3} + c$
4. None

Testbook Solution Correct Option **- 2**

Calculation:

$\Rightarrow \frac{dy}{dx} = e^x e^y + x^2 e^y$

$\Rightarrow \frac{dy}{dx} = e^y \left(e^x + x^2\right)$

$\Rightarrow \frac{dy}{e^y} = \left(e^x + x^2\right) dx$

$\Rightarrow \int \frac{dy}{e^y} = \int e^x dx + \int x^2 dx + c_1$

$\Rightarrow \int e^{-y} dy = e^x + \frac{1}{3}x^3 + c_1$

$\Rightarrow -e^{-y} = e^x + \frac{1}{3}x^3 + c_1$

$\Rightarrow e^x + e^{-y} + \frac{x^3}{3} = c$

Hence, option (2) is correct.

Que. 49 Differentiate {-log (log x), x > 1} with respect to x

1. -1 / (x log x)
2. 1 / (log x)
3. 1 / x
4. x log x

Testbook Solution Correct Option **- 1**

Concept:

Chain rule: $\frac{d}{dx}[f(g(x))] = f'(g(x))g'(x)$

Calculation:

Here, -log (log x), x > 1

Let, log x = y

Differentiating with respect to x, we get

$\Rightarrow$ dy/dx = 1/x ....(1)

Now, -log (log x) = -log y

$\frac{d}{dx}(-\log y) = -\frac{1}{y}\frac{dy}{dx}$

= -1 / (x log x) ....(from (1))

Hence, option (1) is correct.

Que. 50 Evaluate $\lim_{x\to 0} \frac{x \tan x}{1-\cos x}$

1. 1 / 2
2. -1 / 2
3. -2
4. 2

Testbook Solution Correct Option **- 4**

Concept:

cos 2x = 1 - 2sin^{2}x

$\lim_{x\to 0} \frac{\tan x}{x} = 1$

$\lim_{x\to 0} \frac{\sin x}{x} = 1$

Calculation:

Given, $\lim_{x\to 0} \frac{x \tan x}{1-\cos x}$

$\Rightarrow \lim_{x\to 0} \frac{x \tan x}{2 \sin^2 \frac{x}{2}}$

$= \frac{1}{2} \lim_{x\to 0} \frac{\tan x}{x} \times \frac{x.x}{\frac{\sin^2 \frac{x}{2}}{\left(\frac{x}{2}\right)^2} \times \left(\frac{x}{2}\right)^2}$

$= \frac{1}{2} \lim_{x\to 0} \frac{\tan x}{x} \times \frac{4}{\frac{\sin^2 \frac{x}{2}}{\left(\frac{x}{2}\right)^2}}$

$= \frac{1}{2} \times 1 \times 4 = 2$

Hence, option (4) is correct.

Que. 51 Two person S and M have made the following statement among themselves

S say that I am certainly not over 40 year.

M says that I am 38 years and you are at least 5 years older than me.

S says you are at least 39 years.

If all the above statements are wrong, what are the ages of M and S?

1. 36 and 40
2. 36 and 41
3. 37 and 40
4. cannot be determined

Testbook Solution Correct Option **- 4**

Given:

If all the statements are wrong

S say that I am certainly not over 40 year, means **S will be over 40 years**

M says that I am 38 years and you are at least 5 years older than me, which means **M is not 38 years old, and also S is not at least 5 years older than M**.

S says you are at least 39 years which means **M is not at least 39 years**.

Hence, the age of M and S **cannot be determined.**

Que. 52 What is the largest number of positive integer to be picked up randomly so that the sum or difference of any two of the chosen number is divisible by 10?

1. 2
2. 5
3. 7
4. 10

Testbook Solution Correct Option **- 3**

Calculation:

Let number be 10k, 10k + 1, 10k + 2,..... 10k+ 9

Sum of number is divisible by 10:

Possible combination are: (10k, 10k), (10k + 1, 10k + 9), (10k + 2, 10k + 8), (10k + 3, 10k + 7), (10k + 5, 10k + 5) and (10k + 4, 10k + 6)

Difference of number is divisible by 10:

Possible combination are: (10k, 10k)

Total combination of the sum or difference of any two of the chosen number is divisible by 10 is 7

Que. 53 Five children were administered psychological tests to know their intellectual levels . In the report psychogists point that child A is less intelligent than child B . The child C is less intelligent then D , The child B is less intelligent then child C and child A is less intelligent than child E . Which child is most intelligent ?

1. D only
2. E only
3. D or E
4. Neither D and E

Testbook Solution Correct Option **- 3**

1) A is less intelligent than child B .

A < B

2) The child C is less intelligent then D

Child B is less intelligent than child C

Child A is less intelligent than child E.

C < D

B < C

A < E

So, E > A < B < C < D

The information about E is not completely given in the question and from the above conclusion, the most intelligent child is D or E.

Hence, 'D or E' is the correct answer.

Que. 54 From a group of 7 men and 6 women , a committee of 5 person with more males than females is to be formed . In how many ways can this be done ?

1. 564
2. 645

3. 735
4. 756

Testbook Solution Correct Option **- 4**
Formula Used:

Number of ways of selection of r items out of n items: ${}^{n}C_{r} = n!/((n-r)! \times r!)$

Concept:

Probable combinations of selection could be as follows:

Cases	Required number of Males	Required number of Females
I	3	2
II	4	1
III	5	0

Calculation:

Number of ways: ${}^{7}C_{3} \times {}^{6}C_{2} + {}^{7}C_{4} \times {}^{6}C_{1} + {}^{7}C_{5} \times {}^{6}C_{0}$

$\Rightarrow 35 \times 15 + 35 \times 6 + 21 \times 1$

$\Rightarrow 756$

Number of ways in which the following activities can be done = 756

Que. 55 A., B, C, D, E, and F are 6 area group of friends from a club. There are two housewives, one lecturer, one architect, one accountant, and one lawyer in the group. There are two married couples. Lawyer A is married to D , Who is a housewife. No lady is either an architect or an accountant . C, the accountant is married to F , Who is a lecturer.If E is not a house wife ,What is the profession of E ?

1. Lawyer
2. Architect
3. Lecturer
4. Accountant

Testbook Solution Correct Option **- 2**
According to the given information:

Married couples

A(Lawyer) is married to D(housewife)

C(Accountant) is married to F(Lecturer)

C is male because no lady is either architect or an accountant.

According to Option:

A = Lawyer

F = Lecturer

C = Accountant.

Hence, E is **Architect.**

Que. 56 There are five books A,B,C,D and E placed on a table . If A is placed below E , C is placed above D, B is placed below A and D is placed above E , then which of the following books touches the surface of the table.

1. C
2. B
3. A
4. E

Testbook Solution Correct Option **- 2**

1)A is placed below E.

E
A

2)C is placed above D.

C
D

3) B is placed below A and D is placed above E.So the final arrangement is:

C
D
E
A
B

Hence, book 'B' touches the surface of the table.

Que. 57 The following series is obtained by considering representations of decimal 99 in different number systems . 99, 90 , 83 , 78 ___ , ___

1. 75, 74
2. 69, 57
3. 67, 59
4. 69, 63

Testbook Solution Correct Option **- 1**

Given series:

99, 90 , 83 , 78 ___ , ___

The pattern followed here is:

99 - **9** = 90;

90 - **7** = 83;

83 - **5** = 78;

78 - **3** = **75;**

75 - **1** = **74**

Hence, **75, 74** is the correct answer.

Que. 58 * In the family of six person A, B, C , D , E and F , there are two married couples .

* D is the grandmother of A and mother of B
* C is wife of B and mother of F
* F is granddaughter of E

What is C to A ?

1. Daugher

2. Mother
3. Father
4. Can not be determined

Testbook Solution Correct Option **- 2**

Given,

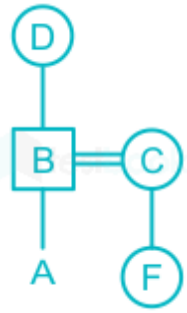
In the family of six-person A, B, C, D, E and F, there are two married couples.

Preparing the family tree using the following symbols,

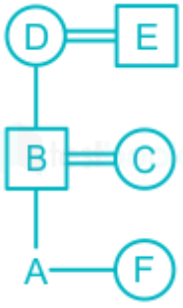
Symbol in Diagram	Meaning
○	Female
□	Male
=	Married couple
—	Siblings
|	Difference of a generation

1) D is the grandmother of A and mother of B.

2) C is the wife of B and mother of F.



3) F is the granddaughter of E.



Hence, 'C' is the mother of 'A'.

Que. 59 Which of the following is true ?

1. A is brother of F
2. A is sister of F
3. B has two daughters
4. None

Testbook Solution Correct Option **- 4**

Given,

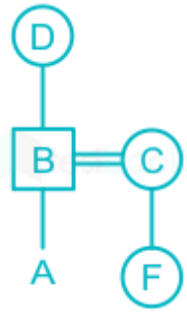
In the family of six-person A, B, C, D, E and F, there are two married couples.

Preparing the family tree using the following symbols,

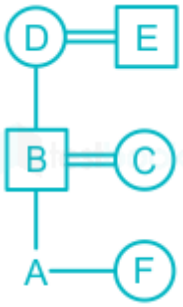
Symbol in Diagram	Meaning
○	Female
□	Male
=	Married couple
—	Siblings
|	Difference of a generation

1) D is the grandmother of A and mother of B.

2) C is the wife of B and mother of F.



3) F is the granddaughter of E.



Gender of A is not known so we can not consider any of the statement is true.

Hence, 'None' is the correct answer.

Que. 60 Who among the following is one of the couples ?

1. CD
2. DE
3. EB
4. None

Testbook Solution Correct Option **- 2**

Given,

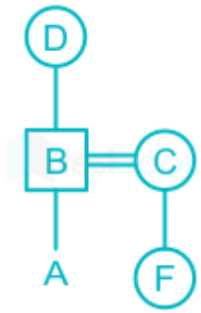
In the family of six-person A, B, C, D, E and F, there are two married couples.

Preparing the family tree using the following symbols,

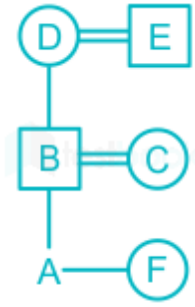
Symbol in Diagram	Meaning
○	Female
□	Male
=	Married couple
—	Siblings
|	Difference of a generation

1) D is the grandmother of A and mother of B.

2) C is the wife of B and mother of F.



3) F is the granddaughter of E.



Hence, 'DE' is the correct answer.

Que. 61 The missing number in the following series

336, 210,120, 60 , _____, 6 is

1. 24
2. 30
3. 34
4. 40

Testbook Solution Correct Option **- 1**

The patter followed here is :

$7^3 - 7 = 336$

$6^3 - 6 = 210$

$5^3 - 5 = 120$

$4^3 - 4 = 60$

$3^3 - 3 = 24$

$2^3 - 2 = 6$

Hence, '24' is the correct answer.

Que. 62 If the day after the day after tomorrow is three days before Friday, then today is

1. Tuesday
2. Thrusday
3. Saturday
4. Monday

Testbook Solution Correct Option **- 3**

Given:

If the day after the day after tomorrow = three days before Friday

Three days before Friday is Tuesday

The day after the day after tomorrow = Tuesday then, the present day is Saturday.

Hence, **Saturday** is the answer.

Que. 63 Find the missing term of the following series?
DCXW, HGTS, ...POLK , TSHG

1. KLOP
2. LKOP
3. KLPO
4. LKPO

Testbook Solution Correct Option **- 4**

The positions of letters according to the English alphabet series is :

Alphabets	A	B	C	D	E	F	G	H	I	J	K	L	M
Positional value	1	2	3	4	5	6	7	8	9	10	11	12	13
Positional value	26	25	24	23	22	21	20	19	18	17	16	15	14
Alphabets	Z	Y	X	W	V	U	T	S	R	Q	P	O	N

The pattern followed here is :

Hence, '**LKPO**' is the correct answer.

Que. 64 Four passenger in a train find that they from an interesting group .Two of them are lawyers and the other two are doctor .Two of them speak Bengoli and the other two speak Hindi and no two of the same profession speak the same language . They also find two of them are Christions and two are muslims and non two of the same religion speak the same language. The Hindi speaking doctor is a Christian . Then which of the following statement logically follows ?

1. The Bengali Spaeking lawyer is a Muslim
2. The Christian lawyer speaks Bengali
3. The Bengali speaking doctor is a Christian
4. The Bengali speaking doctor is a Muslim

Testbook Solution Correct Option **- 4**

Given:

Four passengers on a train find that they form an interesting group. (Let A, B, C, and D)

Two of them are lawyers and the other two are doctors.

Two of them speak Bengoli and the other two speak Hindi and **no two of the same profession speak the same language**.

They also find two of them are Christians and two are Muslims and **no two of the same religion speak the same language**.

The **Hindi speaking doctor is a Christian.**

From here, we can definitely say that Bengoli speaking doctors must be Muslims(**no two of the same religion speak the same language**.)

Lawyer	**Lawyer**	**Doctor**	**Doctor**
A	B	C	D
Bengoli	Hindi	Bengoli	Hindi
		Muslim	**Christian**

Hence, **Bengali speaking doctors is a muslim**

Que. 65 Harish , Javed , Kumar , Laxman and Mohan are deciding who will ride the roller coaster . There is time for only one ride before the park closes.

*If Feroz rides Gautam must ride

*If Gautam and Harish both ride , javed cannot ride

*If Harish and javad both ride , Laxman cannot ride

*If javed rides , either kumar or Mohan must ride kumar and Laxman cannot both ride, but one of them must ride .

*kumar and Mohan cannot both ride .

Which of the following is an acceptable combination of riders if only three people ride ?

1. Harish , javed and Laxman
2. Harish , javed and kumar
3. Feroz , Gautam and javed
4. Gautam , kumar and Laxman

Testbook Solution Correct Option **- 2**

Checking the given option :

1) Harish, Javed and Laxman

It is not possible because If Harish and Javed both ride , Laxman cannot ride as given in the question.

2) Harish, Javed and Kumar

It is true because If Harish and Javed both ride, Laxman cannot ride and If Javed rides, either Kumar or Mohan must ride Kumar and Laxman cannot both ride, but one of them must ride as given in the question.

3) Feroz, Gautam and Javed

It is not possible because If Javed rides, either Kumar or Mohan must ride Kumar and Laxman cannot both ride, but one of them must ride as given in the question.

4) Gautam, Kumar and Laxman

It is not possible because Kumar and Mohan cannot both ride as given in the question.

Que. 66 If javed and Mohan both ride , which of the following is true

1. Gautam cannot ride
2. Harish must ride
3. Feroz cannot ride
4. Laxman must ride

Testbook Solution Correct Option **- 2**
According to the given information :

I) If Harish and Javed both ride, Laxman cannot ride.

II) If Javed rides, either Kumar or Mohan must ride Kumar and Laxman cannot both ride, but one of them must ride.

So, If Javed and Mohan both ride than Harish must ride.

Hence, 'Harish must be' the correct answer.

Que. 67 If Feroz and harish both ride, what is the greatest number of people who can ride ?

1. 5
2. 7
3. 4
4. 6

Testbook Solution Correct Option **- 1**
Given :

I) If Feroz rides Gautam must ride

II) If Gautam and Harish both ride, Javed cannot ride

III) If Harish and Javed both ride, Laxman cannot ride

IV) If Javed rides, either Kumar or Mohan must ride Kumar and Laxman cannot both ride, but one of them must ride .

V) Kumar and Mohan cannot both ride .

According to conditions :

If Feroz ride than Gautam also ride (From statement I) so by this statement there is total 3 person.

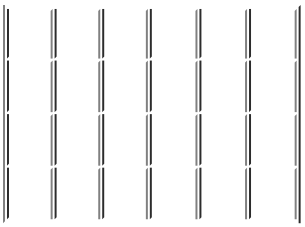
Now, If Guatam Harish and Firoz ride together then Javed can not ride (From statement II)

If Gautam, Harish and Firoz ride together than Laxman also ride because from statement III it is clear that if Harish and Javed both ride then Laxman can not ride but here only Harish ride so Laxman can ride with them so the total number of person by this statement is 4.

Now from Statement (IV) and (V) we can conclude that between Kumar and Mohan any once can join rest of 4 so there are 5 parson ride together.

Hence, '5' is the correct answer.

Que. 68 The number of square in the following 4 × 6 grid is



1. 36

2. 44
3. 50
4. 54

Testbook Solution Correct Option **- 3**

Formula to find the number of squares is:

4×6 is written as $d_2 \times d_1$

Formula: d_1 - (n - 1) × d_2 - (n - 1)

n is the no of the box we are considering: 1×1 (n = 1)

2×2 (n = 2)

3×3 (n = 3)

4×4 (n = 4)

5×5 is not possible because there are only 4 rows.

1×1 (n = 1) putting in formula

6 - (1 - 1) × 4 - (1 - 1);

$6 \times 4 =$ **24**

Simlarly,

2×2 (n = 2) putting in formula

6 - (2 - 1) × 4 - (2 - 1);

$5 \times 3 =$ **15**

and,

3×3 (n = 3) putting in formula

6 - (3 - 1) × 4 - (3 - 1);

$4 \times 2 =$ **8**

also,

4×4 (n = 4) putting in formula

6 - (4 - 1) × 4 - (4 - 1);

$3 \times 1 =$ **3**

Total number of square is 24 + 15 + 8 + 3 = **50**

Hence, 50 is the number of square.

Que. 69 A Cube is made up of 125 one cm. square cubes placed on a table . How many squares are visible only on three sides ?

1. 4
2. 8
3. 12
4. 16

Testbook Solution Correct Option **- 1**

Total cubes = 125

The only cubes present at the upper face and four corners of cube that will be visible to three sides of cube.

A cube is formed by 11 cube horizontally and 11 cube vertically and remaining 4 cube will be visible.

number of cubes required to make largest possible cube = 11 × 11 = 121

∴ Remaining cube = 125 - 121 = 4

Que. 70 Three thieves rob a bakery of bread, one after the other, Each thief takes half of what is present and half a bread . If 3 breads remains at the end , What is the number of breads that were presents initially?

1. 24
2. 31
3. 37
4. 41

Testbook Solution Correct Option **- 2**

Given:

Remaining bead = 3

Calculation:

Let the initially present bread be the X

First thieve robbery

⇒ X/2 + 1/2 ----(1)

Remaining bread present after 1st robbery

⇒ X - (X/2 + 1/2)

Second thieve rob

⇒ (X - X/2 - 1/2)/2 + 1/2

⇒ (X/2 - 1/2)/2 + 1/2

⇒ (X - 1)/4 + 1/2

⇒ (X + 1)/4 ----(2)

Remaining bread after second robbery

⇒ X - X/2 - 1/2 - (X + 1)/4

Third thieve rob

⇒ (X - X/2 - 1/2 - (X + 1)/4)/2 + 1/2

On solving above equation we will get

⇒ (X + 1)/8 ----(3)

Total bread present initially

⇒ X - X/2 - 1/2 - (X + 1)/4 - (X + 1)/8 = 3

⇒ X/2 - X/4 - X/8 = 3 + 1/2 + 1/4 + 1/8

⇒ (4X - 2X- X)/8 = (24 + 4 + 2 + 1)/8

X = 31

∴ **The number of breads that were initially presents is 31.**

Que. 71 A caterpiller crawls up a pole of 75 inches high , standing from the ground . Each day it crawls up 5 inches and each night it slides down 4 inches . When will it reach the top

1. At the end of 70 days
2. At the end of 71 days
3. At the end of 72 days
4. At the end of 73 days

Testbook Solution Correct Option **- 2**

Given:

Height of pole is 75 inches

Calculation:

Caterpillar crawls 5 inches in a day and slide down 4 inches in night

Total distance cover by caterpillar day and night = 5 - 4

⇒ 1 inches

Total distance to cover by caterpillar in 70 days = 70 inches

Remaining = 75 – 70

⇒ 5 inches

Caterpillar takes 1 day to cover 5 inches

Total days required to reach the top = 70 + 1

⇒ 71 days

∴ It will reach at the end of 71 days.

Que. 72 A man's investment doubles in every 5 years . If he invested Rs. 5000 in each of the years 1990 , 1995 , 2000 and 2005 , then what was the total amount recieved by him in 2010?

1. Rs. 1,40,000
2. 30,000
3. 70,000
4. 1,50,000

Testbook Solution Correct Option **- 4**

Given,

Investment doubles every 5 years.

He invested Rs. 5000 in each of the years 1990, 1995, 2000 and 2005.

Now, he invested 5000 in 1990 so the amount for 1990 is 5000

In 1995 the amount gets double the amount become 10000 and then he again invest 5000 so the total amount of the year 1995 is 15000.

In 2000 the amount gets double the amount become 30000 and then he again invest 5000 so the total amount of the year 2000 is 35000.

In the year 2005 the amount gets double the amount become 10000 and then he again invest 5000 so the total amount of the year 1995 is 75000.

So, finally, the amount in the year 2010 is 1,50000.

Hence, '150000' is the correct answer.

Que. 73 A.B,C,D,E,F G and H are sitting around a circular table facing the center , Each one of them has a different profession viz . doctor , engineer , architect, teacher , clerk , shopkeeper , banker m and businessman

* A sits third to right of teacher .
* D sits seconds to left of G .
* G is not an immediate neighbour of teacher ,
* Only one person sits between B, the shopkeeper and the teacher .
* The one who is an architect sits third to right of the teacher ,
* H sits between architect and engineer .

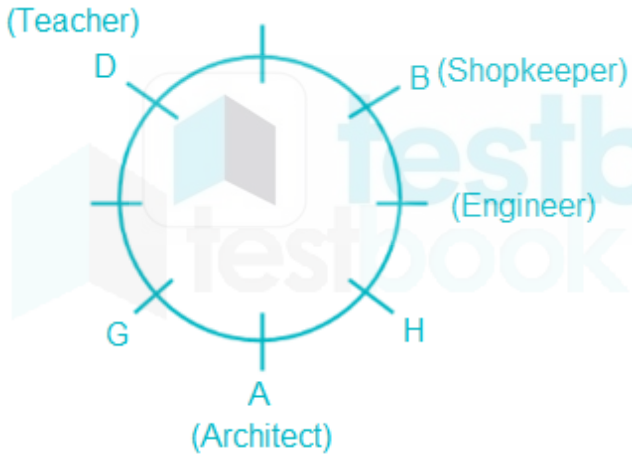
*E is not an immediate neighbour of H .
* Engineer sits third to the right of clerk and immediate neighbour of banker.
* Only one person sits between the businessman and F. E is not an immediate neighbour of shopkeeper.
E is neither a businessman nor a doctor . Who amongst
the following is the clerk ?

1. C
2. D
3. E
4. G

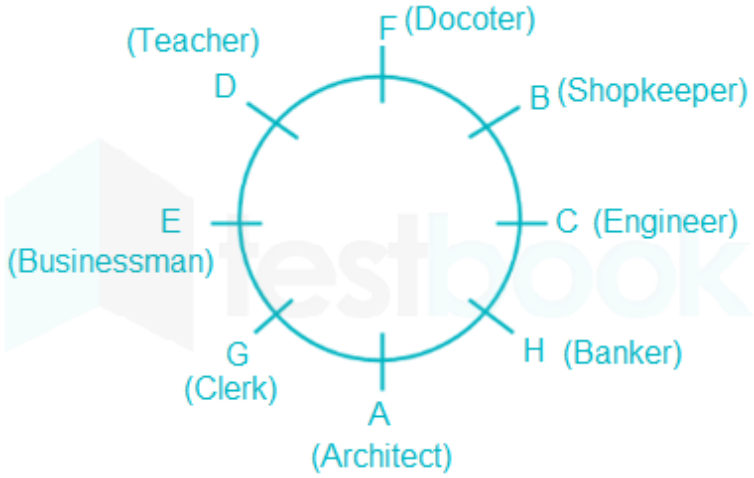
Testbook Solution Correct Option **- 4**
Given,

A.B, C, D, E, F G and H are sitting around a circular table facing the centre, Each one of them has a different profession viz. doctor, engineer, architect, teacher,clerk, shopkeeper, banker m and businessman.

1. A sits third to the right of the teacher.
2. D sits seconds to the left of G.
3. G is not an immediate neighbour of the teacher.
4. Only one person sits between B, the shopkeeper and
the teacher.
5. The one who is an architect sits third to the right of the
teacher.
6. H sits between architect and engineer.



*E is not an immediate neighbour of H.
* Engineer sits third to the right of clerk and immediate neighbour of the banker.
* Only one person sits between the businessman and F. E is not an immediate neighbour of the shopkeeper.



From the above diagram, it is clear that G is the clerk.

Hence, 'G' is the correct answer.

Que. 74 Which of the following is trues with respect to the given sitting arrangement ?

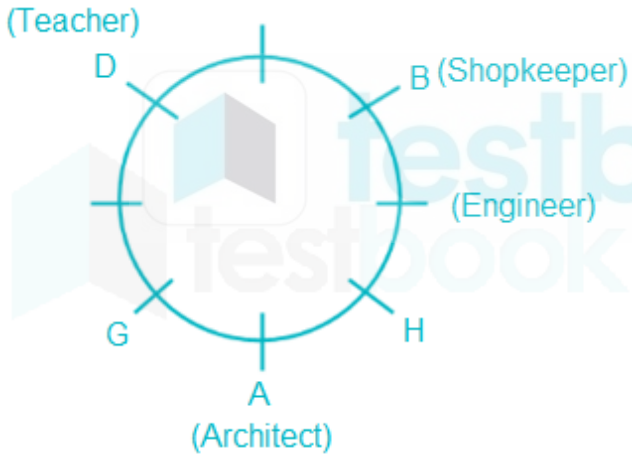
1. E is an immediate neighbour of the engineer
2. E is a businessmen
3. The clerk is an immediate neighbour of the banker
4. The teacher sits between H and the engineer

Testbook Solution Correct Option **- 2**

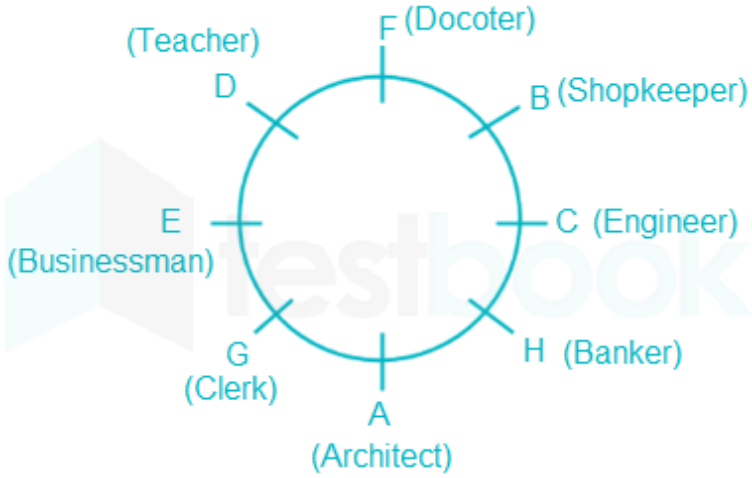
Given,

A.B, C, D, E, F G and H are sitting around a circular table facing the centre, Each one of them has a different profession viz. doctor, engineer, architect, teacher,clerk, shopkeeper, banker m and businessman.

1. A sits third to the right of the teacher.
2. D sits seconds to the left of G.
3. G is not an immediate neighbour of the teacher.
4. Only one person sits between B, the shopkeeper and the teacher.
5. The one who is an architect sits third to the right of the teacher.
6. H sits between architect and engineer.



7. E is not an immediate neighbour of H.
8. Engineer sits third to the right of clerk and immediate neighbour of the banker.
9. Only one person sits between the businessman and F. E is not an immediate neighbour of the shopkeeper.



Hence, 'E is a Businessmen' is the correct answer.

Que. 75 What is the profession of H ?

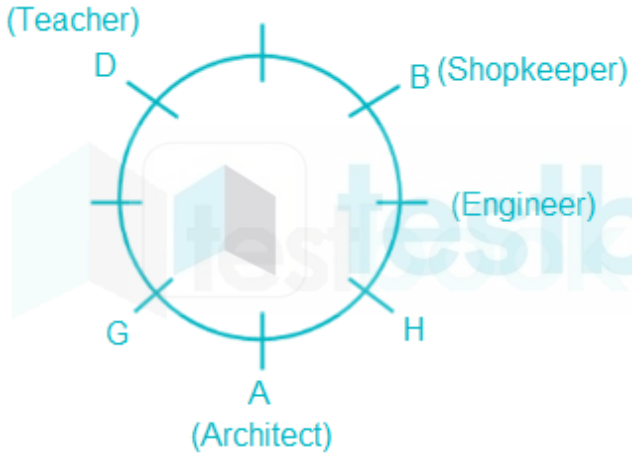
1. Architect
2. Shopkeeper
3. Banker
4. Teacher

Testbook Solution Correct Option **- 3**

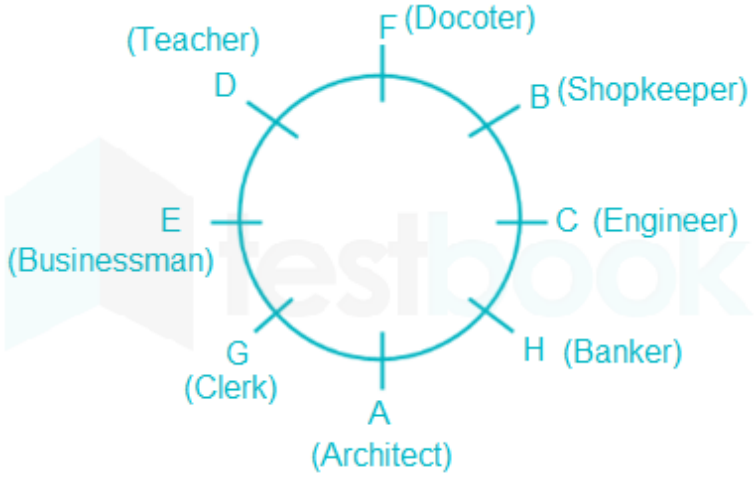
Given,

A.B, C, D, E, F G and H are sitting around a circular table facing the centre, Each one of them has a different profession viz. doctor, engineer, architect, teacher,clerk, shopkeeper, banker m and businessman.

1. A sits third to the right of the teacher.
2. D sits seconds to the left of G.
3. G is not an immediate neighbour of the teacher.
4. Only one person sits between B, the shopkeeper and the teacher.
5. The one who is an architect sits third to the right of the teacher.
6. H sits between architect and engineer.



7. E is not an immediate neighbour of H.
8. Engineer sits third to the right of clerk and immediate neighbour of the banker.
9. Only one person sits between the businessman and F. E is not an immediate neighbour of the shopkeeper.



Hence, 'Banker ' is the correct answer.

Que. 76 Who sits exactaly between the architect and businessman ?

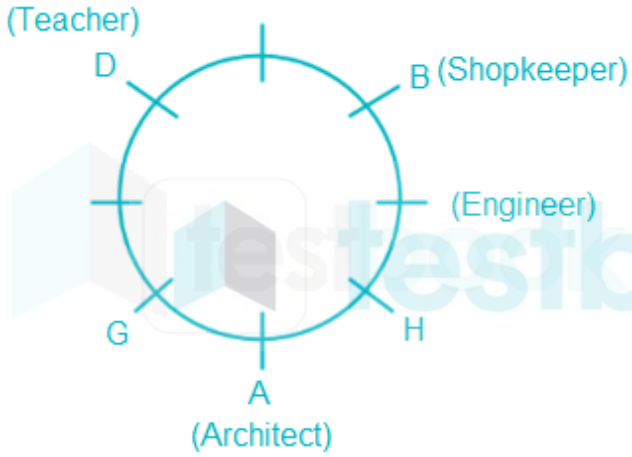
1. C and H
2. Clerk
3. Banker and Shopkeeper
4. Doctor

Testbook Solution Correct Option **- 2**

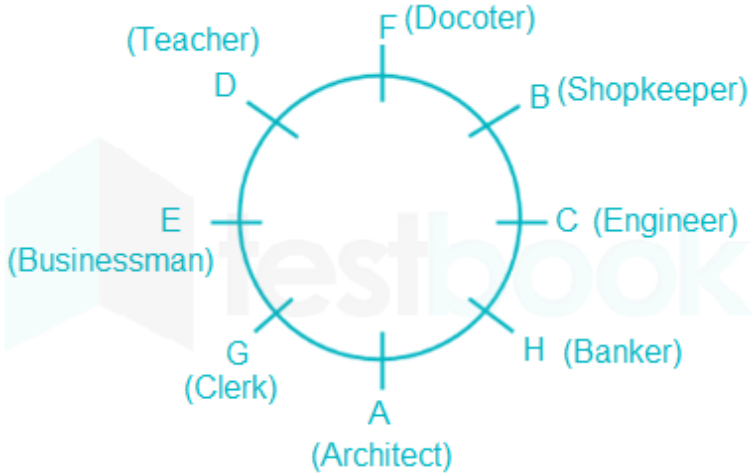
Given,

A.B, C, D, E, F G and H are sitting around a circular table facing the centre, Each one of them has a different profession viz. doctor, engineer, architect, teacher,clerk, shopkeeper, banker m and businessman.

1. A sits third to the right of the teacher.
2. D sits seconds to the left of G.
3. G is not an immediate neighbour of the teacher.
4. Only one person sits between B, the shopkeeper and the teacher.
5. The one who is an architect sits third to the right of the teacher.
6. H sits between architect and engineer.



7. E is not an immediate neighbour of H.
8. Engineer sits third to the right of clerk and immediate neighbour of the banker.
9. Only one person sits between the businessman and F. E is not an immediate neighbour of the shopkeeper.



Hence, 'Clerk' is the correct answer.

Que. 77 Who sits immediately right to the businessman ?

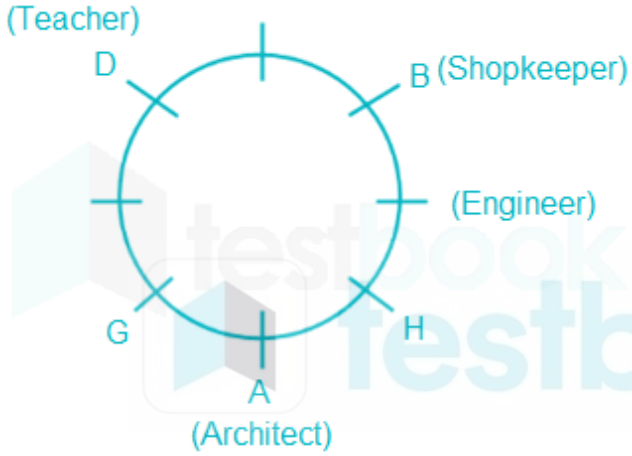
1. Teacher
2. Doctor
3. Clerk
4. Banker

Testbook Solution Correct Option **- 3**

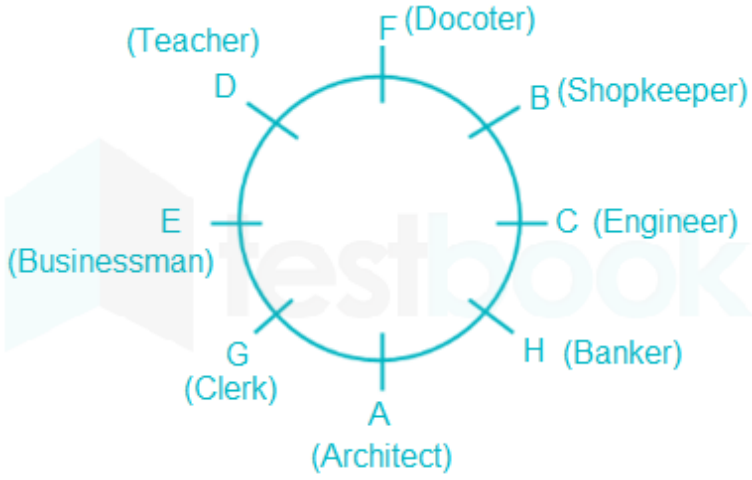
Given,

A.B, C, D, E, F G and H are sitting around a circular table facing the centre, Each one of them has a different profession viz. doctor, engineer, architect, teacher,clerk, shopkeeper, banker m and businessman.

1. A sits third to the right of the teacher.
2. D sits seconds to the left of G.
3. G is not an immediate neighbour of the teacher.
4. Only one person sits between B, the shopkeeper and the teacher.
5. The one who is an architect sits third to the right of the teacher.
6. H sits between architect and engineer.



7. E is not an immediate neighbour of H.
8. Engineer sits third to the right of clerk and immediate neighbour of the banker.
9. Only one person sits between the businessman and F. E is not an immediate neighbour of the shopkeeper.



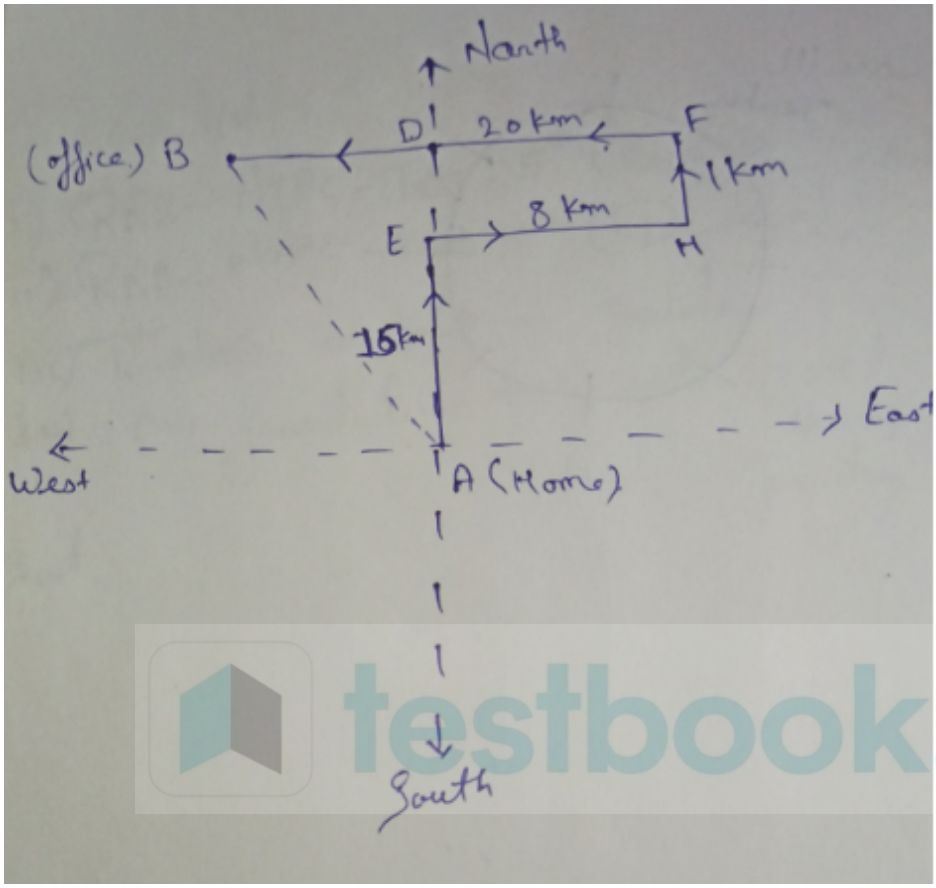
Hence, 'Clerk' is the correct answer.

Que. 78 Raghav left his home for office in car . He drove 15 km straight towards North and then turned east wards and coverd 8 km . He then turned to left and coverd 1 km . He again turned left and drove for 20 km and reached office. How far and in which direction is his office from the home ?

1. 20 km North - West
2. 15 km North - West
3. 30 km North - West
4. 25 km North

Testbook Solution Correct Option **- 1**

Let us draw the diagram according to the information given in the question,



A is the starting point and B is the ending point.

AD = 16km, FB = 20km

EH = DF = 8km,

BD = FB - DF

BD = 20 - 8 km

BD = 12 km

By Pythagoras theorem.

$BA^2 = AD^2 + BD^2$

$BA^2 = 16^2 + 12^2$

$BA^2 = 256 + 144$

$BA^2 = 400$

$BA = \sqrt{400}$

BA = 20 km

Raghav is 20km in North -West direction with respect to his home.

Hence, '20km North -West ' is the correct answer.

Que. 79 John is 20 years older than Steve . In 10 year , Steve" s age will be half that of John , What is steve's age now ?

1. 2
2. 8
3. 10
4. 20

Testbook Solution Correct Option **- 3**

Given,

John is 20 years older than Steve.

10 year, Steve" s age will be half that of John.

Let, the age of Steve is X

So the age of John become 20 + X.

The age of Steve after 10 year is :

$10 + X = (10 + 20 + X) / 2$

$2 \times (10 + X) = 30 + X$

$20 + 2X = 30 + X$

$2X - X = 30 - 20$

$X = 10$

So, the age of Steve is 10 year

Hence,'10' is the correct answer.

Que. 80 Pointing to a boy , Aruna said to Pushpa . "The mother of his father is wife of your maternal grand - father ".How is pushpa related to that boy?

1. Sister
2. Niece
3. Cousin sister
4. Wife

Testbook Solution Correct Option **- 3**

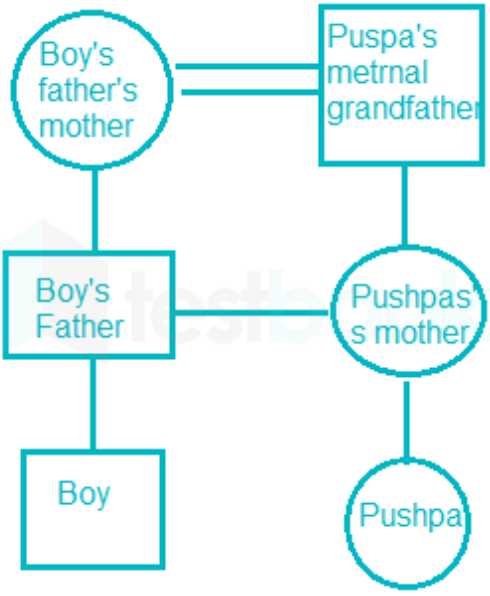
Preparing the family tree using the following symbols,

Alphabets	A	B	C	D	E	F	G	H	I	J	K	L	M
Positional value	1	2	3	4	5	6	7	8	9	10	11	12	13
Positional value	26	25	24	23	22	21	20	19	18	17	16	15	14
Alphabets	Z	Y	X	W	V	U	T	S	R	Q	P	O	N

It is given that,

The mother of his father is the wife of your maternal grandfather it means the boy's father's mother is the wife of Pushpa's maternal grandfather.

So the required family tree is:



Hence, 'Cousin sister ' is the correct answer.

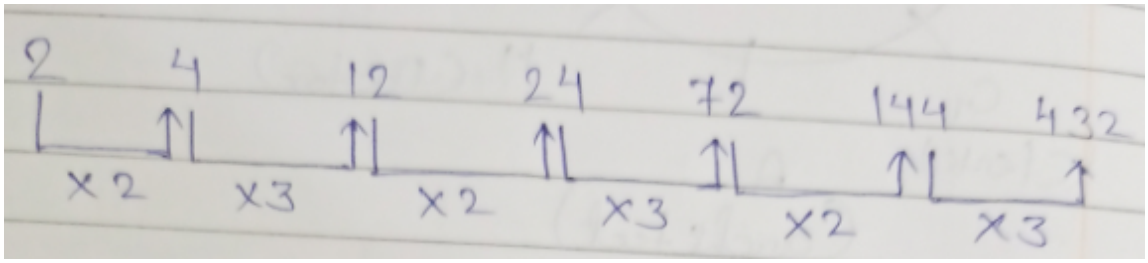
Que. 81 Which of the following pairs of number follow the numbers in the series 2,4 ,12 , 24, 72 , ___, ___ ?

1. 144,432
2. 288,332
3. 332,288
4. 432,144

Testbook Solution Correct Option - **1**

Logic: In the given series the alternately multiply of 2 and 3 to get the next term.

The pattern followed here is:



Hence, '144, 432' is the correct answer.

Que. 82 P, Q , R,S ,T and U are sitting in two rows , three in each row facing each other .

* R is second to the left of P .
* Q and T are facing each other .
* S and P diagonally opposite to each other
* Q is not a neighbour of R .

Which of the following sitting in a row ?

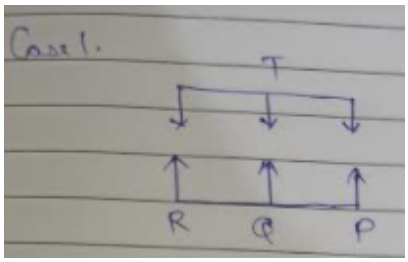
1. P, Q, R
2. P, U, S
3. U, T, S
4. P, T, R

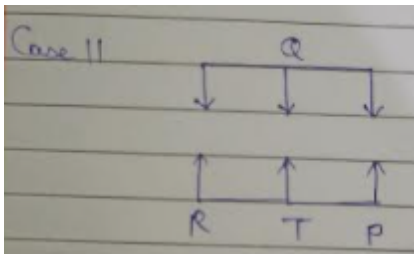
Testbook Solution Correct Option - **4**
Given,

P, Q, R, S, T and U are sitting in two rows, three in each row facing each other.

1) R is second to the left of P.
2) Q and T are facing each other.

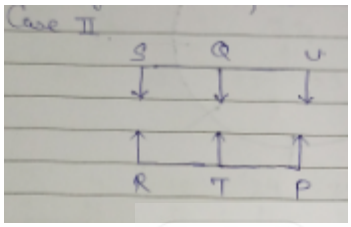
By these two statements, we find 2 cases.





3) S and P diagonally opposite to each other.
4) Q is not a neighbour of R.

From these two statements, we can eliminate the case (I) and continue with case (II) so the final arrangement is:



Hence, 'PTR' is the correct answer.

Que. 83 Three are six teacher A, B, C, D , E and F in a school, Each teacher has to teach two subjects, one compulsory and the other optional. D's optional is History, while three others have it as a compulsory subject, E and F have Physics as one of their subjects, F's compulsory subject in Mathematics, which is an optional subject of both C and E, History and English are A's subject but in term of compulsory and optional subjects, they are reserved of D's Chemistry is an optional subject of one of the teachers. There is only one female teacher, who has English as her compulsory subject.
What is compulsory subject of B?

1. Physics
2. Chemistary
3. Englilsh
4. History

Testbook Solution Correct Option - **4**
Given,

Three are six teachers A, B, C, D, E and F in a school, Each teacher has to teach two subjects, one compulsory and the other optional.

1)D's optional is History, while three others have it as a compulsory subject, E and F have Physics as one of their subjects.

2) F's compulsory subject in Mathematics, which is an optional subject of both C and E, History and English are A's subject but in term of compulsory and optional subjects, they are reserved of D's.

3)Chemistry is an optional subject of one of the teachers. There is only one female teacher, who has English as her compulsory subject.

The given information is summarised in a table as follows :

Teachers	Compulsory Subject	Optional Subject
A	History	English
B	History	Chemistry
C	History	Mathematics
D	(Female) English	History
E	Physics	Mathematics
F	Mathematics	Physics

Hence, 'History' is the correct answer.

Que. 84 Who among the following , has chemistry as a subject?

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

Testbook Solution Correct Option **- 2**

Given,

Three are six teachers A, B, C, D, E and F in a school, Each teacher has to teach two subjects, one compulsory and the other optional.

1)D's optional is History, while three others have it as a compulsory subject, E and F have Physics as one of their subjects.

2) F's compulsory subject in Mathematics, which is an optional subject of both C and E, History and English are A's subject but in term of compulsory and optional subjects, they are reserved of D's.

3)Chemistry is an optional subject of one of the teachers. There is only one female teacher, who has English as her compulsory subject.

The given information is summarised in a table as follows :

Teachers	Compulsory Subject	Optional Subject
A	History	English
B	History	Chemistry
C	History	Mathematics
D	(Female) English	History
E	Physics	Mathematics
F	Mathematics	Physics

Hence, 'B' is the correct answer.

Que. 85 Which of the following group of teacher has History as the compulsaory subject?

1. B , C and D
2. C and D
3. A, B and C
4. A,C and D

Testbook Solution Correct Option **- 3**

Given,

Three are six teachers A, B, C, D, E and F in a school, Each teacher has to teach two subjects, one compulsory and the other optional.

1)D's optional is History, while three others have it as a compulsory subject, E and F have Physics as one of their subjects.

2) F's compulsory subject in Mathematics, which is an optional subject of both C and E, History and English are A's subject but in term of compulsory and optional subjects, they are reserved of D's.

3)Chemistry is an optional subject of one of the teachers. There is only one female teacher, who has English as her compulsory subject.

The given information is summarised in a table as follows :

Teachers	Compulsory Subject	Optional Subject
A	History	English
B	History	Chemistry
C	History	Mathematics
D	(Female) English	History
E	Physics	Mathematics
F	Mathematics	Physics

Hence, 'A, B and C' is the correct answer.

Que. 86 Disregrading which is compulsory or optional subject , who has the same two subject combination as that of F ?

1. B
2. E
3. D
4. A

Testbook Solution Correct Option - **2**

Given,

Three are six teachers A, B, C, D, E and F in a school, Each teacher has to teach two subjects, one compulsory and the other optional.

1)D's optional is History, while three others have it as a compulsory subject, E and F have Physics as one of their subjects.

2) F's compulsory subject in Mathematics, which is an optional subject of both C and E, History and English are A's subject but in term of compulsory and optional subjects, they are reserved of D's.

3)Chemistry is an optional subject of one of the teachers. There is only one female teacher, who has English as her compulsory subject.

The given information is summarised in a table as follows :

Teachers	Compulsory Subject	Optional Subject
A	History	English
B	History	Chemistry
C	History	Mathematics
D	(Female) English	History
E	Physics	Mathematics
F	Mathematics	Physics

Hence, 'E' is the correct answer.

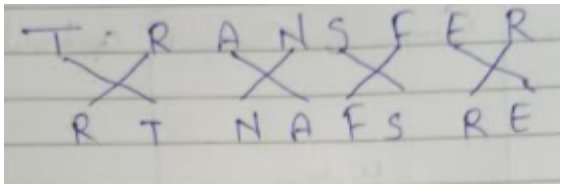
Que. 87 If TRANSFER is coded as RTNAFSRE , then ELEPHANT would be coded as ?

1. LEPEHATN
2. LEPEAHTN
3. LEEPAHTN
4. LEPEAHNT

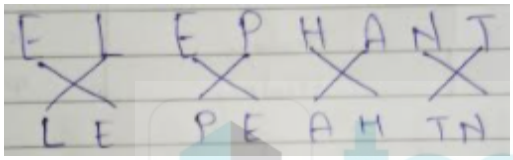
Testbook Solution Correct Option **- 2**
The positions of the letters according to the English alphabet series:

Alphabets	A	B	C	D	E	F	G	H	I	J	K	L	M
Positional value	1	2	3	4	5	6	7	8	9	10	11	12	13
Positional value	26	25	24	23	22	21	20	19	18	17	16	15	14
Alphabets	Z	Y	X	W	V	U	T	S	R	Q	P	O	N

The pattern followed here is :



Similarly,

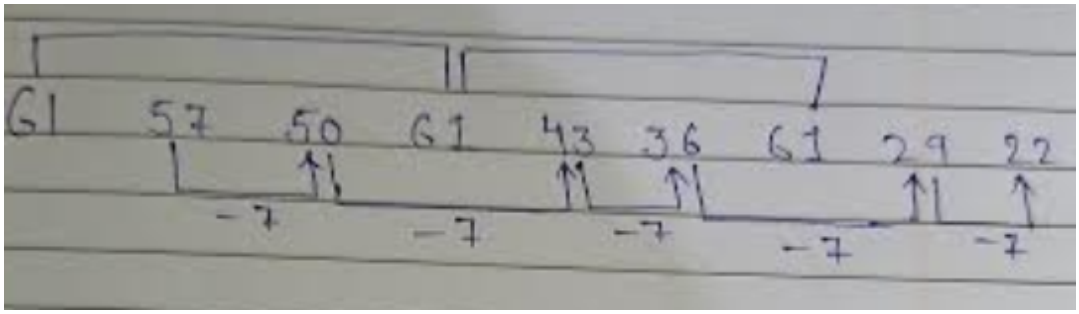


Hence, 'LEPEAHTN' is the correct answer.

Que. 88 Which two of the following numbers comes next in the following sequence ? 61, 57 , 50 , 61, 43 , 36 , 61 .....

1. 29,61
2. 29,20
3. 29,22
4. 31,61

Testbook Solution Correct Option **- 1**
Logic: In the given series 61 is repeat after two numbers and the difference between the number is 7.
The pattern followed here is :



Hence, '29,22' is the correct answer.

Que. 89

How many minimum number of colors will be required to paint all the sides of a cube without the adjacent sides having the same colors ?

1. 3
2. 4
3. 5
4. 6

Testbook Solution Correct Option **- 1**

⇒ Cube contains 6 faces

Any pair of two faces which are opposite can have same colour

Hence minimum no of colours required = 6/2

⇒ 3

Que. 90 In the following sequence , which pair of number fill in the blanks ?

1, 1, 3 , 2 , 8, 5 , 21 , 13 ___ , ____

1. 54,33
2. 34,55
3. 55,34
4. 33,54

Testbook Solution Correct Option **- 3**

The fibonacci series is:

1, 1, 2, 3, 5, 8, 13, 21, 34, 54.....

Similarly, the given series is Febonacci but the adjacent terms are interchanged with each other.

So the required series is:

1, 1, 3, 2, 8, 5, 21, 13, **55, 34**

Hence, '55,34' is the correct answer.

Que. 91 Which one of the following boolean algebraic rule is correct?

1. A .A'=1
2. A+AB=A+B
3. A+A'B = A+B
4. A(A+B)+B

Testbook Solution Correct Option **- 3**

The Correct Answer is **A+A'B = A+B**.

- **A+A'B = A+B**
- **First, take Left Hand Side(LHS),**
- **A + A'B = A.1 + A'B**

= A.(1+B)+A'B

= A.1+A.B+A'B

= A + B.(A+A')

= A + B.1

= A + B

- Hence, Left Hand Side(LHS) is equal to Right Hand Side(RHS).
- To help minimise the number of logic gates required to perform a specific logic operation, a set of rules or Laws of Boolean Algebra expressions were invented to result in a collection of functions or theorems widely known as the **Laws of Boolean Algebra.**

Que. 92 The representation of a floation point binary number +1001.11 in 8 -bit fraction and 6-bit exponent formate is

1. Fraction : 01001110 exponent : 000100
2. Fraction : 00001001 exponent : 000011
3. Fraction : 10010000 exponent : 110000
4. Fraction: 00100100 exponent :011000

Testbook Solution Correct Option **- 1**

Data:

6-bit exponent

8 -bit fraction

Calculation:

Since +1001.11 is positive the sign bit = 1

$(1001.11)_2 = (0.\mathbf{100111}) \times 2^{\mathbf{4}} = (0.10011100) \times 2^4$

Fraction : $(1001110)_2 = (01001110)_2$

Exponent = $(4)_{10} = (100)_2 = (000100)_2$

Therefore option 1 is correct

Que. 93 Which term is redudent is the expression AB+A'C+BC?

1. BC
2. A'C
3. AB
4. AB + A'C

Testbook Solution Correct Option **- 4**

The Correct Answer is **AB + A'C**.

- The simplification of the boolean expression:
- AB+A'C+BC =

= AB + A'C + BC*1 {as A*1 = A}

= AB + A'C + BC(A + A') {as Complement law: A + A' = 1}

= AB + A'C + ABC + A'BC {as Absorption law: A(B + C) = AB + BC & AB = BA}

= AB + ABC + A'C + A'CB {as Commutative Law: A + B = B + A & AB = BA}

= AB*1 + ABC + A'C*1 + A'CB {as A*1 = A}

= AB(1 + C) + A'C(1 + B) {as AB + BC = A(B + C)}

= AB*1 + A'C*1 {as 1 + A = 1}

= AB + A'C {as A*1 = A}

Que. 94

Let the memory access time is 10 milliseconds and cache miss ratio 15% .The effective memory access time is ?

1. 2 milli seconds
2. 1.5 milli seconds
3. 1.85 micro seconds
4. 1.85 milli seconds

Testbook Solution Correct Option **- 2**

Data:

Cache

Cache = T_1 = 0 ms (since not mention)

Hit ratio = 15%

Hit ratio = 100% - 15% = 85% = 0.85

Miss ratio = 1 – 0.85 = 0.15

Main memory

Main memory = T_2 = 10 ms

Formula:

Average memory access time = $T_{avg} = H_1T_1 + (1- H_1)(T_1 + T_2)$

$T_{avg} = T_1 + (1- H_1)(T_2)$

Calculation:

$T_{avg} = 0 + (1- 0.85)(10)$

$\therefore T_{avg}$ = 1.5 milli seconds

Que. 95 Which of the following is the representation of decimal number (- 147) in 2's compliment notation on a 12-bit machine ?

1. 111101101100
2. 110001001101
3. 111101101101
4. 000001101101

Testbook Solution Correct Option **- 3**

The Correct Answer is **111101101101**.

- Conversion of (-147) to a signed binary in 2's complement representation:
- The positive version of the number: **|-147| = 147**
- Divide the number repeatedly by 2 to get the binary form of (147): We stop when we get a quotient that is equal to zero.
- We will get the binary number: $147_{(10)} = 10010011_{(2)}$
- The Positive binary computer representation on 16 bits (2 Bytes): Add extra 0's in front (to the left) of the base 2 number, up to the required length, 16: $147_{(10)} = 0000000010010011$
- Get the negative integer number representation on 16 bits: !(0000000010010011) = 1111111101101100
- To get the negative integer number representation on 16 bits (2 Bytes), the signed binary two's complement, add 1 to the number calculated above: 1111111101101100 + 1 = 1111111101101101
- **$-147_{(10)} = 1111111101101101$**

Que. 96 The first instructor of bootstrap loader program of an operating system is stored in _____.

1. RAM

2. Hard Disk
3. BIOS
4. None

Testbook Solution Correct Option **- 3**
The Correct Answer is **BIOS**.

Key-Points

- The first instructor of the bootstrap loader program of an operating system is stored in **BIOS(Basic Input/Output System).**
- **The bootstrap loader** is a programme that resides on the EPROM, ROM or other non-volatile memory of the machine.
- It is executed by the processor automatically when the device is turned on. To continue installing the computer's operating system, the bootstrap loader reads the boot sector of the hard drives.
- The bootstrap loader first conducts the power-on self-test, also referred to as POST, when the machine is switched on or restarted.
- The bootstrap loader loads the operating system for the machine into memory if the POST is successful and no problems are found.
- It is then possible for the machine to access, load, and operate the operating system.
- In computers that have an **EFI (Extensible Firmware Interface)**, the bootstrap loader has been replaced and is now part of the EFI BIOS.

Que. 97 Consider the equation $(40)_x = (132)_y$ in some bases x and y . Then a possible set of values of x and y are

1. 8 and 12
2. 12 and 8
3. 6 and 12
4. 12 and 6

Testbook Solution Correct Option **- 1**
Concept:
$(ABCD)_a = D^* a^0 + C^* a^1 + B^* a^2 + A^* a^3$
Calculation:
$(40)_x = (132)_y$
$\Rightarrow 0 \times x^0 + 4 \times x^1 = 2 \times y^0 + 3 \times y^1 + 1 \times y^2$
$\Rightarrow 4x = 2 + 3y + y^2$
$\Rightarrow 4x - 2 = 3y + y^2$
All options are wrong

Que. 98 The smallest integer that can be represented by an 8- bit number in 2's complement form is

1. -256
2. -128
3. 127
4. -255

Testbook Solution Correct Option **- 2**

The Correct Answer is **-128**.

- The smallest integer that can be represented by an **8- bit number in 2's complement form** is **-128.**
- The sign bit is the most important bit.
- **00000001 is +1**, a number which is positive.
- So, the range of 8-bit complement numbers of two is -128 to 127, since 128 is not representable (it would be 10000000, but the sign bit rule says that would be a negative number).
- **10000000** is the most negative figure.
- The leading 1 tells you it is negative, and you flip all the bits (011111111) to get the magnitude of the number, then add one (10000000 = 128).
- So **-128 is the resulting number.**

Additional Information

- The range of numbers that can be represented by n-bits in 2's complement form is
- **$(-2)^{n-1}$ to (2^{n-1}) -1**
- Hence, here the smallest number is **$(-2)^7$ = -128.**

Que. 99 Which of the following is a functionally complete set of gates?

(i) NAND (ii) NOR

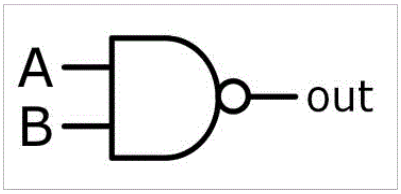
1. I but not II
2. II but not I
3. Neither I not II
4. Both I and II

Testbook Solution Correct Option **- 1**

The Correct Answer is **I but not II**.

- **NAND gate** is a functionally **complete set of gates.**
- In the logic gate, a functionally complete collection of logical connectives or Boolean operators is one which can be used to express all possible truth tables by combining members of the set into a Boolean expression.
- A well-known complete set of connectors is {AND, NOT} and each of the singleton sets {NAND} is functionally complete, consisting of binary conjunction and negation.
- A NAND gate is a logic gate that generates a false output only if all its inputs are valid, so its output is complementary to that of an AND gate.
- A low output only results if all the inputs to the gate are high; a high output results if any input is low.

Key-Points



Input A	Input B	Output
0	0	1
0	1	1
1	0	1

‖1 ‖1 ‖0 ‖

Que. 100 The total number of binary function that can be defined using n boolean variable is _____.

1. $2^n - 1$
2. 2^n
3. 2^{n+1}
4. None

Testbook Solution Correct Option **- 2**

The Correct Answer is **2^n**.

Key-Points

- The total number of binary function that can be defined using n boolean variable is **2^n.**
- **Statement:**
  - Suppose two sets are set **'A' = {1, 2, 3, 4, ……., n}**
  - where each number will be either '0' or '1'
  - So, the total number of boolean variable possible = 2^n
  - **Set 'B' = {0, 1}**
  - Now the number of possible boolean functions from set 'A' to 'B' will be 2^(2^n).
- **Explanation:**
  - As we know that, the boolean variable is either '0' or '1' and there are 'n' numbers in the set 'A' and each number is either '0' or '1' and thus the total number of possible boolean variable is **2^n.**

Que. 101 **Directions: Read the following passage and answer the questions.**

Anthropologists have placed together with the little they know about the history of left-handedness and right -hand handedness from indirect evidence. Though early men and women did not leave a written record, they did leave tool bones and pictures. Stone Age hand axes and hatches made from stone that was carefully chipped away made from sharp cutting edges. In some, the pattern of chipping shows that these tools and weapons were made by right-handed people, designed to fit comfortably into a right hand. Other Stone Age implements were made by or for the left-hander. Prehistoric pictures, painted on walls of caves, provided further clues to the handedness of ancient people. A right-hander finds it easier to draw faces of people and animals facing towards the left whereas a left-hander finds it easier to draw faces towards the right. Both kinds of faces have been found in ancient paintings. On the whole, the evidence seems to indicate that prehistoric people were either ambidextrous or about equally likely to be left or right-handed. But in the Bronze Age, the picture changed. The tools and weapons found from that Period are mostly made for right-handed use. The predominance of right-handedness among humans today had apparently already been established.

What is the main idea conveyed through the passage ?

1. The picture of ancient implements
2. The significance of prehistoric cave paintings
3. The history of right-handedness and left-handedness
4. The pattern of chipping ancient tools

Testbook Solution Correct Option **- 3**

The correct answer is **'The history of right-handedness and left-handedness'.**

Key-Points

- The given passage is about **'right-handedness and left-handedness'.**
- The first line of the given passage is *"Anthropologists have placed together with the little they know about the history of left-handedness and right-handedness from indirect evidence."*
- As the opening sentence shows and as the passage also proceeds, we are given a historical picture of the evolution or development of right-handedness which ends with the last line talking about how today's dominance of right-handedness came to be.

Hence, the correct answer is Option 3

Que. 102 Which of the following developments occurred around the time of the Bronze Age?

1. The establishment of written records
2. A change in the styles of cave painting
3. An increase in human skill in the handling of tools
4. The prevalence of right-handedness

Testbook Solution Correct Option **- 4**
The correct answer is **'The prevalence of right-handedness'.**

Key-Points

- The given passage is about **'Left-handedness and Right-handedness'.**
- The last 3 lines of the given passage: "*But in the Bronze Age, the picture changed. The tools and weapons found from that Period are mostly made for right-handed use. The predominance of right-handedness among humans today had apparently already been established.*"
- Therefore, the correct answer is **Option 4.**

Hence the correct answer is Option 4

Que. 103 What does the word **"picture"** mentioned with reference to the Bronze Age mean?

1. Faces of animals and people
2. People's view from inside the cave
3. People's tendency to work with either hand
4. The kinds of paint used on cave walls

Testbook Solution Correct Option **- 3**
The correct answer is **'People's tendency to work with either hand'.**

Key-Points

- The given passage is about **'Left-handedness and Right-handedness'.**
- In the given question the word ***'Picture'*** is used **figuratively**. The meaning of the word 'Picture' here is as follows:
  - Picture: (an idea of) a situation
    Example: After watching the news, I had a clearer picture of what was happening.

- Here, the word '***Picture***' refers to **People's tendency to work with either hand.**

Hence the correct answer is Option 3

Additional Information

- **Bronze age:** the time in the past when tools and weapons were made of bronze (a brown metal made of copper and tin) before iron was discovered.

Que. 104 According to the passage, a person who is right-handed is more likely to draw people and animals that are facing

1. Upwards
2. Downwards
3. Towards the right
4. Towards the left

Testbook Solution Correct Option **- 4**
The correct answer is **'Towards the left'.**

Key-Points

- The given passage is about **'Left-handedness and Right-handedness'.**
- The 7th line of the passage is: *'A right-hander finds it easier to draw faces of people and animals facing towards the left whereas a left-hander finds it easier to draw faces towards the right.'*

Thus the correct answer is Option 4

Additional Information

- **Stone Age:** the early period in human history when people made tools and weapons only out of stone.

Que. 105 What is the indirect evidence through which the preferred handedness of the Stone Age people could be understood?

1. Petrified forms of vegetation
2. Patterns of stone chipping
3. Fossilized waste material
4. Fossilized footprints

Testbook Solution Correct Option **- 2**
The correct answer is **'Patterns of stone chipping'.**

Key-Points

- The given passage is about **'Left-handedness and Right-handedness'.**
- The second and third lines of the given passage talks about how **Stone Age people** used **hand axes and how they made them.**
- It also talks about how stones that were carefully chipped away made from sharp cutting edges.

- Therefore, **Patterns of stone chipping** is the indirect evidence through which the preferred handedness of the Stone Age people could be understood.
- Therefore, the correct answer is **Option 2.**

Correct Answer: *Patterns of stone chipping.*

Additional Information

- The meaning of '**Anthropologist**' is someone who scientifically studies humans and their customs, beliefs, and relationships.
  - *Example: This group tends to include sociologists, social psychologists, and **anthropologists.***
- **Fossilized -** to turn into rock or to make (part of) an animal or plant turn into rock over thousands of years
- **Petrified -** a special type of fossilized remains of terrestrial vegetation. **Petrifaction** is the result of a tree or tree-like plants having been replaced by stone via a mineralization process that often includes permineralization and replacement

Que. 106 Which of the following refers to the idiom

Under the Sun

1. Things that are unnatural
2. A large number of things
3. A few things
4. Something

Testbook Solution Correct Option **- 2**
The correct answer is **'A large number of things'.**

Key-Points

- **Under the sun:** on earth; in existence (used in expressions emphasizing a large number of something).
  - *Example: I've tried everything **under the sun** to fix this lock, but I just can't get it to work.*

Thus are correct answer is Option 2

Additional Information

- The other idioms from the word **'Under':**
  - **Under the weather:** If someone is or feels under the weather, they fell ill.
    *Example: I'm feeling a bit **under the weather** - I think I'm getting a cold.*
  - **Under someone's breath**: quietly so that other people cannot hear exactly what you are saying.
    *Example: He muttered something **under his breath.***
  - **Under your own steam**: If you do something under your own steam, you do it without help.
    *Example: Do you want a lift or will you get there **under your own steam?***

Que. 107 Choose a phrasal verb to replace the explanation in brackets:

When we arrive at the station, we (descend from) _____ the train.

1. get down

2. stand down
3. get off
4. stand out

Testbook Solution Correct Option **- 3**
The correct answer is **'get off'.**

Key-Points

- **Descend from:** to pass from a higher place or level to a lower one descended from the platform.
  - *Example: The airplane will **descend from** a lower altitude soon to an upper altitude.*
- **Get off:** to leave a train, bus, or aircraft.
  - *Example: I tripped as I **got off** the bus.*

Thus the complete sentence is: *When we arrive at the station, we **get off** the train.*

Additional Information

- The meaning of the other Phrasal Verb as follows:
  - **Get down to sth:** to start to direct your efforts and attention towards something
    *Example: I've got a lot of work to do, but I can't seem to **get down to it.***
  - **Stand down:** to give up your official job or position
    *Example: He's decided to **stand down** after 15 years as managing director.*
  - **Stand out:** to be very noticeable
    *Example: The black lettering really **stands out** on that orange background.*

Que. 108 **Choose the suitable word from the following and fill in the blank:**
The medal was awarded for the student's _____ conduct and courage

1. non receptive
2. exemplary
3. unreliable
4. disputable

Testbook Solution Correct Option **- 2**
The correct answer is **'exemplary'.**

Key-Points

- **Exemplary:** very good and suitable to be copied by other people
  - *Example: His tact was **exemplary,** especially considering the circumstances.*
- By reading the above explanation we find that the correct answer is **Option 2.**

Thus the complete sentence is: *The medal was awarded for the student's **exemplary** conduct and courage*

Additional Information

- The meaning of the other words given in the option as follows:
  - **Non-receptive:** not responsive or receptive to an unreceptive audience

*Example: Some members of the committee were **non-receptive** to the idea.*

- **Unreliable:** not able to be trusted or believed
  *Example: The bus service is **unreliable.***
- **Disputable:** not certain
  *Example: People say that they produce the best athletes in the world, but I think that's **disputable.***

Que. 109 Which of the following is a correctly spelt word ?

1. Hiderence
2. Hindrence
3. Hindarrence
4. Hindrance

Testbook Solution Correct Option **- 4**
The correct answer is **'Hindrance'.**

Key-Points

- **Hindrance**: something that makes it more difficult for you to do something or for something to develop
  - *Example: I've never considered my disability a hindrance, but other people have.*

Hence, the correct answer is Option 4.

Additional Information

- **Synonyms of 'Hindrance':** *Impediment, Obstacle, Barrier, Hurdle, Bar*

Que. 110 **Which of following statements is grammatically correct?**

1. The Earth revolves around the Sun
2. I have not seen him since four years
3. She met an one-eyed man
4. One of the books borrowed by the students are famous

Testbook Solution Correct Option **- 1**
The correct answer is **'The Earth revolves around the Sun'.**

Key-Points

- The grammatically correct Option is The earth revolves around the sun.
- In **option 2, 'since'** is used wrongly because with numbers and/or exact timelines like **'one, two, or three' 'for' is used.**
- In **option 3, 'an'** is used wrongly. Here, **'a'** should be used. This is because although 'one-eyed' starts with a vowel, i.e., 'o', the **pronunciation** of the word **'one'** starts with a **consonant sound** *(v)*
- In **option 4 'are'** is used wrongly. Here, **'is'** should be used since it is referring to "***one** of the books..."*

Thus the correct answer is Option 1

Que. 111 **Choose the set of words from among the alternatives given, which when inserted in the sentence, best suits the meaning of the sentence**

The _____ of evidence was on the side of the plaintiff since all but one witnesses testified that his story was ____

1. paucity, accurate
2. prosperity, far-fetched
3. preponderance, correct
4. accuracy, insufficient

Testbook Solution Correct Option **- 3**
The correct answer is **'preponderance, correct'.**

Key-Points

- **"All but one"** means **Everything or everyone except**
- If we carefully go through the complete sentence, we can clearly figure out that words filling both the blanks have to be in agreement with or justifying each other as the two parts of the sentence are connected by **'since'**
- Now, let's go through the meanings of each word pairs given:
  - **Paucity:** the fact that there is too little of something; **Accurate:** correct, exact, and without any mistakes. Hence, this pair of words would make the sentence inconsistent
  - **Prosperity:** the state of being successful and having a lot of money; **Far-fetched:** very unlikely to be true, and difficult to believe. Hence, this pair of words would make the sentence inconsistent. Also, **prosperity** is not a semantically correct adjective for the word **'evidence'**
  - **Preponderance:** the largest part or greatest amount; **Correct:** in agreement with the true facts or with what is generally accepted. Hence, this pair makes the sentence consistent
  - **Accuracy:** the fact of being exact or correct; **Insufficient:** not enough. Hence, this pair of words would make the sentence inconsistent.

Thus, the complete sentence is: *The **preponderance** of evidence was on the side of the plaintiff since all but one witnesses testified that his story was **correct***

Que. 112 Choose the one which is nearest in meaning to the phrase **"TURN UP"**

1. Show up
2. Some up
3. Land up
4. Crop up

Testbook Solution Correct Option **- 1**
The correct answer is **'Show up'.**

Key-Points

- **Turn up:** If something or someone that you have been looking for turns up, you find them unexpectedly
  - *Example: The missing letter eventually **turned up** inside a book.*
- **Show up:** to appear or be seen
  - *Example: The virus does not **show up** in blood tests.*

Thus the correct answer is Option 1

Additional Information

- The meaning of the other phrasal verbs given in the option as follows:
  - **Crop up:** to happen or appear unexpectedly
    *Example: Her name keeps **cropping up** in conversation.*
  - **Land up:** to finally be in a particular place, state, or situation, especially without having planned it
    *Example: He'll **land up** in the hospital if he carries on drinking like that.*

Que. 113 The phrase **"Ready to believe"** means

1. Credulous
2. Creditable
3. Credible
4. Incredible

Testbook Solution Correct Option **- 1**
The correct answer is **'Credulous'.**

Key-Points

- **Credulous:** too willing to believe what you are told and so easily deceived
  - *Example: In a **credulous** system, both conclusions would be acceptable, whereas in a skeptical system neither of them would.*

Thus the correct sentence is Option 1

Additional Information

- The meaning of the other words given in the option as follows:
  - **Creditable:** deserving praise, trust, or respect
    *Example: Our team came in a **creditable** third in the competition.*
  - **Credible:** able to be believed or trusted.
    *Example: They haven't produced any **credible** evidence for convicting him.*
  - **Incredible:** impossible, or very difficult, to believe
    *Example: The latest missiles can be fired with **incredible** accuracy.*

Que. 114 **Choose the appropriate word from among the choices to fill in the blank in sentence**
"If you drink too much, it will _____ your judgment."

1. impair
2. impede
3. impose
4. impel

Testbook Solution Correct Option **- 1**
The correct answer is **'impair'.**

Key-Points

- **Impair:** to spoil something or make it weaker so that it is less effective
    - Example: A recurring knee injury may have impaired his chances of winning the tournament.

Thus the correct answer is Option 1

Additional Information

- The meaning of the other words given in the option as follows:
    - **Impede:** to make it more difficult for something to happen or more difficult for someone to do something
        *Example: Although he's shy, it certainly hasn't **impeded** his career in any way.*
    - **Impose:** to officially force a rule, tax, punishment, etc. to be obeyed or received
        *Example: Judges are **imposing** increasingly heavy fines for minor driving offenses.*
    - **Impel:** to make someone feel that they must do something
        *Example: I wonder what it is that **impels** him to exercise all the time.*

Que. 115 Choose the set of words for each blank that best fits the meaning of the following sentence as a whole

_____ green and black tea are obtained from the same plant, there are quite a few significant differences _____ them.

1. Since, among
2. However, in
3. Though, between
4. Because, across

Testbook Solution Correct Option - **3**
The correct answer is **'Though, between'.**

Key-Points

- The correct usage of the given fill in the blanks as follows:
- The usage of **'Though'**: It is often used to describe a ‘contrasting’ situation, in which the speaker is aware that it is contradictory, however both parts remain true.
- The meaning of it is **'despite the fact that'.**
- As conjunction, we can use it towards the beginning of the sentence, at the end of the sentence, etc.
    - *Example:*
        ***Though** Malta is a very small island, its history is long and rich.*
        *I already ate. Thanks, **though!***

Thus the correct answer is Option 3

Que. 116 Choose the correct alternative which can be substituted for the given word/sentence

A person who travels to a sacred place as an act of religious devotion

1. Hermit
2. Pilgrim
3. Saint
4. Mendicant

Testbook Solution Correct Option **- 2**
The correct answer is **'Pilgrim'.**

Key-Points

- **Pilgrim:** a person who makes a journey, often a long and difficult one, to a special place for religious reasons
  - *Example: All were silent, only the **pilgrim** woman went on in measured tones, drawing in her breath.*

Thus the correct answer is Option 2

Additional Information

- The meaning of the other words given in the options as follows:
  - **Hermit:** a person who lives alone and apart from the rest of society, especially for religious reasons
    *Example: The town derives its name from a **hermit** who lived here in the 7th and 8th centuries.*
  - **Saint:** a person acknowledged as holy or virtuous and regarded in Christian faith as being in heaven after death
    *Example: This place is dedicated to a seventh-century **saint.***
  - **Mendicant:** someone, especially a member of a religious group, who lives by asking people they do not know for money
    *Example: She abandoned her job and her career, and lived as a homeless **mendicant** on the streets of Philadelphia.*

Que. 117 Pick out the most effective word from the given words to fill in the blanks to make the sentence meaningfully complete

Some people _____ themselves into believing that they are indispensable to the organization they work for

1. keep
2. fool
3. delude
4. denigrate

Testbook Solution Correct Option **- 3**
The correct answer is **'delude'.**

Key-Points

- **Delude:** to make someone believe something that is not true
  - *Example: He's **deluding** himself if he thinks he's going to be promoted this year.*
- **Meanings of other words:**
  - **keep -** retain; stay
  - **fool** - idiot; halfwit; deceive; trick
  - **denigrate -** disparage; belittle; diminish

Thus the correct answer is Option 3

Additional Information

- Some verbs are proceeded by a reflexive pronoun (like 'themselves'). These verbs are: **Average, revenge, present, absent, pride, adjust, acquit, reconcile, kill, prepare, enjoy, introduce, teach, delude, and apply.**

Que. 118 Fill in the blanks with the appropriate phrase to make the sentence meaningfully complete

_____ bad weather, the trip will be postponed to next week.

1. In case
2. In case of
3. In case to
4. In case from

Testbook Solution Correct Option **- 2**
The correct answer is **'In case of'.**

Key-Points

- We use **'in case of' + noun** to mean **'if and when something happens'**
  - *Example: **In case of** breakdown, please press the alarm button and call this number.*

Thus the complete sentence is: *"In case of bad weather, the trip will be postponed to next week."*

Mistake Point

- We tend to go for **Option 3 or Option 4** but it would be wrong because **'In case' does not take prepositions 'to' and 'from'** with it.

Additional Information

- The usage of 'In case':
- **'In case' is used either as a conjunction or an adverb.**
  - **In case:** We use in case to talk about things we should do in order to be prepared for possible future situations

    *Example: **In case** I forget later, here are the keys to the garage. **(conjunction)***
    *Example: She knows she's passed the oral exam, but she doesn't want to say anything just **in case. (adverb)***

Que. 119 In the following sentence, choose the most suitable one word for the expression

"A book containing summarized information on all branches of knowledge"

1. Dictionary
2. Anthology
3. Encyclopedia
4. Ethnology

Testbook Solution Correct Option **- 3**
The correct answer is **'Encyclopedia'.**

Key-Points

- **Encyclopedia:** a book or set of books containing many articles arranged in alphabetical order that deal either with the whole of human knowledge or with a particular part of it, or a similar set of articles on the internet
    - *Example: A special subgroup, possibly the most important for the study of science and philosophy, are the tripartite **encyclopedias.***

Thus the correct answer is Option 3

Additional Information

- The meaning of the other words given in the options as follows:
    - **Dictionary:** a book that contains a list of words in alphabetical order and explains their meanings, or gives a word for them in another language; an electronic product giving similar information on a computer, smartphone, etc.
        *Example: Our online **dictionary** is regularly updated with new entries.*
    - **Anthology:** a collection of artistic works that have a similar form or subject, often those considered to be the best
        *Example: This Bob Dylan **anthology** includes some rare recordings of his best songs.*
    - **Ethnology:** the study of different societies and cultures
        *Example: The scientist went into the field of **ethnology** so that he could study different Asian cultures.*

Que. 120 Pick out the most effective word from the given words to fill in the blanks to make the sentence meaningfully complete

The man was about to move his bike into the compound of his apartment when a passer-by _____ down the motorcycle.

1. Forced
2. Fell
3. Turned
4. Knocked

Testbook Solution Correct Option **- 4**
The correct answer is **'Knocked'.**

Key-Points

- We know that **'Knocked down'** is a phrasal verb. Its meaning as follows:
- **Knocked Down:** (especially of a vehicle) strike or collide with someone so as to cause them to fall to the ground
    - *Example: I was nearly **knocked down** by a bus.*

Thus the complete sentence is: *The man was about to move his bike into the compound of his apartment when a passer-by **knocked** down the motorcycle.*

Additional Information

- Meaning of other options and/or phrasal verbs:

Fell down	To fall from a height
Turned down	To decline or reject
Forced down	To overpoweringly push or shove through

- The other Phrasal Verbs/Idioms of the word **'Knock'.**
  - **Knock the bottom out of sth:** to damage something severely, especially by destroying its support
    Example: The rise in mortgage rates really ***knocked the bottom out of the housing market.***
  - **Knock up:** Players knock up before beginning a game of tennis or similar sport by hitting the ball to each other
    Example: The players have a couple of minutes to ***knock up*** *before the match starts.*
  - **Knock sth over:** to hit or push something, especially accidentally, so that the thing falls to the ground or onto one side
    Example: I ***knocked a bottle of wine over*** *when I reached across the table.*

120 Questions

Que. 1	Correct Option - 1
Que. 2	Correct Option - 2
Que. 3	Correct Option - 2
Que. 4	Correct Option - 1
Que. 5	Correct Option - 1
Que. 6	Correct Option - 1
Que. 7	Correct Option - 4
Que. 8	Correct Option - 3
Que. 9	Correct Option - 2
Que. 10	Correct Option - 1
Que. 11	Correct Option - 1
Que. 12	Correct Option - 2
Que. 13	Correct Option - 1
Que. 14	Correct Option - 3
Que. 15	Correct Option - 1
Que. 16	Correct Option - 4
Que. 17	Correct Option - 4
Que. 18	Correct Option - 3
Que. 19	Correct Option - 2
Que. 20	Correct Option - 3
Que. 21	Correct Option - 1
Que. 22	Correct Option - 4
Que. 23	Correct Option - 1
Que. 24	Correct Option - 3
Que. 25	Correct Option - 2

Que. 26	Correct Option - 4
Que. 27	Correct Option - 3
Que. 28	Correct Option - 2
Que. 29	Correct Option - 1
Que. 30	Correct Option - 4
Que. 31	Correct Option - 2
Que. 32	Correct Option - 4
Que. 33	Correct Option - 3
Que. 34	Correct Option - 2
Que. 35	Correct Option - 1
Que. 36	Correct Option - 1
Que. 37	Correct Option - 3
Que. 38	Correct Option - 2
Que. 39	Correct Option - 4
Que. 40	Correct Option - 1
Que. 41	Correct Option - 1
Que. 42	Correct Option - 4
Que. 43	Correct Option - 1
Que. 44	Correct Option - 2
Que. 45	Correct Option - 4
Que. 46	Correct Option - 2
Que. 47	Correct Option - 1
Que. 48	Correct Option - 2
Que. 49	Correct Option - 1
Que. 50	Correct Option - 4
Que. 51	Correct Option - 4

Que. 52	Correct Option - 3
Que. 53	Correct Option - 3
Que. 54	Correct Option - 4
Que. 55	Correct Option - 2
Que. 56	Correct Option - 2
Que. 57	Correct Option - 1
Que. 58	Correct Option - 2
Que. 59	Correct Option - 4
Que. 60	Correct Option - 2
Que. 61	Correct Option - 1
Que. 62	Correct Option - 3
Que. 63	Correct Option - 4
Que. 64	Correct Option - 4
Que. 65	Correct Option - 2
Que. 66	Correct Option - 2
Que. 67	Correct Option - 1
Que. 68	Correct Option - 3
Que. 69	Correct Option - 1
Que. 70	Correct Option - 2
Que. 71	Correct Option - 2
Que. 72	Correct Option - 4
Que. 73	Correct Option - 4
Que. 74	Correct Option - 2
Que. 75	Correct Option - 3
Que. 76	Correct Option - 2
Que. 77	Correct Option - 3
Que. 78	

	Correct Option - 1
Que. 79	Correct Option - 3
Que. 80	Correct Option - 3
Que. 81	Correct Option - 1
Que. 82	Correct Option - 4
Que. 83	Correct Option - 4
Que. 84	Correct Option - 2
Que. 85	Correct Option - 3
Que. 86	Correct Option - 2
Que. 87	Correct Option - 2
Que. 88	Correct Option - 1
Que. 89	Correct Option - 1
Que. 90	Correct Option - 3
Que. 91	Correct Option - 3
Que. 92	Correct Option - 1
Que. 93	Correct Option - 4
Que. 94	Correct Option - 2
Que. 95	Correct Option - 3
Que. 96	Correct Option - 3
Que. 97	Correct Option - 1
Que. 98	Correct Option - 2
Que. 99	Correct Option - 1
Que. 100	Correct Option - 2
Que. 101	Correct Option - 3
Que. 102	Correct Option - 4
Que. 103	Correct Option - 3
Que. 104	

	Correct Option - 4
Que. 105	Correct Option - 2
Que. 106	Correct Option - 2
Que. 107	Correct Option - 3
Que. 108	Correct Option - 2
Que. 109	Correct Option - 4
Que. 110	Correct Option - 1
Que. 111	Correct Option - 3
Que. 112	Correct Option - 1
Que. 113	Correct Option - 1
Que. 114	Correct Option - 1
Que. 115	Correct Option - 3
Que. 116	Correct Option - 2
Que. 117	Correct Option - 3
Que. 118	Correct Option - 2
Que. 119	Correct Option - 3
Que. 120	Correct Option - 4