

Topic:- ME MSC S2

1) If $2 < x^2 < 3$, then the number of positive roots of $\{x^2\} = \left\{\frac{1}{x}\right\}$, (where $\{x\}$ denotes the fractional part of x) is

[Question ID = 10517]

1. 0

[Option ID = 42062]

2. 1

[Option ID = 42063]

3. 2

[Option ID = 42064]

4. 3

[Option ID = 42065]

Correct Answer :-

• 1

[Option ID = 42063]

2) The domain of the function $f(x) = {}^{16-x}C_{2x-1} + {}^{20-3x}C_{4x-5}$, where the symbols have their usual meanings, is the set

[Question ID = 10518]

1. $\{2, 3\}$

[Option ID = 42066]

2. $\{2, 3, 4\}$

[Option ID = 42067]

3. $\{1, 2, 3, 4\}$

[Option ID = 42068]

4. $\{1, 2, 3\}$

[Option ID = 42069]

Correct Answer :-

• $\{2, 3\}$

[Option ID = 42066]

3) If the function $f(x) = \frac{a^x + a^{-x}}{2}$, where $a > 2$, then $f(x+y) + f(x-y)$ is equal to

[Question ID = 10519]

1. $f(x) + f(y)$

[Option ID = 42070]

2. $f(x) - f(y)$

[Option ID = 42071]

3. $f(y)$

[Option ID = 42072]

4. $2f(x)f(y)$

[Option ID = 42073]

Correct Answer :-

• $2f(x)f(y)$

[Option ID = 42073]

4) Let $X_n = \{z = x + iy : |z|^2 \leq \frac{1}{n}\}$ for all integers $n \geq 1$. Then $\bigcap_{n=1}^{\infty} X_n$ is

1. A singleton set
[Option ID = 42074]
2. Not a finite set
[Option ID = 42075]
3. An empty set
[Option ID = 42076]
4. A finite set with more than one element
[Option ID = 42077]

Correct Answer :-

- A singleton set
[Option ID = 42074]

5) If $f: R \rightarrow R$ satisfies
 $f(x+y) = f(x) + f(y), \forall x, y \in R$ and $f(1) = 7$, then $\sum_{r=1}^n f(r)$ is

[Question ID = 10521]

1. $\frac{7n}{2}$
[Option ID = 42078]
2. $\frac{7(n+1)}{2}$
[Option ID = 42079]
3. $7n(n+1)$
[Option ID = 42080]
4. $\frac{7n(n+1)}{2}$
[Option ID = 42081]

Correct Answer :-

- $\frac{7n(n+1)}{2}$
[Option ID = 42081]

6) 64 numbers that are not necessarily distinct, are placed on the squares of a chessboard such that the sum of the numbers in every 2×2 square is 11. The sum of the four numbers in the corners of the board is

[Question ID = 10522]

1. 22
[Option ID = 42082]
2. 11
[Option ID = 42083]
3. 44
[Option ID = 42084]
4. cannot be determined
[Option ID = 42085]

Correct Answer :-

- 11
[Option ID = 42083]

7) A die is thrown $(2n+1)$ times, $n \in N$. The probability that faces with even numbers show odd number of times, is

[Question ID = 10523]

1. $\frac{2n+1}{4n+3}$
[Option ID = 42086]
2. Less than $1/2$
[Option ID = 42087]
3. Greater than $1/2$

Correct Answer :-

- 1/2

[Option ID = 42089]

8) The outcomes of an experiment are represented by points in the square bounded by $x = 0, y = 0, x = 2$ and $y = 2$ in XY plane. If the probability is distributed uniformly, then the probability that $x^2 + y^2 > 1$ is closest to

[Question ID = 10524]

1. 3/4

[Option ID = 42090]

2. 4/5

[Option ID = 42091]

3. 1/2

[Option ID = 42092]

4. 1/6

[Option ID = 42093]

Correct Answer :-

- 4/5

[Option ID = 42091]

9) A number x is chosen from the set $\{1, 2, 3, \dots, 99, 100\}$. If A is the event that the chosen number x satisfies $\frac{x-20}{x-40} \geq 2$, then the probability of the event A is

[Question ID = 10525]

1. 0.2

[Option ID = 42094]

2. 0.25

[Option ID = 42095]

3. 0.6

[Option ID = 42096]

4. 0.4

[Option ID = 42097]

Correct Answer :-

- 0.2

[Option ID = 42094]

10) Let x_1, x_2, x_3 be uncorrelated variables each having the same standard deviation. The coefficient of correlation between $(x_1 + x_2)$ and $(x_2 + x_3)$ is

[Question ID = 10526]

1. 1/4

[Option ID = 42098]

2. 1/3

[Option ID = 42099]

3. 1/2

[Option ID = 42100]

4. 1

[Option ID = 42101]

Correct Answer :-

- 1/2

[Option ID = 42100]



[Question ID = 10527]

1. $p_1 = p_2$
[Option ID = 42102]
2. $p_1 < p_2$
[Option ID = 42103]
3. $p_1 > p_2$
[Option ID = 42104]
4. $p_1 - p_2 = 1/3$
[Option ID = 42105]

Correct Answer :-

- $p_1 > p_2$
[Option ID = 42104]

12) Given that $x \in [0, 1]$ and $y \in [0, 1]$. Let A be the event of (x, y) satisfying $y^2 \leq x$ and B be the event of satisfying $x^2 \leq y$, then

[Question ID = 10528]

1. $P(A \cap B) = 1/3$
[Option ID = 42106]
2. A, B are exclusive
[Option ID = 42107]
3. $P(A) < P(B)$
[Option ID = 42108]
4. $P(B) < P(A)$
[Option ID = 42109]

Correct Answer :-

- $P(A \cap B) = 1/3$
[Option ID = 42106]

13) A triangle is formed with the vertices of n sided regular polygon. Then the probability that the triangle have exactly one side common with the side of the polygon is

[Question ID = 10529]

1. $\frac{6(n-2)(n-3)}{n(n-1)}$
[Option ID = 42110]
2. $\frac{6(n-3)}{(n-1)(n-2)}$
[Option ID = 42111]
3. $\frac{6(n-4)}{(n-1)(n-2)}$
[Option ID = 42112]
4. $\frac{6(n-2)}{(n-1)(n-3)}$
[Option ID = 42113]

Correct Answer :-

- $\frac{6(n-4)}{(n-1)(n-2)}$
[Option ID = 42112]

14) If $f(x) = \frac{1}{1-x}$, then the points of discontinuity of the function $f^{3n}(x)$, where, $f^n = f \circ f \circ \dots \circ f$, n -times, is/are

[Question ID = 10530]

1. $x = 2$

Option ID = 421141

2. $\{0, 1\}$

[Option ID = 42115]

3. $x = -1$

[Option ID = 42116]

4. continuous everywhere

[Option ID = 42117]

Correct Answer :-

• $x = \{0, 1\}$

[Option ID = 42115]

15) The signum function is defined as $sgn(x) = \begin{cases} -1, & x < 0 \\ 0, & x = 0 \\ 1, & x > 0 \end{cases}$. The number of points, where $f(x) = sgn(x^2 - 3x + 2) + [x - 3]$, $x \in [0, 4]$ is discontinuous, where $[.]$ denotes the greatest integers, is

[Question ID = 10531]

1. 3

[Option ID = 42118]

2. 2

[Option ID = 42119]

3. 5

[Option ID = 42120]

4. 4

[Option ID = 42121]

Correct Answer :-

• 5

[Option ID = 42120]

16) Let f be a function defined and continuous on $[2, 5]$. If $f(x)$ takes rational values for all x and $f(4) = 8$, then the value of $f(3.7)$ is

[Question ID = 10532]

1. 0

[Option ID = 42122]

2. 8

[Option ID = 42123]

3. -1

[Option ID = 42124]

4. 2

[Option ID = 42125]

Correct Answer :-

• 8

[Option ID = 42123]

17) Two adjacent side of a cyclic quadrilateral measure 2 unit each and the angle between them is 30° . If the angle bisector of the angle between these sides passes through the opposite vertex and the centre of the circumscribed circle, then the radius of this circle is

[Question ID = 10533]

1. $\sqrt{6} - \sqrt{2}$ unit

[Option ID = 42126]

2. $\sqrt{6} + \sqrt{2}$ unit

[Option ID = 42127]

3. $-\sqrt{6} - \sqrt{2}$ unit

Correct Answer :-

- $\sqrt{6} - \sqrt{2}$ unit

[Option ID = 42129]

18) $\int_0^{\pi} \frac{x \sin x}{1 + \cos^2 x} dx =$

[Question ID = 10534]

1. $\pi/4$

[Option ID = 42130]

2. $\pi^2/2$

[Option ID = 42131]

3. $\pi^2/4$

[Option ID = 42132]

4. $\pi/2$

[Option ID = 42133]

Correct Answer :-

- $\pi^2/4$

[Option ID = 42132]

19) $\lim_{t \rightarrow \infty} \int_1^t \frac{1}{x(x^2 + 1)} dx =$

[Question ID = 10535]

1. $\ln \sqrt{2}$

[Option ID = 42134]

2. $1 + \ln 2$

[Option ID = 42135]

3. $\ln 2$

[Option ID = 42136]

4. 1

[Option ID = 42137]

Correct Answer :-

- $\ln \sqrt{2}$

[Option ID = 42134]

20) $f(x)$ is a polynomial that satisfies $f(x + y) = f(x) + f(y) + 3xy$ for real numbers x and y . If $f'(0) = 35$, then the value $f'(2)$ is

[Question ID = 10536]

1. 76

[Option ID = 42138]

2. 38

[Option ID = 42139]

3. 41

[Option ID = 42140]

4. 36

[Option ID = 42141]

Correct Answer :-

- 41

21) Consider the two integrals for $a > 0$

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$$I_1 = \int_0^{\pi/2} \frac{1}{1 + \tan^a x} dx$$

$$I_2 = \int_0^{\pi/2} \frac{1}{1 + \cot^a x} dx$$

and the statements

Statement I: The value of I_1 depends on the value of a .

Statement II: The value of I_2 does not depend on the value of a .

Statement III: $I_1 = I_2$ for all values of a .

[Question ID = 10537]

1. Only statements II and III are correct.

[Option ID = 42142]

2. Only statements I and III are correct.

[Option ID = 42143]

3. Only statement II is correct.

[Option ID = 42144]

4. Only statement I is correct.

[Option ID = 42145]

Correct Answer :-

- Only statements II and III are correct.

[Option ID = 42142]

22) The minimum value of the function $\sin^4 x + 1.5 \cos^4 x$ is

[Question ID = 10538]

1. 0.6

[Option ID = 42146]

2. 0.5

[Option ID = 42147]

3. 1.5

[Option ID = 42148]

4. 1

[Option ID = 42149]

Correct Answer :-

- 0.6

[Option ID = 42146]

23) The number of ways in which three integers can be selected from the numbers 1 to 12 so that their sum is exactly divisible by 3 is

[Question ID = 10539]

1. 56

[Option ID = 42150]

2. 76

[Option ID = 42151]

3. 64

Correct Answer :-

- 76

[Option ID = 42151]

24) $P(x)$ is a polynomial with real coefficients. The remainder term of $\frac{P(x)}{(x+3)^3}$ is

[Question ID = 10540]

1. $P(-3) + P'(-3)(x+3) + \frac{1}{2}P''(-3)(x+3)^2$

[Option ID = 42154]

2. $P(3) + P'(3)(x+3) + P''(3)(x+3)^2$

[Option ID = 42155]

3. $P(-3) + P'(-3)(x+3) + P''(-3)(x+3)^2$

[Option ID = 42156]

4. $P(3) - P'(3)(x+3) + \frac{1}{2}P''(3)(x+3)^2$

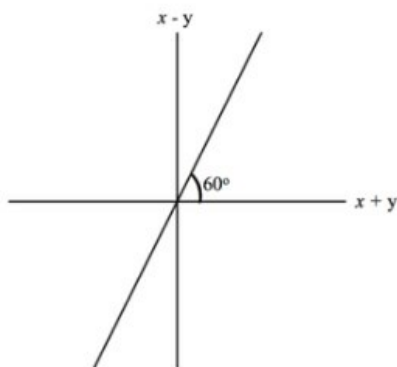
[Option ID = 42157]

Correct Answer :-

- $P(-3) + P'(-3)(x+3) + \frac{1}{2}P''(-3)(x+3)^2$

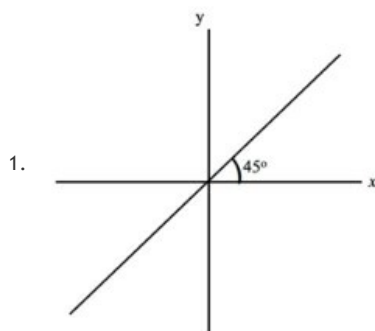
[Option ID = 42154]

25) The graph of $x-y$ against $x+y$ is given below

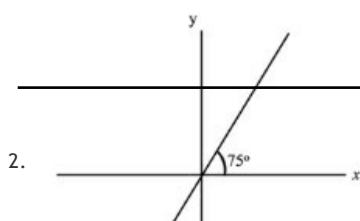


The corresponding graph of y against x is

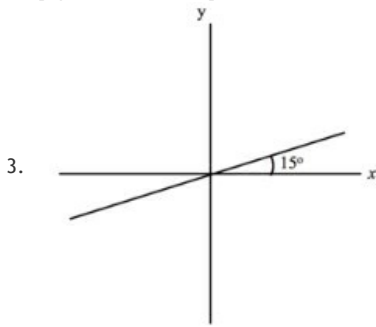
[Question ID = 10541]



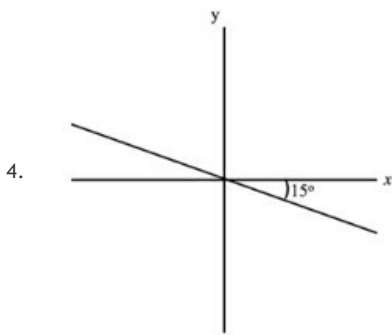
[Option ID = 42158]



[Option ID = 42159]

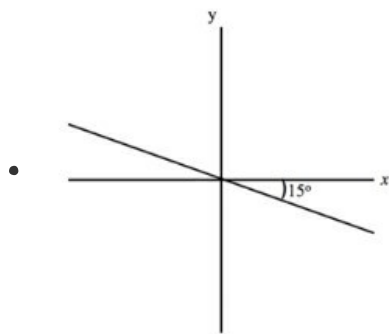


[Option ID = 42160]



[Option ID = 42161]

Correct Answer :-



[Option ID = 42161]

26) The area of the region bounded by $x = 1$, $x = 2$, $y = 4x + 1$ and $y = e^x$ is

[Question ID = 10542]

1. $7 + e - e^2$

[Option ID = 42162]

2. $5 + e - e^2$

[Option ID = 42163]

3. $7 - e + e^2$

[Option ID = 42164]

4. $7 - 2e + e^2$

[Option ID = 42165]

Correct Answer :-

• $7 - e + e^2$

[Option ID = 42164]

27) Let $f(x) = x^2 + xg'(1) + g''(2)$ and $g(x) = x^2 + xf'(2) + f''(3)$, then

[Question ID = 10543]

1. $f'(1) = 4 + f'(2)$

3. $g''(2) + f''(3) = 9$

[Option ID = 42168]

4. $f''(1) = 4 + f''(2)$

[Option ID = 42169]

Correct Answer :-

• $f'(1) = 4 + f'(2)$

[Option ID = 42166]

28) A physical quantity A is related to four observable a , b , c and d as $A = \frac{a^2 b^3}{c \sqrt{d}}$, the percentage errors of the measurement in a , b , c and d are 1%, 3%, 2%, and 2% respectively. The maximum error in the quantity in A is

[Question ID = 10544]

1. 5%

[Option ID = 42170]

2. 7%

[Option ID = 42171]

3. 12%

[Option ID = 42172]

4. 14%

[Option ID = 42173]

Correct Answer :-

• 14%

[Option ID = 42173]

29) A cylindrical gas container is closed at the top and open at the bottom; if the iron plate of the top is $\frac{5}{4}$ times as thick as the plate forming the cylindrical sides. The ratio of the radius to the height of the cylinder using minimum material for the same capacity is

[Question ID = 10545]

1. $\frac{2}{3}$

[Option ID = 42174]

2. $\frac{1}{2}$

[Option ID = 42175]

3. $\frac{4}{5}$

[Option ID = 42176]

4. $\frac{1}{3}$

[Option ID = 42177]

Correct Answer :-

• $\frac{4}{5}$

[Option ID = 42176]

30) If a particle is moving with velocity $v(t) = \cos \pi t$ along a straight line such that at $t = 0$, $s = 4$ its position function is given by

[Question ID = 10546]

1. $\frac{1}{\pi} \cos \pi t + 2$

[Option ID = 42178]

2. $-\frac{1}{\pi} \sin \pi t + 4$

[Option ID = 42179]

3. $\frac{1}{\pi} \sin \pi t + 4$

Correct Answer :-

• $\frac{1}{\pi} \sin \pi t + 4$

[Option ID = 42180]

31) On the portion of straight line $x + y = 2$ which intercepts between the axes, a square is constructed away from the origin, with this portion as one of its side. If p denotes the perpendicular distance of a side of this square from the origin, then the maximum value of p is

[Question ID = 10547]

1. $\sqrt{2}$

[Option ID = 42182]

2. $2\sqrt{2}$

[Option ID = 42183]

3. $3\sqrt{2}$

[Option ID = 42184]

4. $4\sqrt{2}$

[Option ID = 42185]

Correct Answer :-

• $3\sqrt{2}$

[Option ID = 42184]

32) Two roads are represented by the equations $y - x = 6$ and $x + y = 8$. An inspection bungalow has to be so constructed that it is at a distance of 100 from each of the roads. Possible location of the bungalow is given by

[Question ID = 10548]

1. $(100\sqrt{2} + 1, 7)$

[Option ID = 42186]

2. $(100\sqrt{2} - 1, 7)$

[Option ID = 42187]

3. $(-1, 100\sqrt{2} + 7)$

[Option ID = 42188]

4. $(1, -7 - 100\sqrt{2})$

[Option ID = 42189]

Correct Answer :-

• $(100\sqrt{2} + 1, 7)$

[Option ID = 42186]

33) The graphs of $f(x) = x^2$ and $g(x) = cx^3$ intersect at two points. If the area of the region bounded between $f(x)$ and $g(x)$ over the interval $[0, \frac{1}{c}]$ is equal to $\frac{2}{3}$ then the value of $\frac{1}{c} + \frac{1}{c^2}$ is

[Question ID = 10549]

1. 20

[Option ID = 42190]

2. 2

[Option ID = 42191]

3. 6

[Option ID = 42192]

4. 12

[Option ID = 42193]

Correct Answer :-

34) When a right handed rectangular cartesian system $oxyz$ is rotated about the z -axis through an angle $\frac{\pi}{4}$ in the counter clockwise direction it is found that a vector \vec{a} has the components $2\sqrt{2}, -3\sqrt{2}$ and 4. The components of \vec{a} in the $oxyz$ coordinate system are

[Question ID = 10550]

1. 5, -1, 4

[Option ID = 42194]

2. 5, -1, $4\sqrt{2}$

[Option ID = 42195]

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

[Option ID = 42196]

4. 5, 1, $4\sqrt{2}$

[Option ID = 42197]

Correct Answer :-

• 5, -1, 4

[Option ID = 42194]

35) A line L_1 passes through the point $3\hat{i}$ and parallel to the vector $-\hat{i} + \hat{j} + \hat{k}$ and another line L_2 passes through the point $\hat{i} + \hat{j}$ and parallel to the vector $\hat{i} + \hat{k}$, then the point of intersection of the lines is

[Question ID = 10551]

1. $2\hat{i} + \hat{j} + \hat{k}$

[Option ID = 42198]

2. $2\hat{i} - 2\hat{j} + \hat{k}$

[Option ID = 42199]

3. $\hat{i} + 2\hat{j} - \hat{k}$

[Option ID = 42200]

4. $-\hat{i} + \hat{j} + 2\hat{k}$

[Option ID = 42201]

Correct Answer :-

• $2\hat{i} + \hat{j} + \hat{k}$

[Option ID = 42198]

36) Let α and β be the roots of the equation $x^2 - 6x - 2 = 0$ with $\alpha > \beta$. If $a_n = \alpha^n - \beta^n$ for $n \geq 1$, then the value of $\frac{a_{10} - 2a_8}{2a_9}$ is equal to

[Question ID = 10552]

1. -6

[Option ID = 42202]

2. 3

[Option ID = 42203]

3. -3

[Option ID = 42204]

4. 6

[Option ID = 42205]

Correct Answer :-

• 3

[Option ID = 42203]

[Question ID = 10553]

1. $0 < M \leq 1$

[Option ID = 42206]

2. $1 \leq M \leq 2$

[Option ID = 42207]

3. $2 < M \leq 3$

[Option ID = 42208]

4. $3 \leq M \leq 4$

[Option ID = 42209]

Correct Answer :-

• $0 < M \leq 1$

[Option ID = 42206]

38) For $x \in R, x \neq -1$, If

$$(1+x)^{2016} + x(1+x)^{2015} + x^2(1+x)^{2014} + \dots + x^{2016} = \sum_{i=0}^{2016} a_i x^i, \text{ then } a_{17} \text{ is equal to}$$

[Question ID = 10554]

1. $\frac{2017!}{17! 2000!}$

[Option ID = 42210]

2. $\frac{2016!}{17! 1999!}$

[Option ID = 42211]

3. $\frac{2016!}{16!}$

[Option ID = 42212]

4. $\frac{2017!}{2000!}$

[Option ID = 42213]

Correct Answer :-

• $\frac{2017!}{17! 2000!}$

[Option ID = 42210]

39) If $(1-x+x^2)^n = a_0 + a_1x + a_2x^2 + \dots + a_{2n}x^{2n}$, then $a_0 + a_2 + a_4 + \dots + a_{2n}$ is equal to

[Question ID = 10555]

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

[Option ID = 42214]

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

[Option ID = 42215]

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

[Option ID = 42216]

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

[Option ID = 42217]

Correct Answer :-

• $\frac{3^n + 1}{2}$

[Option ID = 42214]

[Question ID = 10556]

1. $2 - \sqrt{3}$
[Option ID = 42218]
2. $2 + \sqrt{3}$
[Option ID = 42219]
3. $\sqrt{2} + \sqrt{3}$
[Option ID = 42220]
4. $3 + \sqrt{2}$
[Option ID = 42221]

Correct Answer :-

- $2 + \sqrt{3}$
[Option ID = 42219]

41) $e^{\left(x - \frac{1}{2}(x-1)^2 + \frac{1}{8}(x-1)^3 - \frac{1}{4}(x-1)^4 + \dots\right)}$ is equal to

[Question ID = 10557]

1. $\log x$
[Option ID = 42222]
2. $\log(x - 1)$
[Option ID = 42223]
3. x
[Option ID = 42224]
4. xe
[Option ID = 42225]

Correct Answer :-

- xe
[Option ID = 42225]

42) If $P = [a_{ij}]$ be a 3×3 matrix and $Q = [b_{ij}]$, where $b_{ij} = 2^{i+j}a_{ij}$ for $1 \leq i, j \leq 3$. If the determinant of P is 2, then the determinant of Q is

[Question ID = 10558]

1. 2^{10}
[Option ID = 42226]
2. 2^{11}
[Option ID = 42227]
3. 2^{12}
[Option ID = 42228]
4. 2^{13}
[Option ID = 42229]

Correct Answer :-

- 2^{13}
[Option ID = 42229]

43) Suppose $a, b, c > 0$ and a, b, c are the p^{th}, q^{th}, r^{th} terms of a G.P.

Let $\Delta = \begin{vmatrix} 1 & p & \log a \\ 1 & q & \log b \\ 1 & r & \log c \end{vmatrix}$, then value of Δ is

[Question ID = 10559]

1. -1

[Option ID = 42231]

3. 0

[Option ID = 42232]

4. 1

[Option ID = 42233]

Correct Answer :-

• 0

[Option ID = 42232]

44) If a, b, c are odd positive integers, then the number of integral solutions of $a + b + c = 13$ is

[Question ID = 10560]

1. 14

[Option ID = 42234]

2. 21

[Option ID = 42235]

3. 28

[Option ID = 42236]

4. 45

[Option ID = 42237]

Correct Answer :-

• 21

[Option ID = 42235]

45) Suppose n, m are natural numbers and let

$$f(x) = \begin{vmatrix} 1 & (1+x)^m & (1+mx)^{mn} \\ (1+mx)^n & 1 & (1+nx)^{mn} \\ (1+nx)^m & (1+x)^n & 1 \end{vmatrix}$$

Then constant term of the polynomial $f(x)$ is

[Question ID = 10561]

1. 1

[Option ID = 42238]

2. $m + n$

[Option ID = 42239]

3. $m - n$

[Option ID = 42240]

4. 0

[Option ID = 42241]

Correct Answer :-

• 0

[Option ID = 42241]

46) If α be a non-real n^{th} root of unity, then $1 + 3\alpha + 5\alpha^2 + \dots + (2n-1)\alpha^{n-1}$ is equal to

[Question ID = 10562]

1. $\frac{2n}{1-\alpha}$

[Option ID = 42242]

2. $\frac{n}{1-\alpha}$

[Option ID = 42243]

4. $\frac{-2n}{1-\alpha}$
 [Option ID = 42245]

Correct Answer :-

• $\frac{-2n}{1-\alpha}$
 [Option ID = 42245]

47) Given an A.P. whose terms are all positive integers. The sum of its first 9 terms is greater than 200 and less than 220. If the second term in it is 12, then its 4th term is

[Question ID = 10563]

1. 8
[Option ID = 42246]
2. 16
[Option ID = 42247]
3. 20
[Option ID = 42248]
4. 24
[Option ID = 42249]

Correct Answer :-

- 20
[Option ID = 42248]

48) If $y = f(x)$, $y > 0$, satisfies the differential equation $y dx + y^2 dy = x dy$, $y(1) = 1$, then $f(-3) =$

[Question ID = 10564]

1. 1
[Option ID = 42250]
2. 2
[Option ID = 42251]
3. 3
[Option ID = 42252]
4. 5
[Option ID = 42253]

Correct Answer :-

- 3
[Option ID = 42252]

49) The differential equation whose solutions are family of circles with centre on the x – axis is

[Question ID = 10565]

1. linear first order differential equation
[Option ID = 42254]
2. non - linear first order differential equation
[Option ID = 42255]
3. linear first second order differential equation
[Option ID = 42256]
4. non - linear first second order differential equation
[Option ID = 42257]

Correct Answer :-

- non - linear first second order differential equation

[Question ID = 10566]

1. 1
[Option ID = 42258]
2. 5
[Option ID = 42259]
3. 25
[Option ID = 42260]
4. 7
[Option ID = 42261]

Correct Answer :-

- 5
[Option ID = 42259]

51) If a cylinder's diameter is equal to its height and its surface area is equal to its volume, then what is the greatest distance between two points within the cylinder?

[Question ID = 10567]

1. 3
[Option ID = 42262]
2. $6\sqrt{5}$
[Option ID = 42263]
3. 6
[Option ID = 42264]
4. $6\sqrt{2}$
[Option ID = 42265]

Correct Answer :-

- $6\sqrt{2}$
[Option ID = 42265]

52) The rectangular coordinate pair (x, y) equivalent to polar coordinates $(6, \pi/3)$ is

[Question ID = 10568]

1. (5.2, 15.6)
[Option ID = 42266]
2. (3.0, 4.8)
[Option ID = 42267]
3. (3.0, 5.2)
[Option ID = 42268]
4. (4.2, 4.7)
[Option ID = 42269]

Correct Answer :-

- (3.0, 5.2)
[Option ID = 42268]

53) If $\sin^2\left(\frac{\pi}{x}\right) + \sin^2\left(\frac{\pi}{y}\right) + \sin^2\left(\frac{\pi}{z}\right) = 2.345$, then the value of $\cos^2\left(\frac{\pi}{x}\right) + \cos^2\left(\frac{\pi}{y}\right) + \cos^2\left(\frac{\pi}{z}\right)$?

[Question ID = 10569]

1. Will be positive and less than 1.
[Option ID = 42270]

2. Will be negative and more than -1.
[Option ID = 42271]

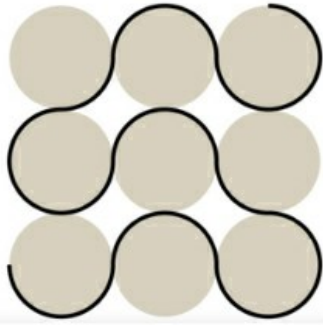
3. Will be more than 1.
[Option ID = 42272]

4. Will be less than -1.
[Option ID = 42273]

Correct Answer :-

- Will be positive and less than 1.
[Option ID = 42270]

54) The distance completely around each of the nine circles is 8 m. The total length of the dark continuous path around the circle is



[Question ID = 10570]

1. 19 m
[Option ID = 42274]

2. 28 m
[Option ID = 42275]

3. 36 m
[Option ID = 42276]

4. 38 m
[Option ID = 42277]

Correct Answer :-

- 38 m
[Option ID = 42277]

55) Which of the following statement is true for function $f(x) = (3x^2 - 6x + 9) / (x^2 - 2x + 1)$?

[Question ID = 10571]

1. $f(x)$ will have two horizontal asymptotes at $y = 3$ and $x = 1$.
[Option ID = 42278]

2. $f(x)$ will have only one horizontal asymptote at $y = 3$.
[Option ID = 42279]

3. $f(x)$ will have one horizontal asymptote at $y = 3$ and one vertical asymptote at $x = 3$.
[Option ID = 42280]

4. $f(x)$ will have two vertical asymptotes at $x = 3$ and $x = 1$.
[Option ID = 42281]

Correct Answer :-

- $f(x)$ will have two horizontal asymptotes at $y = 3$ and $x = 1$.
[Option ID = 42278]

56) Scores of two groups of students, A and B are arranged in exactly two pairs, such that every score from group A is paired with a distinct score from group B. If in each pair, the score from group B is greater than the score from group A, then which of the following statement must be true?

1. The median of the scores in group B is greater than the median of the score in group A.

[Option ID = 42282]

2. Any score of group A is less than any score of group B.

[Option ID = 42283]

3. The range of scores in group B is greater than the range of scores in group A.

[Option ID = 42284]

4. The standard deviation of the scores in group A is less than the standard deviation of the scores in group B.

[Option ID = 42285]

Correct Answer :-

- The median of the scores in group B is greater than the median of the score in group A.

[Option ID = 42282]

57) Skewness of a frequency distribution is indicted by

[Question ID = 10573]

1. Ogive

[Option ID = 42286]

2. Bar graph

[Option ID = 42287]

3. Frequency Polygon

[Option ID = 42288]

4. Histogram

[Option ID = 42289]

Correct Answer :-

- Frequency Polygon

[Option ID = 42288]

58) Poisson distribution is a limiting case of Binomial distribution when:

(n = number of trials; p = probability of success and λ is a constant)

[Question ID = 10574]

1. $n \rightarrow \infty, p \rightarrow 0, np = \sqrt{\lambda}$

[Option ID = 42290]

2. $n \rightarrow 0, p \rightarrow \infty, np = \sqrt{\lambda}$

[Option ID = 42291]

3. $n \rightarrow \infty, p \rightarrow \infty, np = \lambda$

[Option ID = 42292]

4. $n \rightarrow \infty, p \rightarrow 0, np = \lambda$

[Option ID = 42293]

Correct Answer :-

- $n \rightarrow \infty, p \rightarrow 0, np = \lambda$

[Option ID = 42293]

59) *Emile* or *On Education*, a book on the Nature of Education is written by:

[Question ID = 10575]

1. Plato

[Option ID = 42294]

2. John Dewey

[Option ID = 42295]

3. J. J. Rousseau

Correct Answer :-

- J. J. Rousseau

[Option ID = 42296]

60) Howard Gardner's Project on *Human Potential* is known for his:

[Question ID = 10576]

1. Theory of Multiple Intelligence
[Option ID = 42298]
2. Work on children's development in figurative language
[Option ID = 42299]
3. Research on symbol processing in individuals
[Option ID = 42300]
4. Research on people suffering brain injury
[Option ID = 42301]

Correct Answer :-

- Theory of Multiple Intelligence

[Option ID = 42298]

61) The idea that psychological development depends upon outside forces as much as upon inner resources, is proposed by:

[Question ID = 10577]

1. Jean Piaget
[Option ID = 42302]
2. L.S. Vygotsky
[Option ID = 42303]
3. Jerome Bruner
[Option ID = 42304]
4. Albert Bandura
[Option ID = 42305]

Correct Answer :-

- L.S. Vygotsky

[Option ID = 42303]

62) The statement given below is made by:

School itself shall be made a genuine form of active community life, instead of a place set part in which to learn lessons.

[Question ID = 10578]

1. Immanuel Kant
[Option ID = 42306]
2. John Locke
[Option ID = 42307]
3. John Dewey
[Option ID = 42308]
4. Plato
[Option ID = 42309]

Correct Answer :-

- John Dewey

[Question ID = 10579]

1. its applications
[Option ID = 42310]
2. previously known information
[Option ID = 42311]
3. its explanation
[Option ID = 42312]
4. possible inferences that can be drawn from it
[Option ID = 42313]

Correct Answer :-

- previously known information
[Option ID = 42311]

64) A scoring matrix that defines the criteria of performance rating and performance descriptors of a task is called:

[Question ID = 10580]

1. Rating scale
[Option ID = 42314]
2. Rubric
[Option ID = 42315]
3. Inventory
[Option ID = 42316]
4. Check list
[Option ID = 42317]

Correct Answer :-

- Rubric
[Option ID = 42315]

65) Instruction Technology in Education includes:

[Question ID = 10581]

1. Electronic and non-electronic instruments, tools and techniques that are used directly or indirectly in enhancing and improving the effectiveness and efficiency of teaching.
[Option ID = 42318]
2. Electronic devices that are used directly or indirectly in enhancing and improving the effectiveness and efficiency of teaching.
[Option ID = 42319]
3. Software that are used directly or indirectly in enhancing and improving the effectiveness and efficiency of teaching.
[Option ID = 42320]
4. Digital Media that are used directly or indirectly in enhancing and improving the effectiveness and efficiency of teaching.
[Option ID = 42321]

Correct Answer :-

- Electronic and non-electronic instruments, tools and techniques that are used directly or indirectly in enhancing and improving the effectiveness and efficiency of teaching.
[Option ID = 42318]

66) An inductive logic is a logic of:

[Question ID = 10582]

2. Contradictions

[Option ID = 42323]

3. Judgement

[Option ID = 42324]

4. Inferences

[Option ID = 42325]

Correct Answer :-

- Evidential support

[Option ID = 42322]

67) The *Theory of Cognitive Development* by Jean Piaget describes the :

[Question ID = 10583]

1. Cycle of Cognitive Development

[Option ID = 42326]

2. Issues in Cognitive Development

[Option ID = 42327]

3. Stages of Cognitive Development

[Option ID = 42328]

4. Evolution of Cognitive Development

[Option ID = 42329]

Correct Answer :-

- Stages of Cognitive Development

[Option ID = 42328]

68) Blended learning is an approach where a learner is taught through:

[Question ID = 10584]

1. Face to face instruction with computer -mediated instruction

[Option ID = 42330]

2. Text books and hands on approach

[Option ID = 42331]

3. Story boards and lab based activities

[Option ID = 42332]

4. Online mode of instructions

[Option ID = 42333]

Correct Answer :-

- Face to face instruction with computer -mediated instruction

[Option ID = 42330]

69) The language platform launched by Central Institute of Indian Languages to publish content in Indian languages is

[Question ID = 10585]

1. Bharat Bhasha

[Option ID = 42334]

2. Bhasha Bharti

[Option ID = 42335]

3. Bharat Vani

[Option ID = 42336]

4. Bhasha Bharat

[Option ID = 42337]

70) To cultivate one million children in India as Neoteric Innovators is the vision of

[Question ID = 10586]

1. Atal Innovation Mission

[Option ID = 42338]

2. Science Innovation Mission

[Option ID = 42339]

3. Vikas Innovation Mission

[Option ID = 42340]

4. Digital India Innovation Mission

[Option ID = 42341]

Correct Answer :-

• Atal Innovation Mission

[Option ID = 42338]

71) *Diksha* is an online national platform for teachers for

[Question ID = 10587]

1. sharing knowledge

[Option ID = 42342]

2. filling complaints

[Option ID = 42343]

3. recording results

[Option ID = 42344]

4. submitting records

[Option ID = 42345]

Correct Answer :-

• sharing knowledge

[Option ID = 42342]

72) Which of the following is not true for GeoGebra?

[Question ID = 10588]

1. GeoGebra is an interactive software

[Option ID = 42346]

2. GeoGebra is an educational software that can be used to teach Mathematics

[Option ID = 42347]

3. GeoGebra is an open software

[Option ID = 42348]

4. GeoGebra is a paid software

[Option ID = 42349]

Correct Answer :-

• GeoGebra is a paid software

[Option ID = 42349]

73) Sustainable Development Goal on Quality Education aims to

[Question ID = 10589]

1. Ensure inclusion and equitable quality education for all

[Option ID = 42350]

4. Sensitize people for the cause of safe environmental through quality education

[Option ID = 42353]

Correct Answer :-

- Ensure inclusion and equitable quality education for all

[Option ID = 42350]

74) In the statement below, correct punctuation for the underline phrase is:

Gluten is a protein composite found in wheat, barley, rye - and a few other related grains and it contains amino acid that trigger immune responses in people with celiac disease.

[Question ID = 10590]

1. wheat, barley, rye and a few other related grains

[Option ID = 42354]

2. wheat, barley, rye, and a few other related grains

[Option ID = 42355]

3. wheat, barley, rye, and, a few other related grains

[Option ID = 42356]

4. wheat, barley, rye and , a few other related grains

[Option ID = 42357]

Correct Answer :-

- wheat, barley, rye, and a few other related grains

[Option ID = 42355]

75) The most appropriate meaning of the underline word is:

Many people in the public relations field have a bachelor's degree in communications, marketing, journalism, or other field with immovable skills.

[Question ID = 10591]

1. ordinary

[Option ID = 42358]

2. immobile

[Option ID = 42359]

3. transferable

[Option ID = 42360]

4. applicable

[Option ID = 42361]

Correct Answer :-

- transferable

[Option ID = 42360]

76) The closet meaning of the word, *radical* in the statement below is:

Biomimicry is a radical field and one whose practitioners need to be radically optimistic.

[Question ID = 10592]

1. pervasive

[Option ID = 42362]

2. drastic

[Option ID = 42363]

[Option ID = 42365]

Correct Answer :-

- revolutionary

[Option ID = 42365]

77) What is the name of the woman astronaut who has spent maximum days in International Space Station?

[Question ID = 10593]

1. Kalpana Chawla

[Option ID = 42366]

2. Christina Koch

[Option ID = 42367]

3. Kathryn D. Sullivan

[Option ID = 42368]

4. Helen Sharman

[Option ID = 42369]

Correct Answer :-

- Christina Koch

[Option ID = 42367]

78) The only cricketer who has won Golden Bat twice in ICC Champion trophy is

[Question ID = 10594]

1. Virat Kohli

[Option ID = 42370]

2. Shikhar Dhawan

[Option ID = 42371]

3. M.S. Dhoni

[Option ID = 42372]

4. James Anderson

[Option ID = 42373]

Correct Answer :-

- Shikhar Dhawan

[Option ID = 42371]

79) FIFA best player for year 2019 was received by

[Question ID = 10595]

1. Cristiano Ronaldo

[Option ID = 42374]

2. Lionel Messi

[Option ID = 42375]

3. Mohamed Salah

[Option ID = 42376]

4. Kevin De Bruyne

[Option ID = 42377]

Correct Answer :-

- Lionel Messi

[Option ID = 42375]

[Question ID = 10596]

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1. Motor Vehicles, Petroleum Products and Alcohol
[Option ID = 42378]
2. Petroleum Products, Dairy Products and Alcohol
[Option ID = 42379]
3. CNG Vehicles, Petroleum Products and Medicines
[Option ID = 42380]
4. Petroleum Products, Medicines and Leather items
[Option ID = 42381]

Correct Answer :-

- Petroleum Products, Dairy Products and Alcohol
[Option ID = 42379]

81) The book, *The man who knew infinity* is the biography of

[Question ID = 10597]

1. Albert Einstein
[Option ID = 42382]
2. G.H. Hardy
[Option ID = 42383]
3. Srinivasan Ramanujan
[Option ID = 42384]
4. Carl Friedrich Gauss
[Option ID = 42385]

Correct Answer :-

- Srinivasan Ramanujan
[Option ID = 42384]

82) What is the name of the first Supercomputer developed by the Indian scientists?

[Question ID = 10598]

1. Param 8000
[Option ID = 42386]
2. Parth 8000
[Option ID = 42387]
3. Param 4000
[Option ID = 42388]
4. Param 800
[Option ID = 42389]

Correct Answer :-

- Param 8000
[Option ID = 42386]

83) Who is known as the Father of Indian Space Program?

[Question ID = 10599]

1. Dr. Abdul Kalam Azad
[Option ID = 42390]
2. Dr. Vikram Ambalal Sarabhai
[Option ID = 42391]
3. Dr. Homi Jehangir Bhabha
[Option ID = 42392]

Correct Answer :-

- *Dr. Homi Jehangir Bhabha*

[Option ID = 42392]

84) When is the International Day of Mathematics celebrated every year?

[Question ID = 10600]

1. 4th January

[Option ID = 42394]

2. 8th January

[Option ID = 42395]

3. 14th March

[Option ID = 42396]

4. 22nd December

[Option ID = 42397]

Correct Answer :-

- 14th March

[Option ID = 42396]

85) 'Schools need to become centres that prepare children for life and ensure that all children, especially the differently abled, children from marginalized sections, and children in difficult circumstances get maximum benefit of this critical area of education. This observation found in the National Curriculum Framework-2005 is related to:

[Question ID = 10601]

1. Inclusive education

[Option ID = 42398]

2. Constructivist learning

[Option ID = 42399]

3. Gender equality

[Option ID = 42400]

4. Critical pedagogy

[Option ID = 42401]

Correct Answer :-

- Inclusive education

[Option ID = 42398]

86) If R and S are perfect cube integers, which of the following will not necessarily be a perfect cube integer?

[Question ID = 10602]

1. RS

[Option ID = 42402]

2. $RS + 125$

[Option ID = 42403]

3. $125RS$

[Option ID = 42404]

4. $8RS$

[Option ID = 42405]

Correct Answer :-

- $RS + 125$

[Option ID = 42403]

87) Three friends Amar, Akbar and Anthony are playing a game with the following tiles

Amar: Every tile belongs to one of us.

Akbar: My tiles are the digits of Amar's sum

Anthony: My tiles are the digits of Amar's product

Person with tiles with smallest product is

[Question ID = 10603]

1. Amar

[Option ID = 42406]

2. Akbar

[Option ID = 42407]

3. Anthony

[Option ID = 42408]

4. Cannot be determined

[Option ID = 42409]

Correct Answer :-

• Anthony

[Option ID = 42408]

88) Here is a system of linear equations:

$px + qy = r$ and $px + qy = s$, where p, q, r and s are positive integers.

Which of the following can be possible graphs of such a system in the standard (x, y) coordinate plane?

I: Two lines intersecting each other exactly at one point only.

II: Two coincides lines

III: Two parallel lines

[Question ID = 10604]

1. I only

[Option ID = 42410]

2. II only

[Option ID = 42411]

3. II and III only

[Option ID = 42412]

4. I and III only

[Option ID = 42413]

Correct Answer :-

• II and III only

[Option ID = 42412]

89) Swami Vivekananda Fellowship is introduced by UGC to

[Question ID = 10605]

1. single girl child for research in social science.

[Option ID = 42414]

2. girl child for research in science.

[Option ID = 42415]

3. promote women scientists.

Correct Answer :-

- single girl child for research in social science.

[Option ID = 42414]

90) A child learns more effectively when

[Question ID = 10606]

1. educational experiences are contextualized.

[Option ID = 42418]

2. classrooms have child friendly furniture.

[Option ID = 42419]

3. exams are taken frequently.

[Option ID = 42420]

4. learning is rewarded by prize and awards.

[Option ID = 42421]

Correct Answer :-

- educational experiences are contextualized.

[Option ID = 42418]

91) The mandate of Rehabilitation Council of India is to

[Question ID = 10607]

1. regulate and monitor the services given to persons with disability.

[Option ID = 42422]

2. provides financial support to persons with disability.

[Option ID = 42423]

3. arrange resources for persons with disability.

[Option ID = 42424]

4. develops infrastructure for persons with disability.

[Option ID = 42425]

Correct Answer :-

- regulate and monitor the services given to persons with disability.

[Option ID = 42422]

92) 25 points are spaced around a circle. How many different chords can be formed by joining any two points?

[Question ID = 10608]

1. 366

[Option ID = 42426]

2. 250

[Option ID = 42427]

3. 625

[Option ID = 42428]

4. 300

[Option ID = 42429]

Correct Answer :-

- 250

[Option ID = 42427]

93) Two natural numbers m and n are such that:

- $m \times n$ is a power of 10;

[Question ID = 10609]

1. 3
[Option ID = 42430]
2. 7
[Option ID = 42431]
3. 5
[Option ID = 42432]
4. 1
[Option ID = 42433]

Correct Answer :-

- 5
[Option ID = 42432]

94) Four positive integers a, b, c and d are such that :

- $d = 5a + 3b + 5c$
- $d = 4a + 5b + 4c$
- $131 < d < 150$

What is the value of $a + b + c$?

[Question ID = 10610]

1. 33
[Option ID = 42434]
2. 43
[Option ID = 42435]
3. 55
[Option ID = 42436]
4. 101
[Option ID = 42437]

Correct Answer :-

- 33
[Option ID = 42434]

95) The two sequences: 4, 15, 26, 37, 48, 59, 70..... and 6, 12, 18, 24, 30, 36, 42..... have a common term 48. The next common term for the two sequences will be:

[Question ID = 10611]

1. 114
[Option ID = 42438]
2. 141
[Option ID = 42439]
3. 96
[Option ID = 42440]
4. 65
[Option ID = 42441]

Correct Answer :-

- 114
[Option ID = 42438]

[Question ID = 10612]

1. Although she is a mature woman, she is afraid of the dark.
[Option ID = 42442]
2. Although she is mature woman but she is afraid of the dark.
[Option ID = 42443]
3. She is a mature woman, she should be afraid of the dark.
[Option ID = 42444]
4. She is a mature woman so she should not afraid of the dark.
[Option ID = 42445]

Correct Answer :-

- Although she is a mature woman, she is afraid of the dark.
[Option ID = 42442]

97) Choose the correct version of the sentence below:
Delivery of today's newspapers and magazines have been delayed.

[Question ID = 10613]

1. Delivery of today's newspapers and magazines have delayed.
[Option ID = 42446]
2. Delivery of today's newspapers and magazines has been delayed.
[Option ID = 42447]
3. Delivery of today's newspapers and magazines has delayed.
[Option ID = 42448]
4. Deliveries of today's newspapers and magazines has been delayed.
[Option ID = 42449]

Correct Answer :-

- Delivery of today's newspapers and magazines has been delayed.
[Option ID = 42447]

98) Choose the correct version of the sentence below:
Rohit became a good friend of John after he helped him repair his car.

[Question ID = 10614]

1. Rohit became a good friend of John after he has helped him repair his car.
[Option ID = 42450]
2. Rohit became a good friend of John after he had helped him repair his car.
[Option ID = 42451]
3. Rohit and John became good friends after John had helped Rohit repair his car.
[Option ID = 42452]
4. Rohit and John became good friends after John helped Rohit repair his car.
[Option ID = 42453]

Correct Answer :-

- Rohit and John became good friends after John helped Rohit repair his car.
[Option ID = 42453]

99) Choose the correct version of the sentence below:
~~*Of all Shakespeare's plays, Hamlet is the more popular.*~~

[Question ID = 10615]

1. Of all Shakespeare's plays, Hamlet is the best popular.
[Option ID = 42454]

2. Of all Shakespeare's plays, Hamlet is the most popular.
[Option ID = 42455]

3. Of all Shakespeare's plays, Hamlet is more popular.
[Option ID = 42456]

4. Of all Shakespeare's plays, Hamlet is most popular.
[Option ID = 42457]

Correct Answer :-

- Of all Shakespeare's plays, Hamlet is the most popular.

[Option ID = 42455]

100) The movie *Hidden Figure* is based on the life of

[Question ID = 10616]

1. G.H. Hardy (Mathematician)

[Option ID = 42458]

2. Stephen Hawkins (Physicists)

[Option ID = 42459]

3. Katherine Johnson (Mathematician)

[Option ID = 42460]

4. Gregor Mendel (Biologist)

[Option ID = 42461]

Correct Answer :-

- Katherine Johnson (Mathematician)

[Option ID = 42460]