

Q.No.

MATHEMATICS

1. If $G(x) = \begin{vmatrix} f(x)f(-x) & 0 & x^4 \\ 3 & f(x) - f(-x) & \cos x \\ x^4 & 2x & f(x)f(-x) \end{vmatrix}$, then $\int_{-2}^2 x^4 G(x) dx$ is equal to
 A) -1 B) 0 C) 2 D) 1

2. If $1, \alpha_1, \alpha_2, \alpha_3$ are the fourth roots of unity, then the value of $(1 + \alpha_1)(1 + \alpha_2)(1 + \alpha_3)$ is equal to
 A) -3 B) -1 C) 0 D) 2

3. A conic has focus $(1, 0)$ and corresponding directrix $x + y = 5$. If the eccentricity of the conic is 2, then its equation is
 A) $x^2 + 4xy + y^2 + 18x - 20y + 49 = 0$ B) $x^2 - 4xy + y^2 - 18x - 20y + 49 = 0$
 C) $x^2 + 4xy + y^2 - 18x + 20y + 49 = 0$ D) $x^2 + 4xy + y^2 - 18x - 20y + 49 = 0$

4. Let $\bar{u}, \bar{v}, \bar{w}$ to be three vectors such that $|\bar{u}| = 1, |\bar{v}| = 2, |\bar{w}| = 3$ and \bar{v} and \bar{w} are mutually perpendicular. If projection of \bar{v} along \bar{u} is equal to that of \bar{w} along \bar{u} then $|\bar{u} - \bar{v} + \bar{w}|$ equals to
 A) $\sqrt{7}$ B) 14 C) 2 D) $\sqrt{14}$

5. A plane at a unit distance from the origin intersects the coordinate axes at P, Q and R. If the locus of the centroid of ΔPQR satisfies the equation $\frac{1}{x^2} + \frac{1}{y^2} + \frac{1}{z^2} = k$, then the value of k is
 A) 3 B) 4 C) 9 D) 16

6. If g be an inverse function of f and $f'(x) = \frac{1}{1+x^5}$, then $g'(x)$ will be :
 A) $1 + x^5$ B) $1 + (g(x))^5$ C) $\left(\frac{1}{1+g(x)}\right)^5$ D) $(g(x))^5$

7. The area enclosed between the curves $y = |x^3|$ and $x = y^3$ is
 A) $\frac{1}{2}$ B) $\frac{1}{4}$ C) $\frac{1}{8}$ D) $\frac{1}{16}$

8. Let $f(x)$ be a differential function such that $f'(x) = f(x) + \int_0^2 f(x) dx$ and $f(0) = \frac{(4-e^2)}{3}$. Then $f(x)$ is:
 A) $e^x - \frac{(e^2-1)}{3}$ B) $e^x - \frac{(e^2-1)}{4}$ C) $e^x - \frac{(e^2+1)}{3}$ D) $e^x - \frac{(4-e^2)}{3}$

9. A coin is tossed n times. The maximum value of n such that the probability of getting no head is greater than $1/16$ is
 A) 4 B) 3 C) 5 D) 2

10. Suppose 5- digit numbers are formed by the digits 1,2,3,4 and 5 without repetition. If they are arranged in an ascending order, then 100^{th} number is
 A) 51243 B) 51423 C) 51234 D) 51342