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 $\bar{u}, \bar{v}, \bar{\omega}$ to be three vectors such that $|\bar{u}| = 1, |\bar{v}| = 2, |\bar{\omega}| = 3$ and $\bar{v}$ and $\bar{\omega}$ are mutually perpendicular. If projection of $\bar{v}$ along $\bar{u}$ is equal to that of $\bar{\omega}$ along $\bar{u}$ then $|\bar{u} - \bar{v} + \bar{\omega}|$ 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 $\triangle$PQR 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 100th number is

    A) 51243   B) 51423   C) 51234   D) 51342