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)
$$x^2 + 4xy + y^2 + 18x - 20y + 49 = 0$$

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$$x^2 + 4xy + y^2 + 18x - 20y + 49 = 0$$
 B) $x^2 - 4xy + y^2 - 18x - 20y + 49 = 0$

C)
$$x^2 + 4xy + y^2 - 18x + 20y + 49 = 0$$

D)
$$x^2 + 4xy + y^2 - 18x - 20y + 49 = 0$$

- Let \overline{u} , \overline{v} , $\overline{\omega}$ to be three vectors such that $|\overline{u}| = 1$, $|\overline{v}| = 2$, $|\overline{\omega}| = 3$ and \overline{v} and $\overline{\omega}$ are mutually perpendicular. If projection 4. 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
- 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 Δ 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
- If g be an inverse function of f and $f'(x) = \frac{1}{1+x^5}$, then g'(x) will be: 6.
- A) $1 + x^5$ B) $1 + (g(x))^5$ C) $(\frac{1}{1+g(x)})^5$ D) $(g(x))^5$
- 7. The area enclosed between the curves $y = |x^3|$ and $x = y^3$ is
- B) $\frac{1}{4}$

- 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: 8.

- 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