

SECTION – A
MULTIPLE CHOICE QUESTIONS (MCQ)

Question Paper
MA : JAM 2023

Q. 1 – Q. 10 carry one mark each.

Q. 1 Let G be a finite group. Then G is necessarily a cyclic group if the order of G is

- (A) 4
- (B) 7
- (C) 6
- (D) 10

Q. 2 Let $\mathbf{v}_1, \dots, \mathbf{v}_9$ be the column vectors of a non-zero 9×9 real matrix A . Let $a_1, \dots, a_9 \in \mathbb{R}$, not all zero, be such that $\sum_{i=1}^9 a_i \mathbf{v}_i = \mathbf{0}$. Then the system $A\mathbf{x} = \sum_{i=1}^9 \mathbf{v}_i$ has

- (A) no solution
- (B) a unique solution
- (C) more than one but only finitely many solutions
- (D) infinitely many solutions

Q. 3 Which of the following is a subspace of the real vector space $\mathbb{R}^3$?

- (A) $\{(x, y, z) \in \mathbb{R}^3 : (y + z)^2 + (2x - 3y)^2 = 0\}$
- (B) $\{(x, y, z) \in \mathbb{R}^3 : y \in \mathbb{Q}\}$
- (C) $\{(x, y, z) \in \mathbb{R}^3 : yz = 0\}$
- (D) $\{(x, y, z) \in \mathbb{R}^3 : x + 2y - 3z + 1 = 0\}$

Q. 4 Consider the initial value problem

$$\begin{aligned}\frac{dy}{dx} + \alpha y &= 0, \\ y(0) &= 1,\end{aligned}$$

where $\alpha \in \mathbb{R}$. Then

- (A) there is an α such that $y(1) = 0$
- (B) there is a unique α such that $\lim_{x \rightarrow \infty} y(x) = 0$
- (C) there is NO α such that $y(2) = 1$
- (D) there is a unique α such that $y(1) = 2$

