

2. If the system of equations

$$x + ay = 0$$

$$az + y = 0$$

$$ax + z = 0$$

has infinite solutions, then the value of a is

(a) -1

(b) 1

(c) 0

(d) no real value

Solⁿ

for infinite solution

$$AX = B \Rightarrow |A| = 0$$

$$[A] = \begin{bmatrix} 1 & a & 0 \\ 0 & 1 & a \\ a & 0 & 1 \end{bmatrix}$$

$$|A| = \begin{vmatrix} 1 & a & 0 \\ 0 & 1 & a \\ a & 0 & 1 \end{vmatrix} = 0$$

$$\Rightarrow 1(1-0) - a(0-a^2) + 0(0-a) = 0$$

$$1 + a^3 = 0$$

$$a^3 + (1)^3 = 0$$

$$(a+1)(a^2+1-a) = 0$$

$$\Rightarrow a+1 = 0$$

$$\boxed{a = -1}$$

$$\text{or } a = \frac{1 \pm \sqrt{1-4}}{2} \text{ (imaginary)}$$