



DSSSB TGT

PART(B)



MATHS

ALGEBRA

Part-7



24/10/2024 08:00 AM



Q. 1 Consider the following two subsets of vector space $V_3(R)$, $S_1 = \{(x_1, x_2, x_3): x_1 + x_2 + x_3 \geq 0\}$ $S_2 = \{(x_1, x_2, x_3): x_1^2 + x_2^2 + x_3^2 \leq 1\}$, then

सदिश समष्टि $V_3(R)$ के निम्नलिखित दो उपसमुच्चयों पर विचार करें, $S_1 = \{(x_1, x_2, x_3): x_1 + x_2 + x_3 \geq 0\}$ $S_2 = \{(x_1, x_2, x_3): x_1^2 + x_2^2 + x_3^2 \leq 1\}$, तो

- ☒ **a) S_1 is a subspace of $V_3(R)$ but not S_2**
- b) S_2 is a subspace of $V_3(R)$ but not S_1**
- c) Both S_1 and S_2 are subspaces of $V_3(R)$**
- d) Neither S_1 nor S_2 is subspace of $V_3(R)$**

Q.2 Consider the following two subsets of vector space

$V_2(R)$, $T = \{(x_1, x_2): x_1 \neq 0\}$ $W = \{(x_1, x_2): 2x_2 = 3x_1\}$, then

सदिश समष्टि $V_2(R)$ के निम्नलिखित दो उपसमुच्चयों पर विचार करें, $T =$

$\{(x_1, x_2): x_1 \neq 0\}$ $W = \{(x_1, x_2): 2x_2 = 3x_1\}$, फिर

T $\times$
 W $\checkmark$

~~a) T is a subspace of $V_2(R)$ but not W~~

~~b) W is subspace of $V_2(R)$ but not T~~

~~c) Both W and T are subspaces of $V_2(R)$~~

~~d) Neither W nor T is a Subspace of $V_2(R)$~~

$x_1 \neq 0$ not a subspace | $x_1 \cdot x_2 = 0$, $\frac{x_1}{x_2} = 0$, $x_2 \neq 0$ not a subspace.

Q. 3 Let V be the vector space of all $n \times n$ real matrices over R and W_1 and W_2 be the collection of all symmetric and skew-symmetric matrices respectively in V , then

मान लें कि V, R पर सभी $n \times n$ वास्तविक मैट्रिसेस का सदिश समष्टि है तथा W_1 और W_2 क्रमशः V में सभी सममित और ~~विषम~~-सममित मैट्रिसेस का संग्रह है, तो
विषम.

a) W_1 is subspace of V but W_2 is not subspace of V

b) W_2 is subspace of V but W_1 is not subspace of V

☒ c) Both W_1 and W_2 are subspaces of V

d) Neither W_1 nor W_2 is a subspace of V

Q.4 Let R be the set of all real numbers and $R^2 = \{(x_1, x_2): x_1, x_2 \in R\}$, then which one of the following is a subspace of R^2 over R ?

मान लें कि R सभी वास्तविक संख्याओं का समुच्चय है और $R^2 = \{(x_1, x_2): x_1, x_2 \in R\}$, तो निम्नलिखित में से कौन सा R पर R^2 का उप-समष्टि है?

a) $\{(x_1, x_2): x_1 > 0, x_2 > 0\}$

b) $\{(x_1, x_2): x_1 < 0, x_2 < 0\}$

c) $\{(x_1, x_2): x_1 \in R, x_2 > 0\}$

d) $\{(x_1, 0): x_1 \in R\}$

Q.5 Which one of the following is a vector space?

निम्नलिखित में से कौन सा एक सदिश समष्टि है?

☒ a) $R(Q)$ Rational

b) $R(C)$ Complex

c) $R(Z)$ Integers

d) $R(N)$ Natural

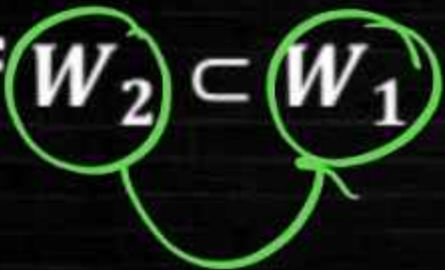
V(F)
field

→ Field $\Rightarrow N, W, Z$ X

field $\Rightarrow \underbrace{Q, R, C}$ ✓

Q.6 Which one of the following is incorrect?

निम्नलिखित में से कौन सा गलत है?

- ✓ a) Intersection of two subspaces is subspace 
- ✓ b) Union of two subspaces W_1 and W_2 is subspace if $W_1 \subset W_2$ 
- ✓ c) Union of two subspaces W_1 and W_2 is subspace if $W_2 \subset W_1$ 
- ✗ d) Union of two subspaces is a subspace

Q.7 If V is a vector space of $n \times n$ matrices of real entries over the field R and W_1 and W_2 are the subspaces of symmetric and skew-symmetric matrices respectively, then which one is correct?

यदि V , क्षेत्र R पर वास्तविक प्रविष्टियों के $n \times n$ मैट्रिसेस का एक सदिश समष्टि है तथा W_1 और W_2 क्रमशः सममित और विक्षिप्त-सममित मैट्रिसेस के उप-समष्टि हैं, तो कौन सा सही है?

- ☒ a) $V = W_1 \oplus W_2$
- ☒ b) $V = W_1 + W_2$
- ☒ c) $W_1 \cap W_2 = \{0\}$
- ☒ d) All of above

$W_1, W_2 \rightarrow \text{Subspace}$

☒ $W_1 \cap W_2 \rightarrow \text{Subspace}$

$$W_1 \Rightarrow \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$$W_2 \Rightarrow \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$$W_1 \cap W_2 \rightarrow \{0\}$$

$$W_1 + W_2 \Rightarrow \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix} \rightarrow \{0\}$$

Q. 8 If $\underline{R^3} = \{(x, y, z) : \underline{x, y, z} \in R\}$ and $W = \{(\underline{x, y, z}) \in R^3; x - 2y - 3z = 0\}$, then which statement is not true?

यदि $R^3 = \{(x, y, z) : x, y, z \in R\}$ और $W = \{(x, y, z) \in R^3; x - 2y - 3z = 0\}$, तो कौन सा कथन सत्य नहीं है?

~~a) W is not subspace of R^3~~

b) $\alpha, \beta \in \underline{W} \Rightarrow \alpha + \beta \in W$ ✓

c) $\alpha, \beta \in W \Rightarrow \alpha - \beta \in W$ ✓

d) W is subspace of R^3 ✓

$$ax + by + cz = 0$$

$$W \Rightarrow x - 2y - 3z = 0$$

Q. 9 Let V be the vector space of all 2×2 matrices and W consists of all 2×2 matrices with zero determinant then

मान लें कि V सभी 2×2 आव्यूहों का सदिश समष्टि है और W शून्य सारणिक वाले सभी 2×2 आव्यूहों से मिलकर बना है, तो

- ☒ a) W is not a subspace of V
- ☐ b) W is a subspace of V
- ☐ c) W may or may not be a subspace
- ☐ d) None of the above

$|A| = 0 \rightarrow$ not a subspace,

Q.10 The zero vector in the vector space R^4

सदिश समष्टि R^4 में शून्य सदिश

a) $(0, 0)$

b) $(0, 0, 0)$

c) $(0, 0, 0, 0)$ ✓✓

d) All of above

