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IVth SEMESTER

MID SEMESTER EXAMINATION

Roll No.....

B. Tech. (MC)

(MARCH-2019)

MC 208: Linear Algebra

Time: 1:30 Hours **Max. Marks: 25**

Note: All questions are compulsory. **All questions carry equal marks.** Assume suitable missing data, if any.

Q1. Let V be the vector space of all 2×2 matrices over the field $\boldsymbol{R}$ of real numbers. Show that $W=\{A\in V: A^2=A\}$ is not a subspace of V.

Q2. Check whether the vectors $(1,1,0),(2,1,1)$ and $(3,0,3)$ are linearly independent or not?

Q3. Let $T: R^3\to R^2$ be the linear transformation defined by $T(x,y,z)=(x+y,2z-x)$. Find a basis and dimension of image of T and kernel of T.

Q4. If the matrix of a linear transformation $T: R^3\to R^3$ relative to the standard basis is $\begin{pmatrix}1 & 1 & 2\\ -1 & 2 & 1\\ 0 & 1 & 3\end{pmatrix}$. Find the matrix of T relative to the basis $\{f_1=(1,1,1), f_2=(0,1,1), f_3=(0,0,1)\}$.

Q5. Let $V=R^3(R)$ and $B=\{v_1=(1,1,2), v_2=(0,2,1), v_3=(0,0,5)\}$ be a basis of V. Determine the dual basis of B.

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