DEPARTMENT OF MATHEMATICS

Bennett University

Linear Algebra and Ordinary Differential Equations
(EMAT102L)

Batch: GR-1
April 23, 2021

Time: 20 minute | *Quiz 2* | Maximum Marks: 10

1. Determine x such that the $(1, 2, 1)$, $(x, 3, 1)$, $(2, x, 0)$ are linearly dependent

   Answer: $x = 2, -1$ (or $x = 2, 2$) [2]

2. If $\{\alpha, \beta, \gamma\}$ is a basis of a vector space V, then $\{\alpha + \beta + \gamma, \beta + \gamma, \gamma\}$ is also a basis of V.

   Answer: True [2]

3. The spaces S is spanned by $(2, 0, 1), (3, 1, 0)$ and T is spanned by $(1, 0, 0), (0, 1, 0)$. Find $dim(S)$, $dim(T)$ and $dim(S \cap T)$

   Answer: $dim(S) = 2$, $dim(T) = 2$ and $dim(S \cap T) = 1$ [2]

4. A linear mapping $T : R^3 \to R^2$ is defined by $T(x, y, z) = (2x+2y+z, \frac{1}{2}(-x+y+3z))$. Find the matrix of T related to the ordered bases $\{(0, 1, 1), (1, 0, 1), (1, 1, 0)\}$ of R^3 and $\{(1, 0), (1, 1)\}$ of R^2

   Answer: $\begin{bmatrix} 1 & 2 & 4 \\ 2 & 1 & 0 \end{bmatrix}$ [2]

5. The mapping $T : R^3 \to R^3$ is defined by $T(x, y, z) = (yz, zx, xy)$, $(x, y, z) \in R^3$ is a linear mapping.

   Answer: False [2]

Teacher's name: Dr. Najnin Islam | End of exam