



Nagar Yuwak Shikshan Sanstha's
Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)
Hingna Road, Wariadongri, Nagpur - 441 110

EVEN Term 2023-24

Course Name: Linear Algebra

Semester: IV

Time: 1.5 Hrs.

22AML401 Mid Semester Exam-II

Code: 22CSE401/22CT401/22ADS401

Branch: CSE, CT, AIDS, AIML Date: 06/05/2024

Max. Marks: 30

Instructions to Examinees:

- 1) All questions are compulsory.
- 2) Figures in bracket to the right indicate the marks for questions, Course outcomes and bloom's level.

Q1	Solve the following	Marks	CO Level
(A)	Let $V = \{(x, y, z) : x, y, z \in R\}$ where R is the field of real numbers. Show that if $S = \{(x, y, z) : y = \sqrt{2}x\}$, then it is a subspace of V over R .	5	CO-3 Level-3
(B)	Show that the set $B = \{(1, 2, 0), (0, 3, 0), (-1, 0, 1)\}$ form a basis of R^3	5	CO-3 Level-3
Q2	Solve the following		
(A)	Test the linear map $T : V_3(R) \rightarrow V_3(R)$ defined by $T(a, b, c) = (3a, a-b, 2a + b + c)$ is a linear transformation or not?	5	CO-4 Level-3
(B)	Prove that the linear map $T : V_2 \rightarrow V_2$ defined by $T(x, y) = (\lambda_1 x, \lambda_2 y)$, $\lambda_1 \neq 0$, $\lambda_2 \neq 0$ is non singular and find its inverse.	5	CO-4 Level-3
Q3	Solve the following		
(A)	If $V(R)$ be a vector space over the closed interval $0 \leq t \leq 1$ and if $f(t), g(t) \in V$, $\langle f(t), g(t) \rangle = \int_0^1 f(t)g(t)dt$. Then find $\langle f, g \rangle$, $\ f\ $ and $\ g\ $ as $f(t) = t^2 - 2t + 3$, $g(t) = t + 2$	5	CO-4 Level-3
(B)	Use Gram-Schmidt orthogonalisation process to construct an orthonormal basis of the subspace generated by $(1, 1, -1, 1)$, $(1, 2, 0, 1)$, $(1, 0, 0, 1)$.	5	CO-4 Level-3