

Ajay Kumar Garg Engineering College, Ghaziabad
Department of Applied Sciences & Humanities

Sessional Test-1

Course: B.Tech
 Session: 2024-25
 Subject: Engg. Math's -I
 Max Marks: 25

Semester: Ist
 Section: All sections excluding S-10
 Sub. Code: BAS-103
 Time: 1 hour

OBE Remarks: All questions are related to CO1.

Q.No	1	2	3	4	5	6	7
CO No.	CO1	CO1	CO1	CO1	CO1	CO1	CO1
Bloom's Level* (L1 to L6)	L1	L1	L2	L3	L4	L5	L5

*Bloom's Level: L1: Remember, L2: Understand, L3: Apply, L4: Analyze, L5: Evaluate, L6: Create

Note: Answer all the sections.

Section-A

(3×2 = 6)

A. Attempt all the parts.

1. Eigen values of a matrix A are 1,1,1, find the eigen values of $A^2 + 2A + 3I$
2. For what value of α , the set of the vectors (1,0, α) (5,3,13) and (4,2,0) is linearly dependent.
3. Check whether the matrix $A = \begin{bmatrix} i & 0 & 0 \\ 0 & 0 & i \\ 0 & i & 0 \end{bmatrix}$ is unitary matrix or not.

Section-B

B. Attempt all the parts.

(3×4 = 12)

4. Reduce the matrix $A = \begin{bmatrix} 1 & 2 & -1 & 4 \\ 2 & 4 & 3 & 4 \\ 1 & 2 & 3 & 4 \\ -1 & -2 & 6 & -7 \end{bmatrix}$ into its Echelon form and hence find its rank.

5. For what values of λ and μ the system of equations

$2x + 3y + 5z = 9$, $7x + 3y - 2z = 8$ and $2x + 3y + \lambda z = \mu$ will have (i) no solution (ii) unique solution (iii) no solution

6. Find the Eigen values and Eigen vectors of the matrix $A = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 2 & 1 \\ 3 & 2 & 3 \end{bmatrix}$

Section-C

C. Attempt all the parts.

(1×7 = 7)

7. Verify the Cayley- Hamilton theorem for the matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 5 \\ 3 & 5 & 6 \end{bmatrix}$ also, find the value of

$A^8 - 11A^7 - 4A^6 + A^5 + A^4 - 11A^3 - 3A^2 + 2A + I$, and hence find A^{-1}

Faculty Sign

HoD Sign