PVP 14

Code: CE2T1, ME2T1, CS2T1, IT2T1, EE2T1, EC2T1, AE2T1

I B.Tech - II Semester–Regular/Supplementary Examinations – May 2017

ENGINEERING MATHEMATICS - II
(Common for all Branches)

Duration: 3 hours Max. Marks: 70

PART – A

Answer ***all*** the questions. All questions carry equal marks

11x 2 = 22 M

1.

a) Find the rank of the matrix $A = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$

b) Explain Gauss Seidal Method for solving linear system of three equations in three unknowns.

c) If $A = \begin{bmatrix} 2 & 4 & 7 \\ 0 & 1 & 8 \\ 0 & 0 & 3 \end{bmatrix}$ then write the eigen values of the matrix $Adj(A)$

d) Prove that the eigen values of A^{-1} are the reciprocals of the eigen values of A

e) Find $L\{a^t\}$

f) Let $f(t)$ and $g(t)$ be any two continuous functions for t >0 then define the convolution product of $f(t)$ and $g(t)$

g) Write the Laplace Transform of Unit Step function.

h) If $f(x) = |cosx|$ in $(-\pi, \pi)$ then write the value of the Fourier coefficient b_2

i) State Fourier integral theorem.

j) Find the Z-Transform of the sequence {3,5,6,9,0,1}

k) Find the inverse Z-Transform of $\frac{1}{Z^2-5Z+6}$ in the region $|Z| > 3$

PART – B

Answer any ***THREE*** questions. All questions carry equal marks.

3 x 16 = 48 M

2. a) Reduce the matrix $A = \begin{bmatrix} 1 & -1 & 2 & -3 \\ 4 & 1 & 0 & 2 \\ 0 & 3 & 0 & 4 \\ 0 & 1 & 0 & 2 \end{bmatrix}$ to Normal form and

Hence find its rank. 8 M

b) Solve the system of equations: 8 M

$$x + 2y - z = 3$$
$$3x - y + 2z = 1$$
$$2x - 2y + 3z = 2$$
$$x - y + z = -1$$

3. a) Find the eigen values and corresponding eigen vectors of the matrix $A = \begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$ 8 M

b) State Cayley –Hamilton theorem and Verify the Cayley – Hamilton theorem for the matrix 8 M

$$A = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 3 & -3 \\ -2 & -4 & -4 \end{bmatrix}$$

4. a) Evaluate the Laplace Transform of the functions 8 M

i) $tsinat$ ii) $\frac{cosat-cosbt}{t}$

b) Using Laplace Transform, solve $\frac{d^2y}{dt^2} + 2\frac{dy}{dt} - 3y = sint$ $Where\ y = \frac{dy}{dt} = 0\ \ at\ t = 0.$ 8 M

5. a) Obtain half range sine series of the function 8 M

$$f(x) = \begin{cases} kx & for\ \ 0 < x < \pi/2 \\ k(l-x) & for\ \ \pi/2 < x < \pi \end{cases}$$

b) Find the Fourier Transform of f(x) defined by 8 M

$$f(x) = \begin{cases} 1 - x^2 & for\ \ |x| \le 1 \\ 0 & for\ \ |x| > 1 \end{cases}$$ hence evaluate

$$\int_0^\infty \frac{x\,cosx - sinx}{x^3} cos\left(\frac{x}{2}\right) dx$$

6. a) Applying the second shifting theorem , evaluate 8 M

i) $Z[\cos(n+1)\theta]$ ii) $Z[\sin(n+1)\theta]$

b) Find Z transform of $\left(\frac{1}{3}\right)^n + \left(\frac{1}{4}\right)^n$ 8 M