**PVP 14**

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

**I B.Tech - II Semester – Regular/Supplementary Examinations**
**April - 2018**

# ENGINEERING MATHEMATICS - II

**(Common for all Branches)**

Duration: 3 hours Max. Marks: 70

PART – A

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

11 x 2 = 22 M

1.

a) Define Normal form of a matrix.

b) Write the working rule for finding the inverse of a matrix by using elementary row operations.

c) If eigen values of A are - 1, 2, -3 then find the eigen values of adj A.

d) Prove that eigen values of A and $A^T$ are same.

e) Write the existence conditions of the Laplace Transforms of a function.

f) Find Inverse Laplace Transforms of $\frac{4}{(s+1)(s+2)}$

g) State and prove First shifting theorem of Laplace Transforms.

h) Find the finite Fourier sine transform of f(x) = x where $0<x<4$

i) Define Periodic function with example.

j) Find $Z\left\{e^{t}\sin 2t\right\}$

k) State and Prove damping rule for z- transform.

## PART – B

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

3 x 16 = 48 M

2. a) Solve the following system of equations

$3x + y + z = 8,\ x + 2y - z = 5,\ 2x + y + 3z = 4$

Using Gauss elimination method. 8 M

b) Show that the only real number λ for which the system

$x + 2y + 3z = \lambda x,\ 3x + y + 2z = \lambda y,\ 2x + 3y + z = \lambda z$

has non – zero solution is 6 and solve them when λ = 6.

8 M

3. a) Diagonalize the matrix A= $\begin{bmatrix} 8 & -8 & -2 \\ 4 & -3 & -2 \\ 3 & -4 & 1 \end{bmatrix}$ 8 M

b) If A and B are n rowed square matrices and if A is invertable, show that $A^{-1}B$ *and* $BA^{-1}$ have the same eigen values. 8 M

4. a) Find $L\left\{\int_0^t t\,e^{-t}\sin 4t\,dt\right\}$ 8 M

b) Using Laplace Transforms solve

$$\frac{d^2y}{dt^2} + 2.\frac{dy}{dt} + 5y = e^{-t}.\sin t$$

given that $y(0) = 0, y'(0) = 1.$ 8 M

5. a) Find the Fourier series for $f(x) = x - x^2 \text{ in } [-\pi, \pi].$ 8 M

b) Find the Fourier cosine and sine transforms of $\frac{e^{-ax}}{x}$ and hence deduce that

$$\int_0^\infty \frac{e^{-ax} - e^{-bx}}{x} \sin sx \, dx = \tan^{-1}\left(\frac{s}{a}\right) - \tan^{-1}\left(\frac{s}{b}\right)$$ 8 M

6. a) Find $z\{(\cos\theta + i\sin\theta)^n\}$. Hence evaluate

$z(\cos n\theta)$ *and* $z(\sin n\theta)$ 8 M

b) Find $z^{-1}\left\{\frac{3z^2}{(5z-1)(5z+2)}\right\}$ 8 M