G.R. No. [   ]   paper code U218-131 (T1)

OCTOMBER 2018 / IN - SEM (T1)

S. Y. B.TECH. (E&TC) (SEMESTER - I)

COURSE NAME: ENGINEERING MATHEMATICS III

COURSE CODE: ETUA21171

(2017 PATTERN)

Time : [1 Hour]   [Max. Marks : 30]

(*) Instructions to candidates:
1) Answer Q.1 OR Q.2, Q.3 OR Q.4
2) Figures to the right indicate full marks.
3) Use of scientific calculator is allowed
4) Use suitable data where ever required

Q 1) a) Solve $D^2 + 3D + 2 = sin e^x$ [6]

b) Solve the differential equation by variation of parameter

$(D^2 - 2D + 2)y = e^x \tan x$ [6]

c)   Solve $\dfrac{dx}{y-z} = \dfrac{dy}{z-x} = \dfrac{dz}{x-y}$ [4]

OR

Q2) a) Solve $x^2 \dfrac{d^2y}{dx^2} - 3x\dfrac{dy}{dx} + 5y = x^2 \sin(\log x)$ [6]

b) Solve $(D^2 + 4)y = x \sin x$ [6]

c) Solve Simultaneous equation $\dfrac{dx}{dt} + y = \sin t ; \dfrac{dy}{dt} + 4x = \cos t$ [4]

Q3) a) By considering Fourier sine & cosine integrals of e^{-mx} (m > 0)
prove that

$\int\limits_0^\infty \dfrac{\lambda \sin \lambda x}{\lambda^2 + m^2}\, d\lambda = \dfrac{\pi}{2}\, e^{-mx}$ m > 0, x > 0.   [6]

b) Solve the integral equation $\int\limits_0^\infty f(x)\cos \lambda x\; dx = \begin{cases} 1-\lambda, & 0 \le \lambda \le 1 \\ 0, & \lambda \ge 1 \end{cases}$ [4]

c) Find Z-Transform of $f(k) = (k+2)2^k$, $k \geq 0$. [4]

OR

Q4) a) Solve the difference equation $6f(k+2) - f(k+1) - f(k) = 0$,

$f(0) = 0, f(1) = 1, k \geq 0$ [6]

b) Find Z-Inverse, where $F(z) = \left(\dfrac{z^2}{z^2+1} \right)$ [4]

c) Find Fourier transform of $f(x) = e^{-|x|}$ [4]