Total No. of Questions – [6]   Total No. of Printed Pages: 2

G.R. No.	

MARCH 2020 INSEM (T1)
S. Y. B.TECH. (COMPUTER ENGINEERING/INFORMATION TECHOLOGY)
(SEMESTER –IV)

COURSE NAME: ENGINEERING MATHEMATICS III
COURSE CODE: ES22181CS/ ES22181IT

(PATTERN 2018)

Time: [1 Hour]   [Max. Marks: 20]

Instructions to candidates:

1. Attempt Q.1 **OR** Q.2, Q.3 **OR** Q.4, Q.5 **OR** Q.6
2. Figures to the right indicate full marks.
3. Use of scientific calculator is allowed.
4. Assume suitable data wherever required

Q 1)   Solve the following

> $(D^2 + 4)y = \cos x.\cos 2x.\cos 3x$ [4]

> $(D^2 - 2D + 2)y = e^x \tan x$ (Using Method of variations of parameter)   [4]

OR

Q2)   Solve the following

> $\left(x^3 \dfrac{d^3 y}{dx^3} + 2x^2 \dfrac{d^2 y}{dx^2} + 2y \right) = 10\left(x + \dfrac{1}{x} \right)$ [4]

> $(D+2)x + (D+1)y = t$
> $5x + (D+3)y = t^2$ [4]

Q 3) Attempt

> Using Fourier integral representation, show that   [4]
  $\displaystyle\int_0^\infty \dfrac{\lambda^3 \sin \lambda x}{\lambda^4 + 4} d\lambda = \dfrac{\pi}{2} e^{-x} \cos x, \text{ where } x > 0$

> Find Z-transform of $f(k) = \cos \alpha k, (k \geq 0)$ [4]

OR

Q4) Attempt

> Find the Fourier transform of $f(x) = \begin{cases} 1-x^2, & |x| \le 1 \\ 0, & |x| > 1 \end{cases}$ and [4]

hence evaluate $\int_0^\infty \left(\frac{x\cos x - \sin x}{x^3} \right) \cos\frac{x}{2} dx$

> Find Z-transform of $f(k) = 4^k \sin(2k+3), (k \ge 0)$ [4]

Q5) Apply Gauss –Seidal method to solve [4]

$$5x + 2y + z = 12$$
$$x + 4y + 2z = 15$$
$$x + 2y + 5z = 20$$

correct upto 4 decimal places taking initial values of $x = y = z = 0$

OR

Q6) Use Runge- Kutta method of fourth order to obtain the solution of [4]

$\frac{dy}{dx} = \sqrt{x+y}$ subject to the conditions $x = 0$, $y = 1$

Find 'y' at $x = 0.2$ taking h= 0.2