CBCS SCHEME

USN

15MAT21

Second Semester B.E. Degree Examination, June/July 2019

Engineering Mathematics – II

Time: 3 hrs. Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Solve $(D^2 - 4D + 4)y = e^{2'} + \cos 2x + 4$ by inverse differential operator method. (06 Marks)

b. Solve $\frac{d2y}{dx`} - 2\frac{dy}{dx} + Sy\ e^2 x \sin x$ by inverse differential operator method. **(05 Marks)**

c. Using the method of undetermined coefficients, solve yff –3y' + 2y = +ex . **(05 Marks)**

OR

2 a. Solve $\frac{cry}{dx}$ $2\frac{dy}{dx} + y = xex \sin x$ by inverse differential operator method. **(06 Marks)**

b. Solve $(D^3\ 6D^2 + I\ 1D - 6)y = e^{-2}x +$ by inverse differential operator method.(05 **Marks)**

c. Solve- $y'' - 2y' + y = \frac{c}{\ }$ by method of variation of parameters. **(05 Marks)**

Module-2

3 a. Solve $(2x-1)2\frac{cr\ y}{dx^2} + (2x-l)\frac{dy}{dx} - 2y = 8x' - 2x + 3$. **(06 Marks)**

b. Solve $xy\left(\frac{dy}{dx}\right)^{2} + y')\frac{dY}{dx} + xy = \mathbf{0}$ **(05 Marks)**

c. Solve $x^2(y - px) - p^2 y$ by reducing into Clairaut's form and using the substation $X = x^2$ and Y = (05 **Marks)**

OR

4 a. Solve $x^{-1}y'' - xy' + 2y = x\sin(\log x)$. **(06 Marks)**

b. Obtain the general solution of the differential equation $p^2 + 4x'p - 12x^4 y = 0$. (05 **Marks)**

c. Obtain the general and singular solution of $y = 2px + p\ 'y$. (05 **Marks)**

Module-3

5 a. Form the partial differential equation by eliminating the arbitrary function from the relation Z = y f(x) + x g(y). **(06** Marks)

b. Solve $\frac{\ }{axay} = \_\_x \sin y$ for which $\frac{(z}{()^1} = -2\sin y$ when x 0 and z 0 when y is an odd multiple of n/2. **(05 Marks)**

c. Derive one dimensional wave equation $\frac{\ }{at2} = \frac{\ }{ax2}$ **(05 Marks)**

OR

6 a. Form a partial differential by eliminating the arbitrary function (I) from the relation 4)(x 2 +y 2 +z 2 ,z 2 _ 2xy) = 0 . **(06 Marks)**

b. Solve $\frac{a^2 z}{ax^2}$ + 4z = 0 , given that when x = 0, z = e"' and $\frac{az}{ax}$ = 2 **(05 Marks)**

c. Determine the solution of the heat equation $\frac{au}{at} = c^2 \frac{a^2 u}{aK^2}$ by the method of separation of variables for the constant K is positive. **(05 Marks)**

Module-4

7 a. Evaluate if (xy + e)dydx 24 **(06 Marks)**

b. Evaluate 4a 2\ ax 0 x² /4a dydx by changing the order of integration. **(05 Marks)**

c. Obtain the relation between the beta and gamma function in the form

p(m,n)= $\frac{km) -1(0}{1(ni+n)}$ **(05 Marks)**

OR

8 a. Evaluate fJe 4'2 dxdy by changing into polar coordinates. x, 0 0 **(06 Marks)**

Evaluate J x x 0 0 fe` `Y"dzdydx **(05 Marks)**

c. Using beta and gamma function, prove that $\int_0 \frac{x^2}{-x^4} dx \times \frac{y}{t, -J1+ x^4}$ 4-\12 **(05 Marks)**

Module-5

9 a. Find L $\frac{}{t}$ + t sin t **(06 Marks)**

b. If f(t) $\frac{t}{2m}$ 0__tsrm , where g t + 2n) = f(t), then prove that L{f(t) = $\frac{1}{s}$ tan h $\frac{Its}{2}$ **(05 Marks)**

c. Find r^{i} $\frac{s}{s` \pm a^2)^2}$ using convolution theorem. **(05 Marks)**

OR

10 a. Express f(t) =
0 < t < 1
t 1 < t < 2
2 t > 2
in term of unit step function and hence find its Laplace transform. **(06 Marks)**

b. Find L-` $\frac{s+5}{s^2 -6s+13}$ 1 . **(05 Marks)**

c. Employ the Laplace transform to solve the differential equation y"(t)+ 4y'(t)+4y(t)= e' with the initial condition AO) = 0 and y'(0) = 0. **(05 Marks)**