Roll No. ☐☐☐☐☐☐☐☐☐☐☐☐   Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Electrical Engg./ECE) (2018 Batch)   (Sem.–2)
MATHEMATICS-II
Subject Code : BTAM-202-18
M.Code : 76255

Time : 3 Hrs.   Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :
1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION - B & C have FOUR questions each.**
3. **Attempt any FIVE questions from SECTION B & C carrying EIGHT marks each.**
4. **Select atleast TWO questions from SECTION - B & C.**

SECTION-A

l.   **Answer briefly :**

a)   Check whether the given equation is exact and obtain the general solution :

$$(1 + x^2)dy + 2xy dx = 0$$

b)   Solve the differential equation $(x - a)dy/dx + 3y = 12 (x–a)^3$; $x > a > 0$.

c)   Find the solution of the differential equation $y^{||} + 2y^{|} + 2y = 0$.

d)   Find a differential equation of the form $ay^{||} + by^{|} + cy = 0$, for which e^{-x} and xe^{-x} are solutions.

e)   Solve the differential equation $y^{||} - 32y^{|} + 256y = 0$

f)   Write a short note on initial value problems.

g)   Find the interval in which the root of equation $x^3 - x - 11 = 0$ lies.

h)   Write a short note on Bisection method.

i)   Define transcendental equation.

j)   Find the polynomial which takes following data (0, 1), (1, 2) and (2, 1).

SECTION-B

2. i) Find the integrating factor and hence solve $(5x^3 + 12x^2 + 6y^2)\, dx + 6xy\, dy = 0$

   ii) Solve the differential equation $dy/dx - y = y^2 (\sin x + \cos x)$.

3. i) Find a homogeneous linear differential equation with real coefficients of lowest order which has the $xe^{-x} + e^{2x}$ as the particular solution.

   ii) Using differential operator, find general solution of $(D^2 + 9)\, y = xe^{2x} \cos x$.

4. Find the general solution of the equation $y + 16y = 32 \sec 2x$, using the method of variation of parameters.

5. Find the general solution of the equation $x^2 y + 5xy - 5y = 24x\,lnx$.

SECTION-C

6. Use Newton iterative method to find the root of equation $3x - \cos(x) + 1$, by taking initial guess 0.6.

7. Solve the following equations by elimination method $2x + y + z = 10$, $3x + 2y + 3z = 18$ and $x + 4y + 9z = 16$.

8. Using Newton's forward formula, find value of $f(1.6)$, if :

x	1	1.4	1.8	2.2
$f(x)$	3.49	4.82	5.96	6.5

9. Using Runge-Kutta method of order 4, find $y(0.2)$ for the equation $y = (y - x)/(y + x)$ $y(0) = 1$, take $h = 0.2$.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.