INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)

B.Tech II Semester End Examinations (Supplementary) - May, 2019

Regulation: IARE – R16

COMPUTATIONAL MATHEMATICS AND INTEGRAL CALCULUS

Time: 3 Hours   (Common to AE | ME | CE)   Max Marks: 70

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. (a) State newtons forward and backward interpolation formulae for equal length of intervals and write the relation between Δ and E. **[7M]**

   (b) From the given Table 1 given below evaluate f(10) by using Lagranges's formula. **[7M]**

Table 1

X	5	6	9	11
Y	12	13	14	16

2. (a) State the newtons Raphson's formula. Find the cube root of the number 15. **[7M]**

   (b) Find one real root of the equation x^3-2x-5 $= 0$ by method of false position correct to three decimal places. **[7M]**

UNIT – II

3. (a) Write the normal equations of the parabola by using the method of least square. **[7M]**

   (b) Fit a Straight line y = a + bx to the following data given in Table 2 by the method of least squares **[7M]**

Table 2

X	0	1	3	6	8
Y	1	3	2	5	4

4. (a) Write Euler's and Modified Euler's Formulae. **[7M]**

   (b) Applying Runge - Kutta method of order 4, compute y(0.2) from, $y^1 = (y^2 - x^2) / (y^2 + x^2)$ taking y(0)=1 and h=0.2.

UNIT – III

5. (a) Explain the change in the order of integration in Cartesian form.   **[7M]**

    (b) Evaluate $\int \int_v \int 2x\,dv$ where v is the region under the plane $2x + 3y + z = 6$ that lies in the first octant.   **[7M]**

6. (a) Explain the concept of surface integral in XY, YZ, ZX plane.   **[7M]**

    (b) Obtain the area of the region which is outside the circle r $= 1$ and inside the cardioid $r = (1 + cos\theta)$.   **[7M]**

UNIT – IV

7. (a) State Gauss divergence and Green's theorem.   **[7M]**

    (b) Calculate the line integral by Stokes's theorem for the given F=[x+y, 2x-z, y+z] where C is the triangle with vertices (2,0,0),(0,3,0) and (0,0,6).   **[7M]**

8. (a) Define Gradient, Divergent, Curl, Solenoid, Irrotational of a vector.   **[7M]**

    (b) Obtain the directional derivative of at A in the direction of AB where A= (1,2,-1) , B=(5,6,8) .   **[7M]**

UNIT – V

9. (a) State and prove generating function of Bessel's functions.   **[7M]**

    (b) Solve in series $\left(1 - x^2\right) d^2y/dx^2 - xdy/dx + 4y = 0$.   **[7M]**

10. (a) Write the any four recurrence relations of Bessel's functions.   **[7M]**

    (b) Define Gamma function. State and prove $\Gamma(1/2)=\sqrt{\pi}$ **[7M]**

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