**20MA201**

**Hall Ticket Number:**

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| **I/IV B.Tech (Regular) DEGREE EXAMINATION** | | | |
| **September, 2021** | **Numerical Methods And Advanced Calculus** | | |
| **Second Semester** | **Common to all branches** | | |
| **Time:** Three Hours | | **Maximum:** 70 Marks | |
| ***Answer question 1 compulsory.*** | | | **(14X1 = 14Marks)** |
| ***Answer one question from each unit.*** | | | **(4X14=56 Marks)** |

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|  |  |  | CO | BL | M |
| 1 | a) | Write Newton – Raphson interpolation formula. | CO1 | L1 | 1M |
|  | b) | Write intermediate Value Property. | CO1 | L1 | 1M |
|  | c) | Write Newton Backward formula. | CO2 | L1 | 1M |
|  | d) | State Simpson’s three – eighth rule. | CO2 | L1 | 1M |
|  | e) | Write Picard’s iterative formula. | CO2 | L1 | 1M |
|  | f) | Write Lagrange’s interpolation formula. | CO2 | L1 | 1M |
|  | g) | Evaluate | CO3 | L2 | 1M |
|  | h) | Find the value of | CO3 | L2 | 1M |
|  | i) | Evaluate the double integral | CO3 | L1 | 1M |
|  | j) | Write formula to find area enclosed by plane curves. | CO3 | L1 | 1M |
|  | k) | Find div F, when **F =** yz **I +** x2z3 **J +** 3xy2 **K.** | CO4 | L2 | 1M |
|  | l) | Find vector normal to the surface f(x.y.z) = x2y2z3 at the point (1,2,3). | CO4 | L2 | 1M |
|  | m) | Define Vector point function. | CO4 | L1 | 1M |
|  | n) | State Gauss divergence theorem in the plane. | CO4 | L1 | 1M |
| **Unit-I** | | | | | |
| 2 | a | Find the cube root of 41, using Newton – Raphson method correct to 4 decimal places. | CO1 | L2 | 7M |
|  | b | Apply Gauss elimination method to solve the equations x + 4y – z = -5; x + y – 6z = -12; 3x – y – z = 4. | CO1 | L2 | 7M |
|  |  | **(OR)** |  |  |  |
| 3 | a | Find a root the equation x3 – x - 1 =0 by using the bisection method correct to three decimal places. | CO1 | L2 | 7M |
|  | b | Solve the the equations 20x + y - 2z = 17; 3x + 20y - z = -18; 2x - 3y + 20 z = 25 by Gauss – Seidel method correct to 2 decimal places. | CO1 | L2 | 7M |
| **Unit-II** | | | | | |
| 4 | a | Find y (55) given that y(50) =205,y(60) = 225,y(70) = 248 and y(80) = 274. Use Newton’s forward interpolation formula. | CO2 | L2 | 7M |
|  | b | If y (1) = -3, y (3) = 9, y(4) = 30, y(6) =132, find the Lagrange’s interpolation polynomial that takes the same values as ‘y’ at the given points. | CO2 | L2 | 7M |
| **(OR)** | | | | | |
| 5 | a | Calculate the value of by Simson’s 1/3 rule, Using 11 ordinates. | CO2 | L2 | 7M |
|  | b | Using Runge – Kutta method of order 4, find y for x = 0.1, 0.2 given that  = xy + y2 , y (0) = 1. | CO2 | L3 | 7M |
| **Unit-III** | | | | | |
| 6 | a | Evaluate dx dy by changing the order of integration | CO3 | L3 | 7M |
|  | b | Evaluate dx dy over the area bounded by the ellipse + =1. | CO3 | L3 | 7M |
| **(OR)** | | | | | |
| 7 | a | Evaluate | CO3 | L2 | 7M |
|  | b | Find the angle between the surfaces x2+y2+z2 =9 and z = x2+y2-3 at the point  (2,-1,2). | CO4 | L2 | 7M |
| **Unit-IV** | | | | | |
| 8 | a | Find the values of a and b such that the surfaces ax2 – byz = (a + 2)x and 4x2y + z3 = 4 cut orthogonally at (1, -1, 2). | CO4 | L2 | 7M |
|  | b | Show that ) = n (n + 1) . | CO4 | L2 | 7M |
| **(OR)** | | | | | |
| 9 | a | Verify Green’s theorem for where C is the boundry of the region bounded by x = 0, y = 0 and x + y = 1 . | CO4 | L3 | 14M |

