**20MA201**

**Hall Ticket Number:**

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| **I/IV B.Tech (Regular) DEGREE EXAMINATION** | | | |
| **September, 2021** | **Common to all branches** | | |
| **Second Semester** | **Numerical Methods And Advanced Calculus** | | |
| **Time:** Three Hours | | **Maximum: 7**0 Marks | |
| *Answer Question No.1 compulsorily.* | | | (1X14 = 14 Marks) |
| *Answer* ***ONE*** *question from each unit.* | | | (4X14=56 Marks) |

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| 1. | a) | | Write Newton – Raphson interpolation formula. | CO 1 | |  |
|  | b) | | Write intermediate Value Property. | CO 1 | |  |
|  | c) | | Write Newton Backward formula. | CO 2 | |  |
|  | d) | | State Simpson’s three – eighth rule. | CO 2 | |  |
|  | e) | | Write Picard’s iterative formula. | CO 2 | |  |
|  | f) | | Write Lagrange’s interpolation formula. | CO 2 | |  |
|  | g) | | Evaluate | CO 3 | |  |
|  | h) | | Find the value of | CO 3 | |  |
|  | i) | | Evaluate the double integral | CO 3 | |  |
|  | j) | | Write formula to find area enclosed by plane curves. | CO 3 | |  |
|  | k) | | Find div F, when **F =** yz **I +** x2z3 **J +** 3xy2 **K.** | CO 4 | |  |
|  | l) | | Find vector normal to the surface f(x.y.z) = x2y2z3 at the point (1,2,3). | CO 4 | |  |
|  | m) | | Define Vector point function. | CO 4 | |  |
|  | n) | | State Gauss divergence theorem in the plane. | CO 4 | |  |
| **Unit - I** | | | | | | |
| 2. | a) | Find the cube root of 41, using Newton – Raphson method correct to 4 decimal places. | | CO1 | 7M | |
|  | b) | Apply Gauss elimination method to solve the equations x + 4y – z = -5; x + y – 6z = -12; 3x – y – z = 4. | | CO1 | 7M | |
|  |  | **(OR)** | |  |  | |
| 3. | a) | Find a root the equation x3 – x - 1 =0 by using the bisection method correct to three decimal places. | | CO1 | 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 | 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 | 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 | 7M | |
|  |  | **(OR)** | |  |  | |
| 5. | a) | Calculate the value of by Simson’s 1/3 rule, Using 11 ordinates. | | CO2 | 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 | 7M | |
|  |  | **Unit - III** | |  |  | |
| 6. | a) | Evaluate dx dy by changing the order of integration | | CO3 | 7M | |
|  | b) | Evaluate dx dy over the area bounded by the ellipse + =1. | | CO3 | 7M | |
|  |  | **(OR)** | |  |  | |
| 7. | a) | Evaluate | | CO3 | 7M | |
|  | b) | Find the angle between the surfaces x2+y2+z2 =9 and z = x2+y2-3 at the point  (2,-1,2). | | CO3 | 7M | |
| **P.T.O.**  **20MA201**  **Unit - IV** | | | | | | |
| 8. | a) | FinF 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 | 7M | |
|  | b) | Show that ) = n (n + 1) . | | CO4 | 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 | 14M | |

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| **I/IV B.Tech (Regular) DEGREE EXAMINATION** | | | |
| **September,2021** | **Common to All Branches** | | |
| **Second Semester** | **Numerical Methods And Advanced Calculus** | | |
|  | |  | |
| **Time:** Three Hours **Maximum: 7**0 Marks | | | |
| *Answer Question No.1 compulsorily.* | | | (1X14 = 14 Marks) |
| *Answer ONE question from each unit.* | | | (4X14 = 56 Marks) |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1. | a) | | | Write Newton – Raphson formula. | | CO 1 | |  | |
|  | b) | | | Write intermediate Value Property. | | CO 1 | |  | |
|  | c) | | | Write Newton Backward formula. | | CO 2 | |  | |
|  | d) | | | State Simpson’s three – eighth rule. | | CO 2 | |  | |
|  | e) | | | Write Picard’s iterative formula. | | CO 2 | |  | |
|  | f) | | | Write Lagrange’s interpolation formula. | | CO 2 | |  | |
|  | g) | | | Evaluate | | CO 3 | |  | |
|  | h) | | | Find the value of | | CO 3 | |  | |
|  | i) | | | Evaluate the double integral | | CO 3 | |  | |
|  | j) | | | Write formula to find area enclosed by plane curves. | | CO 3 | |  | |
|  | k) | | | Is the Vector function **F =** yz **I +** x2z3 **J +** 3xy2 **K** is solenoidal. | | CO 4 | |  | |
|  | l) | | | Find vector normal to the surface f(x.y.z) = x2y2z3 at the point (1,2,3). | | CO 4 | |  | |
|  | m) | | | Define irrotational Vector point function. | | CO 4 | |  | |
|  | n) | | | State Green’s theorem in the plane. | | CO 4 | |  | |
|  | | **Unit -I** | | | | | | | |
| 2. | a) | | Find the cube root of 41, using Newton – Raphson method. | | | | CO1 | | 7M |
|  | b) | | Apply Gauss elimination method to solve the equations x + 4y – z = -5; x + y – 6z = -12; 3x – y – z = 4. | | | | CO1 | | 7M |
|  |  | | **(OR)** | | | |  | |  |
| 3. | a) | | Find a root the equation x3 – x - 1 =0 by using the bisection method correct to three decimal places. | | | | CO1 | | 7M |
|  | b) | | Solve the the equations 20x + y - 2z = 17; 3x + 20y - z = -18; 2x - 3y + 20 z = 25 by Gauss – Seidel method. | | | |  | | 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 difference formula. | | | | CO2 | | 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 | | 7M |
|  |  | | **(OR)** | | | |  | |  |
| 5. | a) | | Calculate the value of by Simson’s 1/3 rule, Using 11 ordinates. | | | | CO2 | | 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 | | 7M |
|  |  | |  | | **Unit -III** | | | | |
| 6. | a) | | Evaluate dx dy by changing the order of integration | | | | CO3 | | 7M |
|  | b) | | Evaluate dx dy over the area bounded by the ellipse + =1. | | | | CO3 | | 7M |
|  |  | | **(OR)** | | | |  | |  |
| 7. | a) | | Evaluate | | | | CO3 | | 7M |
|  | b) | | Find the directional derivative of y z + 4 x z2 at the point (1, -2, 1) in the direction of the ector 2 - - 2. | | | | CO3 | | 7M |
|  |  | | **Unit -IV** | | | |  | |  |
| 8. | a) | | FinF Find the values of a and b such that the surfaces ax2 – byz = (a + 2)x and 4x2y + z3 = 4 cut  Oth orthogonally at (1, -1, 2). | | | | CO4 | | 7M |
|  | b) | | Show that ) = n (n + 1) . | | | | CO4 | | 7M |
|  |  | | **(OR)** | | | |  | |  |
| 9. |  | | Verify Green’s theorem for where C is the boundry of the region bounded by x = 0, y = 0 and x + y = 1 . | | | | CO4 | | 14M |

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