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| **20MA001**  **Hall Ticket Number:**   |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  |      |  |  |  | | --- | --- | --- | | **I/IV B.Tech( Regular/Supplementary) DEGREE EXAMINATION** | | | | **March,2023** | **Common to all branches** | | | **First Semester** | **Linear Algebra and ODE** | | | **Time: Three Hours** | | **Maximum:70 Marks** | |  |
| |  |  | | --- | --- | | ***Answer question 1 compulsory.*** | **(14X1 = 14 Marks)** | | ***Answer one question from each unit.*** | **(4X14=56 Marks)** | |  |

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| 1. | a) | | |  | | --- | | Define rank of a matrix | | CO1 | L1 | 1M |
|  | b) | | Find the characteristic equation of | CO1 | L2 | 1M |
|  | c) | | If A = then find the eigen values of A-1 | CO1 | L1 | 1M |
|  | d) | | Define integrating factor | CO2 | L1 | 1M |
|  | e) | | Find the value of ‘’, if is an exact differential equation | CO2 | L3 | 1M |
|  | f) | | What do you mean by Linear differential equation. | CO2 | L1 | 1M |
|  | g) | | Find the general solution of | CO3 | L1 | 1M |
|  | h) | | Find PI of | CO3 | L3 | 1M |
|  | i) | | Evaluate  whereis differentiable operator with respect to x. | CO3 | L1 | 1M |
|  | j) | | Find the Wronskian of | CO3 | L3 | 1M |
|  | k) | | Find | CO4 | L1 | 1M |
|  | l) | | Find | CO4 | L2 | 1M |
|  | m) | | Evaluate  using Laplace transform | CO4 | L1 | 1M |
|  | n) | | State convolution theorem in Laplace transforms. | CO4 | L1 | 1M |
|  | | **Unit –I** | | | | |
| 2. | a) | | Reduce the matrix  into Echelon form and hence find its rank | CO1 | L3 | 7M |
|  | b) | | Test for consistency and solve the system of equations | CO1 | L2 | 7M |
|  | | **(OR)** | | | | |
| 3. | a) | | Find the Eigen values and the corresponding Eigen vectors of the matrix  A= . | CO1 | L3 | 7M |
|  | b) | | Find the inverse of a matrix using Gauss Jordon method. | CO1 | L2 | 7M |
|  | | **P.T.O**  **20MA001**  **Unit –II** | | | | |
| 4. | a) | | Solve 2xydx+(x2 + y2)dy = 0 | CO2 | L3 | 7M |
|  | b) | | If 30% of a radioactive substance disappears in 10 days, how long will it take for 90% of it to disappear? | CO2 | L2 | 7M |
|  | | **(OR)** | | | | |
| 5. | a) | | A bodyoriginally at 800C cools down to 600C in 20 minutes. The temperature of the air being 400C. What will be the temperature of the body after 40 minutes from the original and when the temperature will be 450C? | CO2 | L2 | 7M |
|  | b) | | Solve | CO2 | L1 | 7M |
|  | | **Unit –III** | | | | |
| 6. | a) | | Solve (D2 + 4)y = sin 2x. | CO3 | L3 | 7M |
|  | b) | | Solve (D2 – 4D + 4)y = 8e2x sin 2x | CO3 | L2 | 7M |
|  | | **(OR)** | | | | |
| 7. | a) | | Solve (D2 – 6D + 9) y = e2x/x2 by the method of variation of parameters | CO3 | L3 | 7M |
|  | b) | | Solve (D2 – 3D + 2)y = xe3x + sin 2x. | CO3 | L2 | 7M |
|  | | **Unit –IV** | | | | |
| 8. | a) | | Find the Laplace transform of | CO4 | L2 | 7M |
|  | b) | | Using convolution theorem, Evaluate. | CO4 | L3 | 7M |
|  | | **(OR)** | | | | |
| 9. |  | | Using Laplace transform technique find the solution of  (D3 – 3D2 + 3D – 1)y = t2et; y(0) = 1, y'(0) = 0 and y''(0) = -2. | CO4 | L4 | 14M |

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