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| **Question Number** | **Mark** |
| **Question I** |  |
| **Question II** |  |
| **Question III** |  |
| **Question IV** |  |
| **Question V** |  |
| **Total** |  |

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| **Question I:**  **A. Choose the correct answer.**  **(1) The differential equation is**  **(a) of order 4 and nonlinear (b) of order 6 and nonlinear**  **(c) of order 4 and linear (d) None of the previous**  **(2) The undetermined coefficient method (superposition method and annihilator method) cannot be applied if in the differential equation is equal to**  **(a) (b) (c) (d) None of the previous** |
| **(3) The minimum value of the radius of convergence of a power series solution centered at zero of the differential equation is**  **(a) (b (c) (d) None of the previous**  **(4) The operator that annihilates is**  **(a) (b)**  **(c) (d) None of the previous**  **(5) =**  **(a) (b) (c) (d) None of the previous**  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  **(6) If the differential equation has a solution then a second solution is**  **(a) (b) (c) (d) None of the previous** |
| **(7)**  **(a) (b)**  **(c) (d) None of the previous**  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  **(8) A linear differential equation with constant coefficients having solutions is**  **(a) (b) (c) (d) None of the previous**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **(9) The following conditions make the differential equation a boundary value problem**  **(a) (b)**  **(c) (d) None of the previous**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**   1. **Without solving classify the differential equations below as separable, linear, exact, homogeneous and/or Bernoulli:**   **Question II :**  **A. Determine the region of the -plane for which the differential equation has a unique solution**  **B. Solve the initial value problem**  **Question III:**  **A. Find the orthogonal trajectories of the family**  **B. Solve the following differential equation**  **Question IV:**   1. **Solve the system of differential equations**   **B. Find two linearly independent power series solutions about the ordinary point ,**  **Question V:**  **A. Prove that if is a piecewise continuous on and of exponential order for then**  **B. Use the Laplace transform to solve the initial value problem**  **Good Luck☺** |
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