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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 equationis 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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