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

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| **Question** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** |
| **Answer** |  |  |  |  |  |  |  |  |

**Question I:** **A. Choose the correct answer, then fill in the table above:** **(1) The differential equation is****(a) of order 3 and nonlinear (b) of order 4 and nonlinear** **(c) of order 3 and linear (d) None of the previous****(2) The value of that makes exact is**  **(a) (b) 4 (c) (d) None of the previous** |
| **(3) The singular points of the differential equation are****(a) (b** **(c) (d) None of the previous****(4) The operator that annihilates is****(a) (b)**  **(c) (d) None of the previous****(5) If the auxiliary equation of a homogeneous Cauchy- Euler differential equation is then** **(a) (b)** **(c) (d) None of the previous**  |
| **(6) If the differential equation has a solution the a second solution is** **(a) (b) (c) (d) None of the previous** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**(7)** **(a) (b) (c) (d) None of the previous**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**(8) If is a set of linearly independent solutions of an order differential equation, then****(a) (b) (c) None of the previous** **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**1. **Without solving classify the differential equations below as separable, linear, exact, homogeneous and/or Bernoulli:**
2. **.**

**Question II :**1. **Determine the region of the xy-plane for which the differential equation has a unique solution**
2. **Find the orthogonal trajectories of the family**

**passing through the point .****Question III:** 1. **Solve the differential equation**

1. **Solve the initial value problem**

**Question IV:** 1. **Solve the following differential equation**
2. **Solve the system of differential equations**

**Question V:** **Find two linearly independent power series solutions about the ordinary point ,** |
| **Question VI:** 1. **Prove that if and is any real number, then**
2. **Use the Laplace transform to solve the initial value problem**

 **Good Luck☺** |