



*Kingdom of Saudi Arabia  
King Abdulaziz University*

**Faculty of Science – Mathematics Department**  
**First Mid-Term Exam (90 Minutes) - (204 Math).**  
**25/12/1434 H – 30/10/2013 A.D. First Semester**  
**1434-1435 H**

**Model: A**

<b>Name:</b>	<b>Section:</b>
<b>Student's I.N. :</b>	<b>Serial Number:</b>

$Q_1$	$Q_2$	$Q_3$	$Q_4$	$Q_5$	<b>Total Marks (30)</b>

**(Answer the following questions)**

- 1 According to the Existence and Uniqueness Theorem prove [6 Marks]  
that the I.V.P.  $\frac{dy}{dx} = x\sqrt{y}$ ,  $y(2) = 1$  has unique solution.

2 Solve the differential equation:

[6 Marks]

$$(2x^2 + y)dx + (x^2y - x)dy = 0$$

3 Solve the differential equation:

[6 Marks]

$$\frac{dy}{dx} = \frac{y}{x} + e^{-\frac{y}{x}}$$

4 Solve the differential equation:

[6 Marks]

$$\frac{dy}{dx} = \tan^2(x + y)$$

- 5 A 12 – volt electromotive force is applied to an  $LR$  series circuit in which the inductance is 0.5 henry and the resistance is 10 ohms. Find the current  $i(t)$  if  $i(0) = 0$ . Determine the current as  $t \rightarrow \infty$ . **[6 Marks]**