

King Fahd University of Petroleum and Minerals  
Department of Mathematical Sciences  
Math 202 Exam I  
Semester II, 2008- (072)  
Dr. Faisal Fairag

Serial NO:	
ID:	
Name:	

FORM <b>A</b>
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Q		Points
1		30
2		30
3		20
4		15
5		15
6		20 (5 each)
Bonus		20
Total		130



(You are an **A+** student when you believe you are an **A+** student)

☺ Say a prayer & Good luck ☺

1) Solve the given initial value problem (Note: it is separable DE)

(#7/p54)

$$\frac{dy}{dx} = e^{4x-2y}$$

$$y(0) = 0$$

2) Solve the given initial value problem (Note: it is linear)

(#11/p65)

$$x \frac{dy}{dx} + 4y = x^3 - x$$

$$y(1) = 1$$

**3)** Find values of  $m$  so that the function  $y = x^m$  is a solution of the given differential equation: Explain your reasoning.

$$x^2 y'' - 7xy' + 15y = 0$$

(#28/p11)

4) Consider the following IVP

$$xy' = y$$

$$y(2) = 0$$

- (a) The IVP has a unique solution.
- (b) The IVP has no solution.
- (c) The IVP has an infinite number of solutions.

5) Consider the DE:

$$\frac{dy}{dx} = y^2 - 4$$

Which of the following statements is **FALSE**.

- (a)  $y = 2$  is a particular solution.
- (b)  $y = -2$  is a singular solution.
- (c)  $y = -2$  is a particular solution.
- (d)  $y = -3$  is a singular solution.

6) TRUE or FALSE

(a) The DE:  $x^3 y''' + 2x^2 y'' - xy' + y = 12x^2$  is linear in  $y$ . (.....)

(b) The order of the DE:  $y' = \frac{1}{x - y''}$  is 1. (.....)

(c)  $y = 5 \tan 5x$  is a solution for the DE  $y' = 25 + y^2$ . (.....)

(d)  $(y^2 + \sin y)xy' + y' \cos y = x$  is a linear DE in  $x$ . (.....)

## **Bonus)**

Give an example of a differential equation which satisfy the following conditions:

- 1) It is linear differential equation
- 2) It is separable
- 3)  $y(x) = 3x$  is a solution.