Kingdom of Saudi Arabia
Ministry of Higher Education
Qassim University
College of Computer
Computer Engineering Department

Qassim University جامعة القصيم
College Of Computer كلية الحاسب

المملكة العربية السعودية
وزارة التعليم العالي
جامعة القصيم
كلية الحاسب
هندسة الحاسوب

Course: Math218/Differential Equations
First Semester 1440/1441 (411)

Mark____/20

Mid Term Exam I
Duration: 1 hour
Day: 13.10.2019

Student Name: **ID:**

Section-A

State whether the statement is True or False **(2×1=2 Marks)**

1. If $f_1(x), f_2(x), \ldots . f_n(x)$ possess at least n-1 derivatives and are linearly independent on I then $W(f_1(x), f_2(x), \ldots . f_n(x)) = 0$ for every x in the interval.

2. The function $f(x,y) = 5x^2y - 4xy$ is homogeneous function of degree 3.

Choose the appropriate answer **(1×1=1 Mark)**

3. The nonlinear differential equation $\frac{dy}{dx} = P(x) + Q(x)y + R(x)y^2$ is called

   (a) Clairaut's Equation (b) Bernoulli's Equation
   (c) Ricatti's Equation (d)None of these

Section B

Answer the following Questions **(3× 3=9 Marks)**

4. Solve the differential equation $\frac{x}{y}dx - e^x \sin y dy = 0$ by separation of variables.

5. Given that $y = c_1e^{4x} + c_2e^{-x}$ is a two-parameter family of solutions of $y'' - 3y' - 4y = 0$ on the interval $(-\infty, \infty)$, find a member of the family satisfying the initial conditions $y(0) = 0,\ y'(0) = 2$.

6. Solve the differential equation $x\frac{dy}{dx} - 2y = x^4e^x$.

Section C

Answer the following Questions **(2× 4=8 Marks)**

7. Solve the homogeneous differential equation $ydx = 2(x+y)dy$.

8. Determine whether the given equation is exact. If exact ,
   Solve $(y^3 + y\ \cos x)dx + (3y^2x + \sin x)dy = 0$