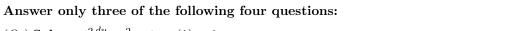
KING ABDULAZIZ UNIVERSITY DEPARTMENT OF MATHEMATICS

Exam/Course: Exam I $\,$ - Math-204

Student University Number:									
Section:									
March 27, 2011									
(Q1) Select the correct response with writing the details:									
(2Pt.)									
(2Pt.)									
(2Pt.)									
(iv) The D.E. $y' = y(1-y)$ has the solution $y = 1$ as									
(5Pt.)									
neorem the IVP:									
$y' = y \ln y$; $y(0)=1$ has									
solution (5 Pt.)									
ł									

 (Q_2) A large tank is filled to capacity with 500 gallons of pure water. Brine containing 2 pounds of salt per gallon is pumped into the tank at a rate 4 gallons per minute. The well mixed solution is pumped out at the same rate. Find the number A(t) of pounds of salt in the tank at any time t. What is the concentration c(t) of the salt in the tank at any time t. (8Pt.)

 (Q_3) Two chemicals A and B are combined to form a chemical C. The rate, or velocity, of the reaction is proportional to the product of the instantaneous amounts of A and B not converted to chemical C. Initially, there are 40 grams of A and 50 grams of B, and for each grams of B, 1 gram of A is used. It is observed that 10 grams of C is formed in 5 minutes. How much is formed in 20 minutes?. What is the limiting amount of C after a long time?. (8Pt.)



(Q₄) Solve:
$$t^2 \frac{dy}{dt} + y^2 = ty$$
; $y(1) = 1$ (6Pt.)

$$(Q_5)$$
 Solve: $(1+x^4)dy+x(1+4y^2)dx=0; y(1)=0$ (6Pt.)

 (Q_6) Solve:

$$\frac{dy}{dx} + y = f(x), \quad y(0) = 0, f(x) = \begin{cases} 1 & \text{if } 0 \le x \le 1, \\ -1 & \text{if } x > 1. \end{cases}$$
 (6Pt.)

(Q₇) Solve
$$\frac{dy}{dx} = 3 + \sqrt{y - 3x + 1}$$
, (6Pt.)

Q1	$\mathbf{Q2}$	$\mathbf{Q3}$	$\mathbf{Q4}$	$\mathbf{Q5}$	$\mathbf{Q6}$	Sum	adapted points