

Kíngdom of Saudí Arabía Kíng Abdulazíz Uníversíty

Faculty of Science –Mathematics Department Second Mid-Term Exam (90 Minutes) - (204 Math). 16/1/1433 H – 11/12/2011 A.D. First Semester 1432-1433 H

Model A

Name:	Section:
Student's I.N.:	Serial Number:

Q_1	Q_2	Q_3	Q_4	Q_5	Total Marks (25)

(Answer the following questions)

1	Choose the correct answer (writing details (iii) and (iv) only) [6 Marks]		
(i)	The general solution of $\frac{d^n y}{dx^n} = 0$ is		
	(a) an exponential function (b) a polynomial function (c) a trigonometric function		
(ii)	A linear <i>nth</i> -order differential equation of the form:		
	$a_n(x)\frac{d^n y}{dx^n} + a_{n-1}(x)\frac{d^{n-1} y}{dx^{n-1}} + \dots + a_1(x)\frac{dy}{dx} + a_0(x)y = g(x) \text{ , is called}$		
	(a) homogeneous (b) non homogeneous		
(iii)	According to the Existence and Uniqueness Theorem the IVP:		
	$ay'' + by' + cy = 0$, $a \neq 0, b, c \in R$, $y(x_0) = y_0, y'(x_0) = y_1$ has		
	(a) unique solution (b) an infinitely many solution (c) no solution		
(iv)	The set of the functions e^x , $\cos x$, $\sin x$ is linear		
	(a) dependent (b) independent		

A culture initially has P_0 number of bacteria. At t=1 hours the number of bacteria is measured to be $\frac{3}{2}P_0$. If the rate of growth is proportional to the number of bacteria P(t) present at time t, determine the time necessary for the number of bacteria to triple. [4 Marks]

 $3 \quad \text{Solve} \quad y'' - 4y = 3 \sin 2x$

[5 Marks]

4 Solve
$$y'' + y = \sec x$$

5 Solve
$$x^2y'' - 4xy' + 6y = \ln x^2$$