

Kíngdom of Saudí Arabía Kíng Abdulazíz Uníversíty

Faculty of Science –Mathematics Department Final Term Exam (120 Minutes) - (204 Math). 11/2/1433 H – 5/1/2012 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	Q_6	Total Marks (40)

(Answer the following questions)

1	Choose the correct answer (writing details (viii) and (ix) only) [11 Marks]					
(i)	The differential equation $xy' - y = x^2 \cos x$ is					
	(a) Linear (b) Bernoulli (c) Recati					
(ii)	The differential equation $y' = \ln\left(\frac{x}{y}\right) + 2$ is					
	(a) Separable (b) Homogenous (c) Exact					
(iii)	The D. E. $y'' - 2y' + y = 0$, $y(0) = 5$, $y'(0) = 10$ is called					
	(a) Initial - value problem (b) Boundary - value problem					
(iv)	A particular solution y_p of $y'' - 2y' + y = e^x$ is					
	(a) $y_p = Ae^x$ (b) $y_p = Axe^x$ (c) $y_p = Ax^2e^x$					
(v)	$\ell\left\{\int_0^t \sin\tau d\tau\right\} = \frac{s}{s^2 + 1}$					
	(a) true (b) false					
(vi)	$\ell\{f * g\} = \ell\{f(t)\}\ell\{g(t)\}$					
	(a) true (b) false					
(vii)	$\ell\{t^3 f(t)\} = \frac{d^3}{dx^3} F(s)$					
	(a) true (b) false					
(viii)	The function $f(t) = t^{-2}$ is not piecewise continuous					
	(a) true (b) false					
(ix)	The function $F(s) = \frac{s^2}{s^2+4}$ is not the Laplace transform of a function that is					
	piecewise continuous and of exponential order					
	(a) true (b) false					

2 Solve the differential equation:

[4 Marks]

$$xy' - 4y = x^5 e^x$$

$$y'' + 3y' + 2y = \cos e^x$$

4 Solve
$$\frac{dx}{dt} + 2x - 4y = -4t - 2;$$
 $x(0) = -5$ [6 Marks]
$$\frac{dy}{dt} - 2x = 4t;$$
 $y(0) = 4$

$$y'' - y' = e^t \cosh t$$
, $y(0) = 0$, $y'(0) = 0$

(i)
$$\ell^{-1} \left\{ \frac{2s+5}{s^2-2s+10} \right\}$$
 (ii) $\ell^{-1} \left\{ \frac{s}{s^2+9} e^{\frac{-\pi s}{2}} \right\}$

(ii)
$$\ell^{-1} \left\{ \frac{S}{S^2 + 9} e^{\frac{-\pi S}{2}} \right\}$$

6(b) Solve $f(t) = 3t^2 - e^{-t} - \int_0^t f(\tau)e^{t-\tau}d\tau$ for f(t). [4 Marks]