



Kingdom of Saudi Arabia
King Abdulaziz University

Faculty of Science - Mathematics Department
Final Exam (120 Minutes) - (Math 204).
25/2/1435 H – 28/12/2013 A.D.
First Semester
1434-1435 H

Model B

Name:	Section	
	BA: S.T.R. 10.00 : 10.50	
Student's I.N. :	BA5: S.T.R. 11.00 : 11.50	
	BA2: S.T.R. 13.00 : 13.50	
	BA1: M.W. 8.00 : 9.20	
	BA6: M.W. 9.30 : 11.00	
	BA4: M.W. 9.30 : 11.00	

Q_1	Q_2	Q_3	Q_4	Q_5	Q_6	Total Marks (40)

(Answer the following questions)

1	Choose the correct answer	[11 Marks]
(1)	The degree of differential equation $\left(\frac{d^3y}{dx^3}\right)^3 + 2\left(\frac{dy}{dx}\right)^4 = \ln x$ is third. (a) true (b) false	
(2)	The differential equation $e^y \sin x dx + e^y \cos x dy = 0$ is an exact (a) true (b) false	
(3)	The differential equation $\frac{1}{y} \frac{dy}{dx} - y = x^2 \tan x$ is linear in y (a) true (b) false	
(4)	The form of a particular solution y_p of $y'' + 2y' + y = e^{-x}$ is (a) $y_p = Ae^{-x}$ (b) $y_p = Axe^{-x}$ (c) $y_p = Ax^2e^{-x}$	
(5)	The differential equation $\frac{dy}{dx} = y(1 + y)$ has the solution $y = 0$ as (a) a singular solution (b) a particular solution	
(6)	The general solution of $\frac{d^4y}{dx^4} = 0$ is (a) an exponential function (b) a trigonometric function (c) a polynomial function	
(7)	If $\ell\{f(t)\} = F(s)$ then $\ell\left\{\int_0^t f(\tau) d\tau\right\} = \frac{F(s)}{s}$ (a) true (b) false	
(8)	The function $F(s) = \frac{s}{s+4}$ has Laplace transform (a) true (b) false	
(9)	$\ell\{\mathcal{U}(t - a)\} = \frac{e^{-as}}{s}$ (a) true (b) false	
(10)	$\ell\{e^{-2t} \cosh 2t\} = \frac{s + 2}{(s + 2)^2 - 4}$ (a) true (b) false	
(11)	$\ell\{f * g\} = \ell\{f(t)\}\ell\{g(t)\}$ (a) true (b) false	

2 (a) Solve the differential equation: $y' - \frac{4}{x}y = x^4 e^x$

[4 Marks]

2 (a) Evaluate: $\ell\{\cos^2 t\}$

[2 Marks]

3 Solve the differential equation:

[5 Marks]

$$y'' - 2y' - 3y = 3x^2 - 2x$$

4 Use the Laplace transform to solve the IVP:

[4 Marks]

$$\frac{dy}{dt} - 3y = t^2 e^{3t}, \quad y(0) = 6$$

5 Evaluate:

[9 Marks]

(i) $\ell^{-1}\left\{\frac{1}{s-4}e^{-2s}\right\}$

[3 Marks]

(ii) $\ell\{\cos t \mathcal{U}(t - \pi)\}$

[3 Marks]

(iii) $\ell^{-1}\left\{\frac{2s+5}{s^2-2s+10}\right\}$

[3 Marks]

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

[5 Marks]