King Fahd University of Petroleum & Minerals
Department of Mathematics and Statistics
MATH 301
EXAM II
(part I)
2014-2015 (143)

Monday, July 6, 2015 **Allowed Time: 1 Hours**

Name: ____

ID Number: ________________________ **Serial Number:** _______________

Section Number: _____________ **Instructor's Name:** _________________

Instructions:

1. Write neatly and legibly. You may lose points for messy work.

2. **Show all your work.** No points for answers without justification.

3. **Calculators and Mobiles are not allowed**.

4. Make sure that you have 3 different problems (3 pages + cover page).

Problem No.	Points	Maximum Points
1		18
2		16
3		16
Total:		50

Q1. Use the **Stokes' theorem** to evaluate $\oint_C y\,dx + 2x\,dy + z\,dz$, where C is the curve of intersection of the cylinder $x^2 + y^2 = 1$ with the upper half sphere $x^2 + y^2 + z^2 = 4$. Orient C counterclockwise as viewed from above.

(note: If you don't use **Stokes' theorem,** you will get zero)

Q2. Let D be the region lying inside the cylinder $x^2 + y^2 = 1$ bounded by the two planes $z = 0$ and $z = 2 - y$. Use the **divergence theorem** to find the outward flux $\iint_S (\mathbf{F} \cdot \mathbf{n})\, dS$ of the vector field $\mathbf{F} = z\,\mathbf{k}$, where S is the boundary of D.

Q3. Use the Laplace transform to solve the integrodifferential equation

$$y'' + y + \int_0^t y(\tau)\sinh(t-\tau)\,d\tau = \delta(t-1), \qquad y(0) = 1, \qquad y'(0) = 0.$$

Preview Test: Exam2

Test Information

Description	Respondus
Instructions	
Timed Test	This test has a time limit of 1 hour. This test will save and submit automatically when the time expires. Warnings appear when **half the time**, **5 minutes**, **1 minute**, and **30 seconds** remain. *[The timer does not appear when previewing this test]*
Multiple Attempts	Not allowed. This test can only be taken once.

Question Completion Status:

1 2 3 4 5 6 7 8 9 10 11

Save All Answers | Save and Submit

QUESTION 1 — 4 points — Save Answer

Let $G(s) = \mathcal{L}\{g(t)\}$
where g(t) = 4 t cosh(6t)
then G(1) =

QUESTION 2 — 4 points — Save Answer

Let $G(s) = \mathcal{L}\{g(t)\}$
where g(t) = 5 t^3 + 2
then G(1/2) =

QUESTION 3 — 4 points — Save Answer

Let
F(s) be the laplace transform
of f (t) = 100 e^{-9t} cos(7t)
then
F(0) =

QUESTION 4

6 points Save Answer

The piecewise function

$$f(t)=\begin{cases} a & 0\le t<5 \\ b & 5\le t<9 \\ 0 & t\ge 9 \end{cases}$$

can be written in terms of step functions as

$f(t)=\alpha+\beta\,\mathcal{U}(t-5)+\gamma\,\mathcal{U}(t-9)$

if a = 8 . b = 9 , then $\alpha-\beta+\gamma=$

QUESTION 5

6 points Save Answer

Let $f(t)=\mathcal{L}^{-1}\left\{\dfrac{s\,e^{-a\pi s}}{s^2+b^2}\right\}$

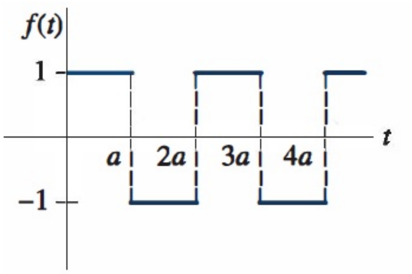
if a = 4 and b = 12 then $f\left(\dfrac{45\pi}{4}\right)=$

QUESTION 6

5 points Save Answer

Let $F(s)=\mathcal{L}\{f(t)\}$

where f(t) is the given periodic function



Meander function

if a = 7 then F(1) =

QUESTION 7

4 points Save Answer

Let $G(s)=\mathcal{L}\{g(t)\}$

where g(t) = 10000 sin(6 t) $\mathcal{U}$(t - 3 π)

then G(1) =

QUESTION 8

5 points Save Answer

Let $G(s) = \mathcal{L}\{\ 19\, t^{3/2}\ \}$
then $G(\sqrt[5]{\pi}\,)$ =

QUESTION 9

4 points Save Answer

Let $G(s) = \mathcal{L}\{g(t)\}$
where g(t) = $e^{5t} * \sinh(5t)$
then G(1) =

{note that * is the convulotion symbol}

QUESTION 10

4 points Save Answer

Let $G(s) = \mathcal{L}\{g(t)\}$
where g(t) = $3e^{-3t} + 6e^{6t}$
then G(2) =

QUESTION 11

4 points Save Answer

Let
$F(s) = \mathcal{L}\{\ 3\,\delta(t-2)\ \}$
then
F(1) =

Click Save and Submit to save and submit. Click Save All Answers to save all answers.

Save All Answers Save and Submit