

	FINALTERM EXAMINATION SPRING 2006 MTH301 - CALCULUS II (Session - 2)	Marks: 55 Time: 120min
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StudentID/LoginID: _____

Student Name: _____

Center Name/Code: _____

Exam Date: Thursday, August 17, 2006

Please read the following instructions carefully before attempting any of the questions:

1. Attempt all questions. Marks are written adjacent to each question.
2. Do not ask any questions about the contents of this examination from anyone.
 - a. If you think that there is something wrong with any of the questions, attempt it to the best of your understanding.
 - b. If you believe that some essential piece of information is missing, make an appropriate assumption and use it to solve the problem.
 - c. Write all steps, missing steps may lead to deduction of marks.
3. Calculator is allowed.

****WARNING: Please note that Virtual University takes serious note of unfair means. Anyone found involved in cheating will get an `F` grade in this course.**

For Teacher's use only											
Question Marks	1	2	3	4	5	6	7	8	9	10	Total
Question Marks	11	12	13								

Question No: 1 (Marks: 2) - Please choose one

Laplace transform of 't' is

▶ $\frac{1}{s}$

▶ $\frac{1}{s^2}$

▶ e^{-s}

▶ s

Question No: 2 (Marks: 2) - Please choose one

Symmetric equation for the line through (1,3,5) and (2,-2,3) is

▶ $x-2 = -\frac{y+2}{3} = -\frac{z-3}{5}$

▶ $x+2 = -\frac{y+3}{5} = -\frac{z+5}{2}$

▶ $x-1 = -\frac{y-3}{5} = -\frac{z-5}{2}$

▶ $x+1 = \frac{y+3}{5} = \frac{z-5}{5}$

Question No: 3 (Marks: 1) - Please choose one

The level curves of $f(x, y) = y \csc x$ are parabolas.

▶ True.

▶ False.

Question No: 4 (Marks: 1) - Please choose one

The equation $z = r$ is written in

▶ Rectangular coordinates

- ▶ Cylindrical coordinates
- ▶ Spherical coordinates
- ▶ None of the above

Question No: 5 (Marks: 5)

$$\int_C \frac{1}{1+x} ds, \quad x=t, y=\frac{2}{3}t^{\frac{3}{2}}, 0 \leq t \leq 3$$

Compute where C is the curve

Question No: 6 (Marks: 5)

$$\iiint_Q (3x + y^2 - z) dV \text{ over the box } 0 \leq x \leq 2, -1 \leq y \leq 1, -3 \leq z \leq 0$$

Evaluate

Question No: 7 (Marks: 10)

Use Stokes theorem to evaluate the integral

$$\oint_C \vec{F} d\vec{r}, \quad \text{where } \vec{F} = 2z\hat{i} + 3x\hat{j} + 5y\hat{k}, C \text{ is the circle } x^2 + y^2 = 1$$

In the xy-plane with counter clockwise orientation looking down the positive z-axis.

Question No: 8 (Marks: 3)

Find f_{wxx} for function $f(w, x, y, z) = w^2xyz - 5e^{wz^2}$

Question No: 9 (Marks: 4)

Locate critical points for the function

$$f(x, y) = xy + \frac{a^3}{x} + \frac{b^3}{y} \quad (a \neq 0, b \neq 0)$$

Question No: 10 (Marks: 4)

$$z = \sqrt{x^2 + y^2}, y = 4 - x^2,$$

Set up a double integral for the volume bounded by surface

and first

octant.
(Do not evaluate.)

Question No: 11 (Marks: 4)

Determine whether \vec{u} and \vec{v} make an acute angle ,an obtuse angle , or are orthogonal.
 $\vec{u} = 7\hat{i} + 3\hat{j} + 5\hat{k}$, $\vec{v} = -8\hat{i} + 4\hat{j} + 2\hat{k}$

Question No: 12 (Marks: 4)

Given $\vec{F} = x^2\hat{i} - 2\hat{j} + yz\hat{k}$.Find $\text{div}(\text{Curl } \vec{F})$.

Question No: 13 (Marks: 10)

Determine the Fourier coefficients a_0, a_n and b_n for a periodic function of period 2π defined by

$$f(x) = \begin{cases} -x & -\pi \leq x < 0 \\ 0 & 0 \leq x < \pi \end{cases}$$