

**King Fahd University of Petroleum & Minerals**

Department of Mathematical Sciences

**Math 102(Calculus II)(052)**

**Major Examination II (Sec # 18, 20, 23)**

**April 26, 2006**

**Time: 90 Minutes**

**Marks:...../60**

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Name: \_\_\_\_\_

Serial #: \_\_\_\_\_

ID#: \_\_\_\_\_

Section #: \_\_\_\_\_

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(1) Show complete and neat work for full credit.

(2) This exam consists of (9) pages.

1. Find volume of solid of revolution by revolving about  $y$ –axis, the region bounded by the graphs of :

$$y = x^2 + 1, y = 0, x = 0 \text{ and } x = 1$$

(i) by Washers method      (ii) by Cylindrical shell method.      (10 Points)

(i)

(ii)

2. Find

(i) The arc length of the curve:  $x = \cos^3 t, y = \sin^3 t$  where  $0 \leq t \leq \pi/2$ .

(ii)  $\frac{d}{dx}(x^2 \operatorname{cosech} e^{4x})$  (5+5=10 Points)

(i)

(ii)

3. Evaluate:  $\int_0^1 \sqrt{x} \tan^{-1} \sqrt{x} \, dx$

(5-Points)

4. Evaluate:  $\int \frac{\sqrt{2} dx}{x^4 \sqrt{x^2 + 3}}$

(10 Points)

5. Use method of partial fractions to evaluate:  $\int \frac{x^3 + 6x^2 + 3x + 16}{x^3 + 4x}$   
(10 Points)

6. Evaluate:  $\int \frac{dx}{1 - \sin x + \cos x}$  (5 Points)

7. Evaluate:  $\int \frac{x+5}{9x^2+6x+17} dx$

(5 Points)



8. Which one of the integrals

$$\int_{-2}^0 \frac{x \, dx}{\sqrt{4-x^2}}, \quad \int_0^{\pi/2} \tan^2 x \, dx$$

is convergent? Find its sum.

(5 Points)