King Fahd University of Petroleum and Minerals
Department of Mathematics

Semester I (021) Jan 21/2003
Math 102 - Final Exam Time 2 hrs & 30 Minutes

Dr Adnan Al-Shakhs

Name _____I D # _____Serial # _____

Section 7 8

A

1. The exam is composed of 18 multiple choice questions and 4 **solving questions**

Answer all the questions

Notation **1**. *For each question mark your choice*(*one only*) *on the assigned space given below*

Question #	*a*	*b*	*c*	*d*	*e*
1	*a*	*b*	*c*	*d*	*e*
2	*a*	*b*	*c*	*d*	*e*
3	*a*	*b*	*c*	*d*	*e*
4	*a*	*b*	*c*	*d*	*e*
5	*a*	*b*	*c*	*d*	*e*
6	*a*	*b*	*c*	*d*	*e*
7	*a*	*b*	*c*	*d*	*e*
8	*a*	*b*	*c*	*d*	*e*
9	*a*	*b*	*c*	*d*	*e*
10	*a*	*b*	*c*	*d*	*e*
11	*a*	*b*	*c*	*d*	*e*
12	*a*	*b*	*c*	*d*	*e*
13	*a*	*b*	*c*	*d*	*e*
14	*a*	*b*	*c*	*d*	*e*
15	*a*	*b*	*c*	*d*	*e*
16	*a*	*b*	*c*	*d*	*e*
17	*a*	*b*	*c*	*d*	*e*
18	*a*	*b*	*c*	*d*	*e*

Question #	19	20	21	22	*Total*
Grade	/ 4	/ 4	/ 4	/ 4	

2. *One of the following is* *TRUE*

a. $\sum_{n=1}^{\infty} \frac{1}{n^2}$ *is divergent*

b. $\sum_{n=1}^{\infty} \frac{1}{2^n}$ *is convergent and its sum is* 1

c. $\sum_{n=1}^{\infty} \frac{3^n}{n!}$ *is divergent*

d. $\sum_{n=1}^{\infty} 1 \quad \frac{1}{n}$ *is convergent*

e. $\sum_{n=1}^{\infty} 1^{\,n} \frac{1}{n}$ *is divergent*

3. *The area of the region* R *which is bounded by* $y \quad e^x$, $y \quad e$, *and the* y *axis is*

a. e

b. $\frac{1}{e}$

c. $\ln e \quad 1$

d. $1 \quad e$

e. 1

4. $\lim_{x \to 0} \cos x \quad \sin x^{\frac{1}{x}}$

a. $\frac{1}{e}$

b.

c. -1

d. e

e. 1

5. $\int_{1}^{0} \sqrt{1 \quad \sqrt{x \quad 1}}\, dx$

a. $\frac{3}{5}$

b. $\frac{4}{3}$

c. $\frac{8}{15}$

d. $\frac{1}{2}$

e. 0

6. $\int_{e}^{e^2} \frac{1}{x \ln x}\, dx$

a. $\ln 2$

b. 2

c. $e^4 \quad e^2$

d. $\frac{e^2 \quad 1}{2e^4}$

e. 1

7. *The volume of the solid generated if the region bounded by the graphs of* $y \quad \frac{1}{x^2 \quad 1}$, $x \quad 1$, x *axis , and* y *axis , revolves about the* y *axis equals to* :

a. $\frac{}{\ln 2}$

b. $\ln 2$

c. $\frac{}{2}$

d. 2

e. $\frac{2}{4}$

8. *The radius of convergence of the power series* $\sum_{k \ 1} \frac{2x \quad 3^{\ k}}{3^{2k}}$

a. $\frac{9}{2}$

b. $\frac{5}{2}$

c. 9

d. 3

e. $\frac{3}{2}$

9. $\int_{\frac{}{2}}^{} 21 \sin x \cos x \ \cos x \quad 1^{\ 5}\, dx$

a. $\frac{1}{5}$

b. $\frac{1}{2}$

c. $\frac{1}{7}$

d. $\frac{1}{6}$

e. $\frac{1}{2}$

9. *If the Maclaurin series for* $\cos x$ $\sum_{k=0}^{\infty} \frac{x^{2k}}{2k!}$ *, then the first three non-zero terms of the series representstion of* $\int_0^1 \frac{1-\cos x}{x}\,dx$ *are*

a. $\frac{1}{2!}$, $\frac{1}{4!}$, $\frac{1}{6!}$

b. 1 , $\frac{1}{3!}$, $\frac{1}{5!}$

c. $\frac{1}{2\ 2!}$, $\frac{1}{4\ 4!}$, $\frac{1}{6\ 6!}$

d. $\frac{1}{3\ 2!}$, $\frac{1}{5\ 4!}$, $\frac{1}{7\ 6!}$

e. $\frac{1}{3\ 2!}$, $\frac{1}{5\ 4!}$, $\frac{1}{7\ 6!}$

10. *If* $A = \int_0^{\frac{\pi}{2}} \sin^3 x \cos x\ dx$ *, and* $B = \int_0^{\frac{\pi}{4}} \tan^2 x \sec^2 x\ dx$ *, then* $2A - 5B$ *is*:

a. 7

b. $\frac{7}{12}$

c. $\frac{3}{4}$

d. $\frac{7}{6}$

e. $\frac{1}{7}$

11. $\int_0^1 \frac{1}{1+e^x}\,dx$

a. $\ln e - 1$

b. $\frac{e \quad 1}{2}$

c. $ln \ \frac{2e^x}{e^x \quad 1}$

d. e

e. $e \quad 1$

12. *The volume of the solid generated if the region bounded by the graphs of* $y \quad x^2$, $y \quad 1$ *and* y *axis revolved about* $x \quad 3$ *is given by the integral*:

a. $\int_0^1 9 \quad 3 \quad y^2 \quad dy$

b. $\int_0^1 3 \quad 3 \quad \sqrt{y} \quad dy$

c. $\int_0^1 9 \quad y \ dy$

d. $\int_0^1 3 \quad \sqrt{y}^{\ 2} \ dy$

e. $\int_0^1 9 \quad 3 \quad \sqrt{y}^{\ 2} \ dy$

13. $\frac{\cos x}{\sqrt{4 \quad \sin^2 x}} \ dx$

a. $\sin^{\ 1} \frac{\sin x}{2} \quad C$

b. $\frac{1}{2} \sin^{\ 1} \frac{\sin x}{2} \quad C$

c. $\frac{1}{2} \sin^{\ 1} x \quad C$

d. $\frac{1}{2} \sin^{\ 1} \frac{x}{2} \quad C$

e. $\frac{1}{2} \sqrt{4 \quad \sin^2 x} \quad C$

14. *The first four terms of the taylor series of the function* $f \ x \quad e^{\ x}$, *at* $x \quad 1$ *are*:

a. $\frac{1}{e}$, $\frac{1}{e} \ x \quad 1$, $\frac{1}{e2!} \ x \quad 1^{\ 2}$, $\frac{1}{e3!} \ x \quad 1^{\ 3}$

b. $\frac{1}{e}$, $\frac{1}{e} x$, $\frac{1}{e2!} x^2$, $\frac{1}{e3!} x^3$

c. $\frac{1}{e}$, $\frac{1}{e} x$, $\frac{1}{e2!} x^2$, $\frac{1}{e3!} x^3$

d. $1 \quad x \quad 1 \quad \frac{1}{2!} x \quad 1^{2} \quad \frac{1}{3!} x \quad 1^{3}$

e. $\frac{1}{e} \quad \frac{1}{e} x \quad 1 \quad \frac{1}{e2!} x \quad 1^{2} \quad \frac{1}{e3!} x \quad 1^{3}$

15. $\int_{\frac{1}{2}}^{0} 4x\ 2x \quad 1^{10}\ dx$

a. $\frac{1}{12}$

b. $\frac{1}{121}$

c. $\frac{1}{121}$

d. $\frac{1}{11}$

e. $\frac{1}{23}$

16. $\int^{0} \frac{e^{x}}{e^{2x} \quad 2e^{x} \quad 2}\ dx$

a. *Diverges*

b. $tan^{1}2 \quad \frac{}{4}$

c. $ln\,2$

d. $e^{2} \quad 1$

e. $e \quad 1$

17. $\lim_{n} \sqrt{n^{2} \quad 2n} \quad n$

a. 1

b. $\frac{1}{2}$

c. $\frac{1}{4}$

d. *diverges*

e. 0

18. $\int_{0}^{2} 3 \quad \sqrt{4 \quad x^{2}}\ dx$

a. 6

b. 3

c.

d. 2

e. $\frac{}{4}$

19. *Find a vertical line* $x \quad k$ *, that divides the area enclosed by* $x \quad \sqrt{y}$ *,* $x \quad 2$ *, and* $y \quad 0$ *into two equal parts*.

20. $\frac{dx}{x^2\sqrt{4 \quad x^2}}$

21. $\frac{2x^2 \quad 1}{4x \quad 1 \quad x^2 \quad 1}dx$

22. *Determine if the series* $\sum_{k \ 0} 1^{\ k}\frac{3^k \ k!^{\ 2}}{2k \ !}$ *is conditionally convergent , absolutely convergent , or divergent*

King Fahd University of Petroleum and Minerals

Department of Mathematical Sciences

Fall 2002 — Tuesday 15 / 10 / 2001

MATH 102 – TEST I TIME : 75 Minutes

Dr.Adnan Al-Shakhs

Name_____I D #:_____Serial#:____

Section 7 8

Instructions:

Solve all the problems.

Show all of your work.

The points for each question is given .

Question #	1	2	3	4	5	6	7	8	9	10	Total
Grade	/3	/3	/4	/4	/3	/5	/5	/4	/4	/5	

1. Find y , if $\frac{dy}{dx} \quad x^2\sqrt{x^3}$ and $y\ 0 \quad 2$

2. $\sum_{k=1}^{10} 3k^2 \quad 7k \quad 1$

3. $\frac{d}{dx} \int_{\ln x}^{\sqrt{x}} \frac{t^3}{t^3 \quad 7} dt$

4. Find the area below the curve $y \quad \frac{1}{1 \quad e^x}$ over the interval $0, 1$

5. Find n , if $\sum_{k=1}^{n} \frac{k}{5} \quad 93$

6. $\int_{0}^{\frac{}{4}} \frac{1}{1 \quad \sin} d$

7. Find the volume generated if the region bounded by the curves $y \quad x^2 \quad 1$, $y \quad axis$, and $y \quad 2$ is revolving about the line $y \quad 1$

8. $\int_{e^{\quad 4}}^{e^4} \frac{\sqrt{16 \quad \ln x^{\ 2}}}{x} dx$

9. Find the volume generated if the region bounded by the curves $y \quad \sqrt{x}$, $x \quad axis$, and $x \quad 1$ is revolving about the line $x \quad 1$

10. Find the area between the curves $y \quad 2x$, $y \quad \frac{x}{2}$, and $x \quad y \quad 3$

Quize # 5 Math 102- 8 A

NAME:_____ I.D.#_____ Serial #_____

1. Let $y \quad \tan h \cos x$, find $\frac{dy}{dx}$.

2. $\sec hx \ dx$

3. $\sin^{\ 1} x \ dx$

Quize # 5 Math 102- 8 B

NAME:_____ I.D.#_____ Serial #_____

1. Let $y \quad \tan h \sin x$, find $\frac{dy}{dx}$.

2. $\sec hx \ dx$

3. $\tan^{\ 1} x \ dx$