KING FAHD UNIVERSITY OF PETROLEUM & MINERALS

Department of Mathematics and Statistics

MATH 260-(133)

Major Exam 1

Code 001

Time: 120 Minutes **Maximum Points: 100**

Name: I.D. # Section: Ser.#

Show All Necessary Work

Calculators are not allowed in this exam

PART-I (MCQ) Each MCQ = 8 points]

Encircle your choice (answer of each MCQ) in the following Table

QCQ #	Answer				
1	A	B	C	D	E
2	A	B	C	D	E
3	A	B	C	D	E
4	A	B	C	D	E

PART-II (Written)

Q	Points
1	/10
2	/12
3	/12
4	/10
5	/12
6	/12
Total	/68

PART I, MCQ: Encircle your answer in the Table on the Cover Page.

Q1. Consider the differential equation $2xdy - (y^2 - 1)dx = 0$. Then:

A) $y(x) = 1$ is a singular solution.

B) $y(x) = -1$ is a singular solution.

C) $y(x) = 1$ and $y(x) = -1$ are singular solutions.

D) has no singular solution.

E) $y(x) = -1$ and $y(x) = 0$ are singular solutions.

Q2. [**Use the Newton's Law of Cooling/Warming**]

A bare, initially at a temperature of $100\ ^0$F, is placed in an oven where the temperature is $200\ ^0$F. If after **one** hour the temperature of the bare is $150\ ^0$F, then its temperature after two hours is:

A) $165\ ^0$F

B) $200\ ^0$F

C) $195\ ^0$F

D) $175\ ^0$F

E) $185\ ^0$F

Q3. The initial value problem value problem $y''-2y'+2y=0$, $y'(0)=-1, y(0)=1$ has a solution of the form $y(x)=e^{x}(A\cos x+B\sin x)$. Then:

A) A-B=1

B) A-B=3

C) A-B=0

D) A-B=-1

E) A-B=2

Q4. The values of k for which the system (S): $\left\{\begin{array}{rrrcl} 3x+ & y+ & 8z & = & 0 \\ x+ & y+ & z & = & 1 \\ x- & y+ & 2kz & = & 0 \end{array}\right\}$ has no solutions are:

A) k=0

B) k=-1

C) k=1

D) k=3

E) k=2

Part II. Provide <u>complete</u> solution of each question <u>showing all necessary steps</u>

Q 1. Solve the initial value problem: $y'-3x^2y^2-3x^2-y^2-1=0,\ y(0)=1.$

Q 2. Solve the differential equation: $xy'-y-x^2\ln x=0$

Q 3. Solve the differential equation: $xy' = y + \sqrt{x^2 - y^2}$.

Q 4. Verify that the differential equation: $(x + y\sin x)dx - (\cos x - y)dy = 0$ is exact and solve it.

Q 5. Solve the differential equation: $y''-(y')^2=0$

Q 6. Use Jordan-elimination to solve the system $\left\{\begin{array}{rrrcr} x+ & y+ & z & = & -1 \\ 2x+ & y+ & z & = & 1 \\ 2x- & y+ & 2z & = & 0 \end{array}\right\}$

KING FAHD UNIVERSITY OF PETROLEUM & MINERALS

Department of Mathematics and Statistics

MATH 260-(133)

Major Exam 1

Code 002

Time: 120 Minutes **Maximum Points: 100**

Name: I.D. # Section: Ser.#

Show All Necessary Work

Calculators are not allowed in this exam

PART-I (MCQ) Each MCQ = 8 points]

Encircle your choice (answer of each MCQ) in the following Table

QCQ #	Answer				
1	A	B	C	D	E
2	A	B	C	D	E
3	A	B	C	D	E
4	A	B	C	D	E

PART-II (Written)

Q	Points
1	/10
2	/12
3	/12
4	/10
5	/12
6	/12
Total	/68

PART I, MCQ: Encircle your answer in the Table on the Cover Page.

Q1. Consider the differential equation $2xdy - (y^2 - 1)dx = 0$. Then:

A) $y(x) = 1$ is a singular solution.

B) $y(x) = 1$ and $y(x) = -1$ are singular solutions.

C) $y(x) = -1$ is a singular solution.

D) has no singular solution.

E) $y(x) = -1$ and $y(x) = 0$ are singular solutions.

Q2. [**Use the Newton's Law of Cooling/Warming**]

A bare, initially at a temperature of $100\ ^0$F, is placed in an oven where the temperature is $200\ ^0$F. If after **one** hour the temperature of the bare is $150\ ^0$F, then its temperature after two hours is:

A) $165\ ^0$F

B) $200\ ^0$F

C) $195\ ^0$F

D) $185\ ^0$F

E) $175\ ^0$F

Q3. The initial value problem value problem $y''-2y'+2y=0$, $y'(0)=-1, y(0)=1$ has a solution of the form $y(x)=e^{x}(A\cos x+B\sin x)$. Then:

A) A-B=1

B) A-B=0

C) A-B=3

D) A-B=-1

E) A-B=2

Q4. The values of k for which the system (S): $\left\{\begin{array}{rrrcl} 3x+ & y+ & 8z & = & 0 \\ x+ & y+ & z & = & 1 \\ x- & y+ & 2kz & = & 0 \end{array}\right\}$ has no solutions are:

A) k=0

B) k=-1

C) k=1

D) k=2

E) k=3