King Fahd University Of Petroleum & Minerals
Mathematical sciences Department

Final Exam

Term: 041

Math 131 – Finite Mathematics

Time: 150 minutes

Name: *ID:* *Serial:*

Question	Full Mark	Student mark
1	**10**	
2	**5**	
3	**8**	
4	**6**	
5	**8**	
6	**7**	
7	**8**	
Part II	**26**	
Total	***78***	

Part I :(Written Part 52-Points)

Question 1 :(10 Points)

A pair of dice is rolled on a table.

a. Write the sample space (4-Points)

b. Write the elements of the events: (3-Points)

E: a 2 or a 5 appears on either or both of the dice.

F: the sum of the dots on the two dice is more than 6.

c. What is the probability that a 2 or 5 appears on either or both of the dice, given that the sum of the dots on the two dice is more than 6. (3-Points)

Question 2 :(5 Points)

Two urns I and II, urn I contains one white marble and urn II contains one white and one black marbles. If one urn is selected at random, and a marble is selected randomly from it and put in the other urn, then one marble is selected randomly from it. Find the probability that the last selected marble is white.

Question 3 :(8 Points)

In a study of genetics, a class used a sample of 100 people to obtain the following information.

	Male	**Femal**	**Total**
Color blind (C)	**4**	**1**	**5**
Not color blind (C')	**40**	**55**	**95**
Total	**44**	**56**	**100**

a. What is the probability that a person is color blind, *given that the person is a female?* **(2-Points)**

b. Determine whether the events: $B:\{\text{Color Blind}\}$, $M:\{\text{Male}\}$ **are independent or not. Explain? (4-Points)**

c. Find the probability that a person color blind or female. (2-Points)

Question 4 :(6 Points)

In a book store there are five calculators, two of them are defective. If one of the departments in the university received two calculators randomly from the store. Let X be a random variable represents the number of defective calculators. Determine the distribution of X and find its expected value.

Question 5 :(8 Points)

The grades in a certain class are normally distributed with mean of 78 and a standard deviation of 10. The lowest D is 61, the lowest C is70, the lowest B is 82, and the lowest A is 91.

a. **If the class has 100 students, what is the expected number of the C students.**

b. **If the instructor will give the A^+ grade to the highest** 4.05% **students, find the mark for which the student will get A^+.**

Question 6 :(7 Points)

A test of six multiple choice questions, each one has five choices, one is true and other choices are false. If one student answers the test by guessing, find

a. The probability of getting at most one correct answer (3-Points)

b. The probability that the student will answer all questions correctly. (2-Points)

c. The expected value of the correct answers. (2-Points)

Question 7 :(6 Points)

The times in minutes that 20 **students spent in a certain quiz are given in the following frequency table:**

Interval	Frequency
1—3	4
4—6	2
7—9	6
10—12	5
13—15	3
Total	20

a. Find the standard deviation for the above frequency table. (3-Points)

b. Graph the frequency polygon for the data. (3-Points)

Part II :(Multiple Choice 26-Points)

Write all your choices in this table:

Question	Answer				
Q1	**a**	**b**	**c**	**d**	**e**
Q2	**a**	**b**	**c**	**d**	**e**
Q3	**a**	**b**	**c**	**d**	**e**
Q4	**a**	**b**	**c**	**d**	**e**
Q5	**a**	**b**	**c**	**d**	**e**
Q6	**a**	**b**	**c**	**d**	**e**
Q7	**a**	**b**	**c**	**d**	**e**
Q8	**a**	**b**	**c**	**d**	**e**
Q9	**a**	**b**	**c**	**d**	**e**
Q10	**a**	**b**	**c**	**d**	**e**
Q11	**a**	**b**	**c**	**d**	**e**
Q12	**a**	**b**	**c**	**d**	**e**
Q13	**a**	**b**	**c**	**d**	**e**

Select the correct choice: ***(2** marks for each question)*

1) A company produces a product for which the variable cost per unit is $\$4$ **and fixed cost** $\$40,000$**. If the selling price for each unit is** $\$8$**, then the number of units that must be sold to earn** $\$50,000$ **is:**

a. $2,500$
b. $22,500$
c. $25,000$
d. $20,000$
e. $50,000$

2) If the demand function for a certain product is $p = 2100 - 15q$**, where** p **is the price per unit when** q **units are demanded, then the number of units that maximizes the total revenue and the total revenue point** (q, R) **is equal to:**

a. $(35, \$155,125)$
b. $(70, \$73,500)$
c. $(140, 0)$
d. $(70, \$1,050)$
e. $(105, \$55,125)$

3) The following system of equations $\begin{cases} x^2 = y^2 + 13 \\ y = x^2 - 15 \end{cases}$ **has**

a. No solution
b. Three solutions
c. Two solutions
d. Four solutions
e. One solution

4) If the supply and demand equations of a certain product are: $125p - q - 250 = 0$ **and** $100p + q - 1100 = 0$ **, respectively, then the equilibrium point** (q, p) **is:**

a. $(722.22, \$3.78)$
b. $(1000, \$10)$
c. $(500, \$6)$
d. $(750, 8)$
e. $(900, \$9.2)$

5) The maximum value of the following objective function:

$$z = x + 2y$$

subject to

$$2x + y \leq 8$$
$$2x + 3y \leq 12$$
$$x, y \geq 0$$

is equal to:

a. 8
b. 2
c. 4
d. $\frac{1}{3}$
e. 0

6) If $\$5,000$ **is amounted to** $\$7,250$ **at an annual rate of** 10% **compounded quarterly, then the number of periods needed to the nearest integer is:**

a. 12
b. 14
c. 16
d. 10
e. 15

7) A dept of $1,500 due in three years and $1,200 due in six years. If you want to pay of the total dept now by a single payment, then the value of this payment to the nearest dollar if the interest of 8% compounded semiannually is used equals to:

a. $2,282

b. $1,935

c. $2,278

d. $1,422

e. $3,819

8) The present value of an annuity (*ordinary*) of $1,000 every six months for four years at rate of 10% compounded semiannually is:

a. $5,334.9

b. $57,295.8

c. $12,577.9

d. $6,463.2

e. $9,549.1

9) A die is rolled five times, if the order of rolls is considered, and the second role is even number, fourth role is 5, then the number of possible results is:

a. 3,240

b. 216

c. 648

d. 7,776

e. 6,480

10) An urn contains six chips numbered from 1 to 6. Two chips are randomly drawn with replacement. Let E be the event of getting 4 on the first draw and F be the event of getting 4 on the second draw. Then one of the following statements is <u>TRUE:</u>

a. *E and F are mutually exclusive.*
b. *E and F are dependent.*
c. *E and F are independent.*
d. E' *and* F' *are dependent*.
e. *E and F are not mutually exclusive.*

11) Let X be a discrete random variable with the following probability distribution:

x	0	1	2	3	4	5	6
$P(X=x)$	0.17	0.27	a	0.16	0.07	0.03	.01

Then the mean of the random variable X is equal to:

a. 1.82
b. 1
c. 7.04
d. 0.29
e. 1.24

12) The value of k for which $P(|Z|<k)=0.2662$ is equal to:

a. 0
b. 0.66
c. 0.34
d. 0.68
e. -0.34

13) A company prepares a bid on a job at a cost of $7,000. They estimate that if they get the job, they will make $250,000 in profits. If the probability of getting the job is 0.4**, then their expected profit is:**

a. 9,300 **b.** 0
c. 10,000 **d.** 2,800

e. None of the above.