King Fahd University of Petroleum and Minerals
Department of Mathematics

CODE00

STAT 214
Major Exam I
Term 241
06-October-2023
Net Time Allowed: 90

Name: _____

ID: _____ Sec: _____.

Check that this exam has 14 questions.

Important Instructions:

1. All types of calculators may be used, provided that they cannot store text.

2. Use HB 2.5 pencils only.

3. Use a good eraser. DO NOT use the erasers attached to the pencil.

4. Write your name, ID number and Section number on the examination paper and in the upper left corner of the answer sheet.

5. When bubbling your ID number and Section number, be sure that the bubbles match with the numbers that you write.

6. The Test Code Number is already bubbled in your answer sheet. Make sure that it is the same as that printed on your question paper.

7. When bubbling, make sure that the bubbled space is fully covered.

8. When erasing a bubble, make sure that you do not leave any trace of penciling.

1 The operations manager of a plant that manufactures tires wants to compare the actual inner diameters of two grades of tires, each of which is expected to be 575 millimeters. A sample of five tires of each grade was selected, and the results representing the inner diameters of the tires, ranked from smallest to largest, are as follows:

Grade X	Grade Y
568, 570, 575, 578, 584	573, 574, 575, 577, 578

If quality is measured by consistency in the tire diameters, which grade of tire demonstrates better quality?

(a) Grade Y provides better quality because its standard deviation is much smaller.

(b) Grade X provides better quality because both the mean and median are equal to 575 mm.

(c) Grade X provides better quality because the range of diameters is higher.

(d) Grade Y provides better quality because its variance is much larger.

(e) Grade Y provides better quality because its mean is larger than the expected value of 575mm.

2 You are provided with the following data for ten cereal brands. The data include the number of calories per serving (measured in kcal), the amount of sugar (measured in grams), and the amount of sodium (measured in milligrams) per serving.

Cereal Brand	1	2	3	4	5	6	7	8	9	10
Calories (kcal)	110	150	90	120	130	140	100	160	105	115
Sugar (grams)	12	8	10	14	9	11	7	13	10	8
Sodium (mg)	200	180	220	190	210	230	170	240	195	225

Determine which of these nutritional components varies most from cereal to cereal?

(a) Sugar

(b) Calories

(c) Sodium

(d) Sodium and Calories

(e) Sugar and Sodium

3 Consider a population of 1,024 mutual funds that primarily invest in large companies.You have determined that μ, the mean one-year total percentage return achieved by all the funds, is 8.20 and that σ, the standard deviation, is 2.75. According to the Chebyshev rule, at least 93.75% of these funds are expected to have one-year total returns between what two amounts?

(a) -2.8 to 19.2

(b) -2.8 to 15.2

(c) -4.2 to 19.20

(d) 2.8 to 19.20

(e) 2.8 to 15.2

4 The data below shows the overall miles per gallon(MPG) of 2010 small SUVs

24   23   22   21   22   22   18   18   26

26   26   19   19   19   21   21   21   21

21   18   19   21   22   22   16   16

Compute the five-number summary of the numbers of miles per gallon in 2010 small SUVs.

(a) 16,19,21,22,26

(b) 16,19,20,22,26

(c) 16,19,21,24,26

(d) 16,18,21,22,26

(e) 16,19,21,23,26

5 The following table indicates the percentage of residential electricity consumption in the Kingdom, organized by type of appliance in a recent year:

Type of Appliance	Percentage (%)
Air conditioning	18
Clothes dryers	5
Clothes washers/other	24
Computers	1
Cooking	2
Dishwashers	2
Freezers	2
Lighting	16
Refrigeration	9
Space heating	7
Water heating	8
TVs and set top boxes	6

Which graphical method do you think is best for portraying relative categorical importance in these data?

(a) a pareto chart

(b) a bar chart,

(c) a pie chart,

(d) a time series plot

(e) a stem-and-leaf display

6 A box of nine gloves contains two left-handed gloves and seven right-handed gloves. If two gloves are randomly selected from the box, without replacement (the first glove is not returned to the box after it is selected), what is the probability that there will be one right-handed glove and one left-handed glove selected?

(a) 0.3889

(b) 0.3457

(c) 0.6049

(d) 0.0110

(e) 0.5833

7 A municipal bond service has three rating categories (A, B, and C). Suppose that in the past year, of the municipal bonds issued throughout the United States, 70% were rated A, 20% were rated B, and 10% were rated C. Of the municipal bonds rated A, 50% were issued by cities, 40% by suburbs, and 10% by rural areas. Of the municipal bonds rated B, 60% were issued by cities, 20% by suburbs, and 20% by rural areas. Of the municipal bonds rated C, 90% were issued by cities, 5% by suburbs, and 5% by rural areas. What proportion of municipal bonds are issued by suburbs?

(a) 0.325
(b) 0.375
(c) 0.625
(d) 0.225
(e) 0.560

8 If $P(B) = 0.05$, $P(A/B) = 0.80$, $P(B') = 0.95$ and $P(A/B') = 0.40$, find $P(B/A)$.

(a) 0.0952
(b) 0.4200
(c) 0.3800
(d) 0.9520
(e) 0.0420

9 The following table contains the probability distribution for the number of traffic accidents daily in a small city:

Number of Accidents (X)	Probability (P(X))
0	0.10
1	0.20
2	0.45
3	0.15
4	0.05
5	0.05

Compute the standard deviation.

(a) 1.18

(b) 1.40

(c) 2.00

(d) 0.45

(e) 1.08

10 The increase or decrease in the price of a stock between the beginning and the end of a trading day is assumed to be an equally likely random event. What is the probability that a stock will show an increase in its closing price on five consecutive days?

(a) 0.0312

(b) 0.3120

(c) 0.9688

(d) 0.0968

(e) 0.6880

11 A toll-free phone number is available from 9 A.M. to 9 P.M. for your customers to register complaints about a product purchased from your company. Past history indicates that an average of 0.8 calls is received per minute. What is the maximum number of phone calls that will be received in a one-minute period 99.99% of the time?

(a) 6

(b) 4

(c) 2

(d) 5

(e) 3

12 From an inventory of 30 cars being shipped to a local automobile dealer, 4 are SUVs. What is the probability that if 4 cars arrive at a particular dealership, none are SUVs?

(a) 0.5455

(b) 0.4545

(c) 0.3877

(d) 0.0005

(e) 0.6123

13 The GMAT scores from a sample of 50 applicants to an MBA program indicate that none of the applicants scored below 450. A frequency distribution was formed by choosing class intervals 450 to 499, 500 to 549, and so on, with the last class having an interval from 700 to 749. Two applicants scored in the interval 450 to 499, and 16 applicants scored in the interval 500 to 549. What percentage of applicants scored below 550?

(a) 36%
(b) 32%
(c) 100%
(d) 4%
(e) 72%

14 The following is a stem-and-leaf display representing the amount of gasoline purchased, in gallons (with leaves in tenths of gallons), for a sample of 25 cars that use a particular service station on the New Jersey Turnpike:

```
 9 | 147
10 | 02238
11 | 125566777
12 | 223489
13 | 02
```

What amount of gasoline (in gallons) is most likely to be purchased?

(a) 11 and 11.7
(b) 11 and 12.9
(c) 10 and 11.7
(d) 9 and 10.8
(e) 12 and 13.2