Department of Statistics & Operations Research
College of Science
King Saud University
STAT-324: Probability and Statistics for Engineers
First Mid-Term Exam
Second Semester 1436 – 1437

Student's Name (In Arabic):		Section's Number:	
Student's Number:		Attendance number:	
Teacher's Name:			

Instructions:

- There are 25 multiple choice questions.
- Time allowed is 90 minutes (1.5 Hour).
- For each question, put the code of the correct answer in the following table beneath the question number.
- Please, use capital letters: A, B, C, and D.
- Do not copy answers from your neighbors; they have different question forms.
- Mobile Telephones are not allowed in the classroom.

1	2	3	4	5	6	7	8	9	10

11	12	13	14	15	16	17	18	19	20

21	22	23	24	25

Question (1-3):

Consider a sample of size $n = 5$ with $\sum x_i = 35$ and $\sum x_i^2 = 259$.

(1) The sample mean ($\bar{x}$) equals:

(A) 5 **(B) 7** (C) 8.5 (D) 35

(2) The sample standard deviation (S) equals:

(A) 2.7709 (B) 3.9 **(C) 1.8708** (D) 0.0593

(3) The sum of deviations of observations from the sample mean, $\sum(x_i - \bar{x})$, equals:

(A) 0 (B) 1 (C) $\frac{\bar{x}}{2}$ (D) $2\bar{x}$

Question (4-5):

(4) The number of ways for selecting 3 students from 8 students equals:

(A) 64 (B) 5 (C) 24 **(D) 56**

(5) Suppose that there are 15 books on a table; 5 of which are Mathematics and 10 are Statistics. If 2 books are selected at random and removed from the table in succession without replacing the first, then the probability that both books are Mathematics equals:

(A) 0.1172 (B) 0.0006 (C) 0.5007 **(D) 0.0952**

Question (6-7)

Suppose that two balanced (fair) dice are tossed. Then:

(6) The probability of getting a total of 8 equals:

(A) 0.6111 (B) 0.8266 **(C) 0.1389** (D) 0.0845

(7) The probability of getting at most a total of 5 equals:

(A) 0.2778 (B) 0.3860 (C) 0.0977 (D) 0.4151

Question (8-11)

A students need to register some courses offered by the College of Science this semester. The probability that he will register a Statistics course is 0.7, the probability that he will register a Mathematics course is 0.3, and the probability that he will register both courses is 0.3. Then:

(8) The probability that he will register a Statistics course only equals:

(A) 0.4 (B) 0.7 (C) 0.3 (D) 0.1

(9) The probability that he will register a Mathematics course only equals:

(A) 0.2 **(B) 0.0** (C) 0.5 (D) 0.8

(10) The probability that he will not register a Mathematics course and will not register a Statistics course equals:

(A) 0.6 (B) 0.9 **(C) 0.3** (D) 0.05

(11) If it is known that the student has registered a Mathematics course, then the probability that he will register a Statistics course equals:

(A) 0.5 (B) 0.8 (C) 0.0 **(D) 1.0**

Question (12- 15)

Suppose that we have two events A and B with: $P(A) = 0.8$, $P(B) = 0.5$, and $P(A \cup B) = 0.9$.

(12) The probability $P(A \cap B)$ equals:

(A) 0.55 **(B) 0.4** (C) 0.6 (D) 0.01

(13) The conditional probability $P(B|A)$ equals:

(A) 0.2 (B) 0.9 (C) 0.3 **(D) 0.5**

(14) The events A and B are:

(A) joint (B) disjoint (C) mutually exclusive (D) sure events
(not disjoint)

(15) The events A and B are:

(A) dependent **(B) independent** (C) impossible events (D) disjoint
(not independent)

Question (16- 17)

Suppose that in a certain STAT-324 class 20% of the students are industrial engineering students, 30% are chemical engineering students, 10% are mechanical engineering students, 40% are civil engineering students. It is known that 10% of the industrial engineering students, 6% of the chemical engineering students, 8% of mechanical engineering students, and 4% of the civil engineering students have failed the exam. If we select a student at random from this class, then:

(16) The probability that the student failed the exam equals:

(A) 0.552 (B) 0.115 **(C) 0.062** (D) 0.227

(17) If it is known that the selected student has failed the exam, then the probability that he is an industrial engineering student equals:

(A) 0.4789 (B) 0.5903 (C) 0.7017 **(D) 0.3226**

Question (18- 20)

Suppose that the random variable X has the following probability distribution:

x	0	1	2	3
f(x)	0.2	0.2	0.2	k

(18) The value of k equals:

(A) 0.4 (B) 0.2 (C) 0.6 (D) 1.0

(19) The probability $P(X < 3)$ equals:

(A) 0.3 **(B) 0.6** (C) 0.5 (D) 0.8

(20) If $F(x)$ is the cumulative distribution function (CDF) of X, then $F(0.5)$ equals:

(A) 0.7 (B) 0.9 **(C) 0.2** (D) 0.1

Question (21- 22)

Suppose that the random variable X has the following probability distribution:

x	0	1	2
f(x)	0.3	0.2	0.5

(21) The mean or the expected value of X ($\mu_X = E(X)$), equals:

(A) 0.5 (B) 1.0 **(C) 1.2** (D) 1.9

(22) The variance of X ($\sigma_X^2 = Var(X)$), equals:

(A) 0.44 **(B) 0.76** (C) 1.87 (D) 0.03

Question (23- 24)

Suppose that the random variable X has the following probability density function:

$$f(x) = \begin{cases} \frac{1}{50}x \ ; \ 0 < x < 10 \\ 0 \ ; \ elsewhere \end{cases}$$

(23) The probability $P(X > 5)$ equals:

(A) 0.95 (B) 0.55 (C) 0.2 **(D) 0.75**

(24) The mean or the expected value of X ($\mu_X = E(X)$), equals:

(A) 6.67 (B) 0.50 (C) 7.5 (D) 2.5

Question (25)

Suppose that the random variable X has a mean $\mu_X = E(X)$=100 and a variance $\sigma_X^2 = Var(X) =$ 25.

(25) The probability $P(85 < X < 115)$ is greater than or equal to:

(A) 0.75 (B) 0.3375 (C) 0.96 **(D) 0.8889**