Department of Statistics
& Operations Research
College of Science, King Saud University

STAT 324

Test 1
Semester II, 1432 – 1433 H

Student Name:			
Student Number:		**Section Number:**	
Teacher Name:		**Attendance Number**	

- Mobile Telephones are not allowed in the classrooms.
- Time allowed is 90 minutes
- Answer all questions.
- Choose the nearest number to your answer.
- WARNING: Do not copy answers from your neighbours. They have different questions forms.
- For each question, **put the code in capital letter** of the correct answer, in the following table, beneath the question number:

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	26	27	28	29	30

Consider randomly selecting a single individual and having that person test drive 3 different vehicles. Define events A1, A2, and A3 by:
A1= likes vehicle #1 A2= likes vehicle #2 A3= likes vehicle #3.
Suppose that $P(A_1) = 0.55,\ P(A_2) = 0.65,\ P(A_3) = 0.70,$
$P(A_1 \cup A_2) = 0.80,\ P(A_2 \cap A_3) = 0.4\ and\ P(A_1 \cup A_2 \cup A_3) = 0.88.$

(1) The probability that the individual likes both vehicle #1 and vehicle #2 equal:

(A) 1.2	(B) 0.36	(C) 0.84	(D) 0.4

(2) The value of $P(A_2 \mid A_3)$ equal:

(A) 0.7	(B) 0.65	(C) 0.571	(D)0.455

(3) The events $A_2\ and\ A_3$ are:

(A) independent	(B) dependent	(C) disjoint	(D) sure events

Suppose that the following sample represents the ages (in year) of a sample of 5 men: 25, 28, 23, 30 and 24.

(4) the sample mean is:

(A) 23	(B) 25	(C) 26	(D) 26.5

(5) the sample variance is:

(A) 5.1	(B) 8.5	(C) 2.92	(D) 25

A mixture of candies consists of 5 mints, 5 toffees, and 2 chocolates. If a person makes a random selection of two of these candies,

(6) The probability of getting two mints is:

(A) 0.83	(B) 0.152	(C) 0.3	(D) 0.42

(7) The probability of getting one mint and one toffee is:

(A) 0.58	(B) 0.42	(C) 0.83	(D) 0.38

An individual has 3 different email accounts. Most of his messages, in fact 70%, come into account #1, whereas 20% come into account #2 and the remaining 10% into account #3. Of the messages into account #1, only 1% are spam, whereas the corresponding percentages for accounts #2 and #3 are 2% and 5%, respectively.

(8) The probability that a randomly selected message is spam is equal to:

(A) 0.58	(B) 0.016	(C) 0.83	(D) 0.38

(9) If the selected message is spam, then the probability that it has been selected from account #2 is:

(A) 0.2	(B) 0.004	(C) 0.02	(D) 0.25

An oil exploration company currently has two active projects, one in Asia and the other in Europe. Let A be the event that the Asian project is successful and B be the event that the European project is successful. Suppose that A and B are independent events with $P(A)$ =0.4 and $P(B)$=0.7.

(10) If the Asian project is not successful, then the probability that the European project is also not successful is:

(A) 0.0	(B) 1.1	(C) 0.6	(D) 0.3

(11) The probability that at least one of the two projects will be successful is:

(A) 0.82	(B) 0.28	(C) 0.4	(D) 0.7

(12) Given that at least one of the two projects is successful, then the probability that only the Asian project is successful equal:

(A) 0.54	(B) 0.488	(C) 0.4	(D) 0.146

A committee need to be formed from a group of 4 chemists and 3 physicists,

(13) The number of committees that can be formed consisting of 3 persons is:

(A) 3	(B) 7	(C) 35	(D) 12

(14) The number of committees that can be formed consisting of 2 chemists and 1 physicist is:

(A) 18	(B) 3	(C) 35	(D) 2

Let X be a random variable with the following cumulative distribution function (CDF):

$$F(x)=\begin{cases} 0\ , & x<1 \\ 0.15\ , & 1\le x<2 \\ 0.70\ , & 2\le x<3 \\ 1\ , & x\ge 3 \end{cases}$$

(15) The probability P(1 <X ≤ 3) equals:

(A) 0.70	(B) 0.15	(C) 0.85	(D) 0.55

Consider a short quiz consisting of 3 independent questions. One of the students correctly answers any of these questions with a probability of 0.8. Let "C" denotes the correct answer and "W" denotes the wrong answer. Let the random variable X be the number of correct answers.

(16) The number of outcomes of the experiment (the number of elements of the sample space, S) is:

(A) 8	(B) 2	(C) 6	(D) 27

(17) The set of all possible values of X is:

(A) {3, 0.8}	(B) {1, 2, 3}	(C) {0, 1, 2, 3}	(D) {3}

(18) The event (X = 3) is equivalent to:

(A) {CCC, WWW}	(B) {3C, 3W}	(C) {C}	(D) {CCC}

(19) The probability P(X = 0) equals:

(A) 0.2	(B) 0.008	(C) 0.8	(D) 0.6

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

x	1	2	3	4
f(x)=P(X=x)	0.2	0.3	0.3	k

(20) The value of k is:

(A) 0.1	(B) 0.3	(C) 0	(D) 0.2

(21) The probability: $P(1 < X \leq 3)$ is:

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

(22) The value of the cumulative distribution function at X =2, F(2), is:

(A) 0.5	(B) 0.1	(C) 0.3	(D) 0

Let X be a random variable with mean $E(X) = \mu = 4$, and variance $Var(X) = \sigma^2 = 0.25$.

(23) The value of $E(X^2)$ equals:

(A) 16.25	(B) 16.00	(C) 16.50	(D) 3.75

(24) $E(3X - 2)$, i.e., the expected value of (3X -2), equals:

(A) 12	(B) 10	(C) 2	(D) 36

(25) According to Chebyshev's Theorem, the probability: P(3 < X < 5) is at least:

(A) 0.9375	(B) 0.8889	(C) 0.7500	(D) 0.9600

Let X be a random variable with the following probability density function:

$$f(x) = \begin{cases} \frac{1}{8}x & , \ 0 < x < 4 \\ 0 & , \ otherwise \end{cases}$$

(26) The probability P(1 < X < 2) equals:

(A) 0.3409	(B) 0.0623	(C) 0.1875	(D) 0.7993

(27) The probability P(X = 2) equals:

(A) 0	(B) 0.25	(C) 0.75	(D) 0.5

(28) The value of the cumulative distribution function, F(3), equals:

(A) 0.3750	(B) 0.5625	(C) 0.1250	(D) 0

(29) The mean (expected value) of X equals:

(A) 1.333	(B) 3.333	(C) 1.667	(D) 2.667

(30) The variance of X equals:

(A) 3.889	(B) 1.889	(C) 4.889	(D) 0.889