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

STAT 109
Second Midterm Exam

Student Name:	

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

- Mobile Telephones are <u>not allowed</u> in the classrooms.

- Time allowed is <u>90 minutes</u>

- Answer all questions.

- Choose the nearest number to your answer.

- WARNING: Do not copy answers from your neighbours. <u>They have different questions forms.</u>

- 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
B	A	C	D	A	B	D	C	A	D

11	12	13	14	15	16	17	18	19	20
B	C	D	B	C	C	B	A	C	A

21	22	23	24	25
B	B	D	D	C

QUESTIONS 1 - 4

Suppose that 25% of the people in a certain large population have high blood pressure. A Sample of 7 people is selected at random from this population. Let X be the number of people in the sample who have high blood pressure, follows a binomial distribution then

1) The values of the parameters of the distribution are:

(A) 7, 0.75	(B) 7, 0.25	(C) 0.25, 0.75	(D) 25, 7

2) The probability that we find exactly one person with high blood pressure, is:

(A) 0.31146	(B) 0.143	(C) 0.125	(D) 0.25

3) The probability that there will be at most one person with high blood pressure, is:

(A) 0.311	(B) 0.25	(C) 0.4449	(D) 0.5551

4) The probability that we find more than one person with high blood pressure, is:

(A) 0.689	(B) 0.857	(C) 0.4449	(D) 0.5551

QUESTIONS 5 - 7

The number of serious cases coming to a hospital during a night follows a Poisson distribution with an average of 10.5 persons per night, then:

5) The probability that 12 serious cases coming in the next night, is:

(A) 0.10324	(B) 0.3456	(C) 12	(D) 0.5

6) The average number of serious cases in a two nights period is:

(A) 10.5	(B) 21	(C) 0.2065	(D) 0.0867

7) The probability that 20 serious cases coming in next two nights is:

(A) 10.5	(B) 0.7694	(C) 0.20	(D) 0.0867

QUESTIONS 8 -10
Given the standard normal distribution, then:

8) $P(-1.1 \le z \le 1.1)$ is:

(A) 0.3254	(B) 0.8691	(C) 0.7286	(D) 0.1475

9) $P(z > -0.15)$ is:

(A) 0.5596	(B) 0.9394	(C) 0.0606	(D) 0.4404

10) The z value that has an area of 0.883 to its right, is:

(A) -0.811	(B) 1.19	(C) 0.811	(D) -1.19

QUESTIONS 11 - 14
A nurse supervisor has found that staff nurses, on the average, complete a certain task in 10 minutes. If the times required to complete the task are approximately normally distributed with a standard deviation of 3 minutes, then:

11) The probability that a nurse will complete the task in less than 8 minutes is:

(A) 0.3221	(B) 0.2514	(C) 0.5288	(D) 0.1565

12) The probability that a nurse will complete the task in more than 4 minutes is:

(A) 0.5461	(B) 0.7558	(C) 0.9772	(D) 0.8712

13) If eight nurses were assigned the task, the expected number of them who will complete it within 8 minutes is approximately equal to:

(A) 4	(B) 1	(C) 5	(D) 2

14) If a certain nurse completes the task within k minutes with probability 0.6293; then k equals approximately:

(A) 15	(B) 11	(C) 7	(D) 21

QUESTION 15

15) When taking a sample of size 50 from a non-normal population, the distribution of the sample mean $\bar{x}$ will be:

(A) Binomial	(B) Poisson	(C) Normal	(D) other

QUESTIONS 16 - 18

In a simple random sample of size 36 drawn from a population with a mean of 100 and a standard deviation of 36, then

16) the probability that the sample mean will be less than 91 is:

(A) 0.1549	(B) 0.0753	(C) 0.0668	(D) 0.0875

17) the probability that the sample mean will be more than 98 is:

(A) 0.5468	(B) 0.6293	(C) 0.8527	(D) 0.7169

18) the probability that the sample mean will be between 95 and 105 is:

(A) 0.5934	(B) 0.6174	(C) 0.8432	(D) 0.7647

QUESTIONS 19 - 21

Suppose we have a sample of 4 observations with mean = 9 and standard error estimate of the mean = 0.3. Assume that the distribution of data is normal.

19) The sample standard deviation is:

(A) 0.3	(B) 2	(C) 0.6	(D) 4

20) The point estimate for the population mean is:

(A) 9	(B) 0.3	(C) 4	(D) 9.3

21) The 95 % confidence interval for the population mean is:

(A) 9 ± 0.588	(B) 9 ± 0.955	(C) 9 ± 0.494	(D) 9 ± 0.706

QUESTIONS 22, 23

A Physical therapist wished to estimate, with 90 % confidence, the mean maximal strength of a particular muscle in a certain group of individuals. He is willing to assume that strength scores are normally distributed with a variance of 144. A sample of 15 subjects who participated in the experiment gave a mean of 84.3.

22) The value of the reliability coefficient is:

(A) 1.96	(B) 1.645	(C) 1.29	(D) 2.575

23) The 90% confidence interval for the true mean is:

(A) 84.3 ± 6.073	(B) 84.3 ± 7.978	(C) 84.3 ± 3.997	(D) 84.3 ± 5.097

QUESTIONS 24, 25

In a study on obesity, a sample of 950 adult Saudi women in the Western Region seeking care at primary health centers was taken. It was found that 611 of these were obese. We wish to construct a 99 % confidence interval for the true proportion of adult Saudi women in the Western Region seeking care at primary health centers who are obese.

24) The standard error estimate of sample proportion is:

(A) 2.58	(B) 0.480	(C) 0.230	(D) 0.016

25) The 99 % confidence interval for the true proportion is:

(A) 0.643 ± 0.016	(B) 0.643 ± 0.031	(C) 0.643 ± 0.041	(D) 0.643 ± 0.026