

Department of Statistics and Operations Research

College of Science
King Saud University

STAT 145 Second Mid-term Examination
Semester I, 1432/33 H

Name of Student:

Student's Number:

Teacher's name: Dr.

Section number:

Serial Number:

1	2	3	4	5	6	7	8	9	10
A	D	C	B	D	A	B	D	B	B

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

21	22	23	24	25
D	B	A	C	D

- ▶▶ Mobile Telephones are not allowed in the classrooms
- ▶▶ Time allowed is 1 and 1/2 hours
- ▶▶ Attempt all questions
- ▶▶ Choose the nearest number to your answer
- ▶▶ For each question, put the code of the correct answer in the above table under the question number

----- Questions 1 -----

A random variable has a normal distribution with mean $\mu = 50$ and standard deviation $\sigma = 5.2$. What are the probabilities that the random variable will take a value:

- 1) less than 55.2 :
 (A) **0.8413** (B) 0.0475 (C) 0.1587 (D) 0.34
- 2) greater than 60.3 :
 (A) 0.8601 (B) 0.0918 (C) 0.9761 (D) **0.0239**
- 3) between 52 and 57.2 :
 (A) 0.7318 (B) 0.8024 (C) **0.2682** (D) 0.0260

----- Questions 2 -----

A sample of 25 observations is drawn from a normal population with mean = 40 and variance = 100.

- 4) The mean $\mu_{\bar{x}}$ of the sampling distribution of \bar{x} is:
 (A) 4 (B) **40** (C) 25 (D) 15
- 5) The standard error of the sample mean, $\sigma_{\bar{x}}$, is:
 (A) 10 (B) 100 (C) 40 (D) **2**
- 6) The probability that $P(\bar{x} \geq 35)$ is:
 (A) **0.9938** (B) 0.0062 (C) 0.9162 (D) 0.9505

----- Questions 3 -----

Suppose we are interested in the patient visit time in the hospitals A and B. If the means of the patient visit times are μ_A and μ_B minutes and for two patient samples of sizes n_A, n_B the means are \bar{x}_A, \bar{x}_B with standard deviations S_A, S_B , respectively for the visit times, then:

❖ If we found that $n_A = 36$ that $S_A = 0.3$, $\bar{x}_A = 2.6$ then:

- 7) The point estimate of μ_A is:
 (A) 36 (B) **2.6** (C) 0.3 (D) 1.2
- 8) The value of $s_{\bar{x}_A}$ is:
 (A) 0.008 (B) 1.2 (C) 0.3 (D) **0.05**

9) The reliability factor of 95 % confidence interval for μ_A is:

- (A) 1.645 (B) **1.96** (C) 1.28 (D) 2.325

10) The upper bound of 95 % confidence interval for μ_A is equal to:

- (A) 14.2 (B) **2.7** (C) 20.7 (D) 16.4

11) The lower bound of 95 % confidence interval for μ_A is equal to:

- (A) 14.2 (B) 13.6 (C) **2.5** (D) 16.4

❖ If you have $\mu_A = 82$, $\mu_B = 76$, and $n_A = 75$, $n_B = 50$ with $S_A = 8$, $S_B = 6$ then:

12) The value of $S_{\bar{x}_A - \bar{x}_B}$ is:

- (A) 2 (B) 1.644 (C) 2.702 (D) **1.254**

13) The probability $P(\bar{x}_A - \bar{x}_B > 3)$ is:

- (A) 0.0344 (B) 0.9656 (C) 0.0735 (D) **0.9916**

14) The lower bound of 96 % confidence interval for $\mu_A - \mu_B$ is: (assuming the point estimate is 6)

- (A) **3.43** (B) 2.73 (C) 2.05 (D) 6

15) The upper bound of 96 % confidence interval for $\mu_A - \mu_B$ is: (assuming the point estimate is 6)

- (A) 6 (B) **8.57** (C) 2.52 (D) 12

----- Questions 4 -----

To study the relation of gender and diagnosis to suicidality among adolescent psychiatric inpatients, two samples consisted of 123 girls and 96 boys are selected from admission unit of a private psychiatric hospital. Suicide attempts were reported by 60 of the girls and 18 of the boys.

16) The standard error of the difference between sample proportions is:

- (A) **0.0602** (B) 0.0206 (C) 0.15 (D) 0.85

17) The reliability factor of 99 % confidence interval for the difference between the true proportions is:

- (A) 2.33 (B) 1.65 (C) **2.58** (D) 1.96

18) The lower bound of 99 % confidence interval for the difference between the true proportions is:

- (A) **0.145** (B) 0.736 (C) - 0.456 (D) - 0.568

19) The upper bound of 99 % confidence interval for the difference between the true proportions is:

- (A) - 0.145 (B) - 0.136 (C) **0.456** (D) 0.568

----- Questions 5 -----

Suppose that it is known that a kidney transplant is successful 60 % of the time. If a random sample of 15 patients who receive kidney transplants is chosen, then:

20) The probability that the transplant will be successful in 10 of the patients is:

- (A) 0.8141 (B) 0.3003 (C) **0.1859** (D) 0.1762

21) The expected number of successful transplants is:

- (A) 15 (B) 4 (C) 6 (D) **9**

22) The variance of successful transplants is:

- (A) 1.89 (B) **3.60** (C) 15 (D) 9

----- Questions 6 -----

The number of traffic accidents that occurs on a particular road during a month follows a Poisson distribution with a mean of 8.

23) The probability that less than two accidents will occur on that road during a randomly selected month is:

- (A) **0.003** (B) 0.0750 (C) 0.0331 (D) 0.8655

24) The probability that exactly 4 accidents will occur on that road during a randomly selected 2 months is:

- (A) 0.3214 (B) 0.9991 (C) **0.0003** (D) 0.01008

25) The standard deviation for the number of accidents during a randomly selected month is:

- (A) 16 (B) 4 (C) 8 (D) **2.83**

Good luck