

KING FAHD UNIVERSITY OF PETROLEUM & MINERALS, DHAHRAN, SAUDI ARABIA
DEPARTMENT OF MATHEMATICS

STAT 201: Introduction to Statistics

Term 211, Second Major Exam, Thursday November 18, 2021, 06:00 PM

Name: _____ ID #: _____

Please mark the correct answer to each of the questions by completely darkening the circle of your choice with a dark pen or pencil.

MULTIPLE CHOICE:

	A	B	C	D	E
Q.No.1: -	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q.No.2: -	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q.No.3: -	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q.No.4: -	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q.No.5: -	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q.No.6: -	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q.No.7: -	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q.No.8: -	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q.No.9: -	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q.No.10: -	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

MULTIPLE CHOICE:

	A	B	C	D	E
Q.No.11: -	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q.No.12: -	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q.No.13: -	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q.No.14: -	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q.No.15: -	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q.No.16: -	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q.No.17: -	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q.No.18: -	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q.No.19: -	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q.No.20: -	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Code: 00

Score:

$\frac{\quad}{20}$

Instructions:

1. Formula sheet is attached at the end of this exam. You are not allowed to bring with you, formula sheet or any other printed/written paper.
2. Mobiles are not allowed in exam. If you have your mobile with you, turn it off and keep it under your seat so that it is visible to proctor. Your mobile(s) should not be in your pocket during the exam.
3. The answers are rounded. If the exact answer is not there in any of the 5 choices, then pick the one that you think is closest to correct answer.
4. Make sure you have 12 unique pages of exam paper (including this title page.)

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Q1: Each of 2 identical cabinets has 2 drawers. Cabinet A contains a silver coin in each drawer, and cabinet B contains a silver coin in one of its drawers and a gold coin in the other. Suppose that the selection of cabinets and drawers is equally likely. One cabinet is randomly selected, one of its drawers is opened, what is the probability that a silver coin is found?

- (A) 3/4
- (B) 1/2
- (C) 1/4
- (D) 1/8
- (E) 0

Q2: Each of 2 identical cabinets has 2 drawers. Cabinet A contains a silver coin in each drawer, and cabinet B contains a silver coin in one of its drawers and a gold coin in the other. Suppose that the selection of cabinets and drawers is equally likely. If a silver coin is found in the first drawer, what is the probability that Cabinet A was opened?

- (A) 2/3
- (B) 1/3
- (C) 1/2
- (D) 1/4
- (E) 3/4

Q3: In the inspection of tin plates produced by a process, the probability of spotting x imperfections per minute is given by the following discrete probability function:

$$P(X = x) = \frac{1}{e(x!)}; \quad x = 0, 1, 2, \dots$$

What is the average number of imperfections per minute for this process?

- (A) 1
- (B) 0.5
- (C) 0
- (D) 1.5
- (E) 2

Q4: The length of time it takes students to complete an exam is given by a random variable, Y (measured in hours), which has a probability density function given by:

$$f(y) = \begin{cases} ay & 0 < y < 2 \\ 0 & \text{elsewhere} \end{cases}$$

For what value of a , the above density function is valid?

- (A) 1/2
- (B) 1
- (C) 3/2
- (D) 2
- (E) 1/4

Q5: For a random variable X , the probability density function is given as $f(x) = 4x$ for $1 < x < \sqrt{3}/2$ and zero elsewhere. Rounded to 2 decimal points, what is the 60th percentile of X .

- (A) 1.14
- (B) 0.60
- (C) 0.55
- (D) 1.22
- (E) -1.14

Q6: The number of typing errors per page on a 798-page book follow a Poisson distribution. If there are 169 typing errors randomly distributed in the book, find the probability that a given page contains at least two typing error.

- (A) 0.0195
- (B) 0.9805
- (C) 0.8091
- (D) 0.1909
- (E) 0.0181

Q7: A Quality Control Inspector (QCI) has to investigate a lot containing 25 pieces of metallic sheet out of which 21 have acceptable color. The QCI randomly selects 5 pieces of metallic sheet from the lot, without replacement, and rejects the lot if more than 1 metallic sheets have unacceptable color. Find the probability that this lot will be accepted by QCI.

- (A) 0.8336
- (B) 0.8165
- (C) 0.3830
- (D) 0.4506
- (E) 0.3983

Q8: Historically, it is known that a machine produces 7% defective products. If 25 products manufactured by this machine are selected randomly, what is the expected number of defectives?

- (A) 1.75
- (B) 0.07
- (C) 2.50
- (D) 3.25
- (E) 0

Q9: The working life of a certain type of light bulb is normally distributed such that the life time of 99.73% light bulbs is between 600 hours and 900 hours. If the given interval is symmetric around mean, what is the standard deviation?

- (A) 50
- (B) 60
- (C) 70
- (D) 40
- (E) 80

Q10: The manager of a gasoline station wants to study gasoline purchasing habits of motorists at his station. In particular, he decides to focus on the amount purchased by the motorists. He selects a random sample of 60 motorists during a certain week and found that the mean amount purchased was 11.3 gallons, with variance 9.61 gallons². Set up a 99% confidence interval estimate of the population mean purchased.

- (A) **(10.2347, 12.3653)**
- (B) (10.3430, 12.2570)
- (C) (8.3334, 14.2666)
- (D) (7.9976, 14.6024)
- (E) (10.6312, 11.9688)

Q11: The length of the tube rods (in cm) is normally distributed with mean 80 cm and standard deviation 0.5 cm. If the length of the tube rod is between 79.4 cm and 80.8 cm, it is considered as non-defective. Otherwise, the rod is declared defective. What is the probability that a randomly selected tube rod is defective?

- (A) **0.1699**
- (B) 0.8301
- (C) 0.9452
- (D) 0.1151
- (E) 1.0603

Q12: The net weight of a packaged chemical follow a distribution with mean 50 pounds and standard deviation 0.15 pounds. If a random sample of size 36 packages is selected, what is the probability that the average weight is less than 50.05 pounds?

- (A) **0.9772**
- (B) 0.0228
- (C) 0.6306
- (D) 0.3694
- (E) 1

Q13: A sample of 250 households from Saudi Arabia revealed that 112 use electric heater during the winter season. Construct a 96.6% confidence interval for proportion of households in Saudi Arabia who use electric heater during the winter season.

- (A) **(0.3813, 0.5147)**
- (B) (0.3904, 0.5056)
- (C) (0.4853, 0.6187)
- (D) (0.4944, 0.6096)
- (E) (0.4480, 0.5520)

Q14: Following are 5 confidence intervals for μ using the same dataset. The confidence levels used for constructing these intervals are 0.9, 0.92, 0.95, 0.98 and 0.99. Which one of these is a 99% confidence interval?

- (A) **(17.424, 22.576)**
- (B) (18.355, 21.645)
- (C) (18.040, 21.960)
- (D) (17.674, 22.326)
- (E) (18.249, 21.751)

Q15: Suppose the diameter of trees (measured at 4.5 feet above the ground) of a certain type is normally distributed with a mean $\mu = 8.8$ inches and standard deviation $\sigma = 0.8$ inches. What is the probability that the diameter of a randomly selected tree will be between 8 and 13 inches?

- (A) **0.8413**
- (B) 0.2904
- (C) 0.1587
- (D) 0
- (E) 1

Q16: Suppose that a help session for a popular course has a capacity of 650 students, but that invitations are sent out to 4600 students. If each student who receives an invitation has a probability of 0.13 of attending the help session, independently of everybody else, what is the probability that the number of students attending the help session will exceed the capacity?

Hint: Number of students attending the help session $\sim \text{Bin}(n = 4600, p = 0.13)$.

- (A) **0.0107**
- (B) 0.9893
- (C) 0.0113
- (D) 0.9881
- (E) 0.0119

Q17: Suppose the number of accidents occurring weekly on a particular highway follow a Poisson distribution with mean of 1.2. Find the probability that there is no accident this week.

- (A) **0.3012**
- (B) 0.3614
- (C) 0.2069
- (D) 0.0867
- (E) 0.5089

Q18: For a standard normal random variable Z , find the $P(-2.5 < Z < -0.5)$.

- (A) **0.3023**
- (B) 0.6915
- (C) 0.9938
- (D) 0.8023
- (E) 0.8413

Q19: Suppose a random variable X can take values 1, 2 and 3 with $P(X = 1) = 0.3$ and $P(X = 2) = 0.5$. Find the $E(X)$.

- (A) 1.9
- (B) 1.5
- (C) 2.5
- (D) 0.5
- (E) 2.9

Q20: Let a random variable X follow a symmetric distribution with mean 10 and standard deviation 1.1. What is the median of X ?

- (A) 10
- (B) 1.1
- (C) 8.9
- (D) 11.1
- (E) 10.5

[End]