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**Name**

**No ID:**

**Section:**

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You have 40 questions in 9 pages. You have 90 minutes to solve the exam. Please mark all your answers on the answer sheet provided to you. You can use your question paper to solve problems but only answer sheets will be graded. You have to submit both questions paper and answer sheet. Be sure that the answer model matches the question model. Good luck

**Choose the best answer from the following questions:**

1. How many different ways can four people: Andy, Betty, Cindy, and Doug, sit in a row at the cinema if Andy and Betty must sit together?  
A) 18  
B) 6  
C) 12  
D) 24
2. A measure defined as the difference between the third quartile and the first quartile and is used to identify outliers is called a(n)  
A) decile  
B) interquartile range  
C) z-score  
D) percentile
3. On a Pareto chart, the frequency should be represented on the  
A) X-axis  
B) regression  
C) Y-axis  
D) none of the above
4. When all data for a variable are transformed into z-score, the resulting distribution will have  
A)  $\mu = 0, \sigma^2 \neq 1$   
B)  $\mu = \sigma^2 = 1$   
C)  $\mu \geq \sigma^2$   
D)  $\mu = 0, \sigma^2 = 1$
5. " Salaries of the employees in a big store ", is an example of which level of measurement?  
A) interval  
B) nominal  
C) ratio  
D) ordinal

6. How many outcomes are there in the sample space if a coin is tossed once and a die is rolled?
- A) 10
  - B) 4
  - C) 12
  - D) 36
7. 3 statistics professors and 7 chemistry professors are available to be advisors to a student organization. The student organization needs two of the professors to be advisors, what is the probability that both professors are chemistry professors?
- A) 0.111
  - B) 0.233
  - C) 0.100
  - D) 0.467
8. The graph that represents the cumulative frequencies for the classes in a frequency distribution is called a(n)
- A) ogive
  - B) time series
  - C) histogram
  - D) bar chart
9. The .....is the sum of the frequencies accumulated to the upper boundary of a class in the distribution.
- A) frequency polygons
  - B) cumulative frequency
  - C) relative frequency
  - D) percent
10. A characteristic (measure) obtained by using all the data values from a specific population is called a
- A) factorial
  - B) statistic
  - C) parameter
  - D) none of the above
11. Which of the following properties **does not** apply to a theoretical normal distribution?
- A) the mean, median, and mode are equal
  - B) the normal distribution is bimodal
  - C) the normal distribution is bell-shaped
  - D) the curve never touches the x-axis

12. The number of beds in 8 hospitals in Jeddah is 230, 410, 540, X, 620, 1200, 1250 and 1300, where X is unknown value. If the median is 600, then the value of X is
- A) 580
  - B) 420
  - C) 850
  - D) 620
13. What type of sampling is being used if KAU students are divided into different groups according to their colleges and a sample is chosen from each college to be surveyed?
- A) stratified
  - B) cluster
  - C) random
  - D) systematic

A supermarket employs cashiers, managers, and cleaner. The distribution of employees according to marital status is shown here. (Use the following table to answer questions 14, 15, 16)

	Cashier	manager	cleaner	Total
Married	8	12	3	23
Not married	5	15	2	22
Total	13	27	5	45

14. The employee is a cashier given that he is married
- A)  $\frac{4}{11}$
  - B)  $\frac{5}{23}$
  - C)  $\frac{8}{23}$
  - D)  $\frac{5}{22}$

15. Find the probability that the employee is a manager or married

- A)  $\frac{27}{45}$
- B)  $\frac{38}{45}$
- C)  $\frac{10}{9}$
- D)  $\frac{3}{5}$

16. The employee is not married

- A)  $\frac{13}{45}$
- B)  $\frac{22}{45}$
- C)  $\frac{20}{45}$
- D)  $\frac{3}{5}$

17. A recent survey by an insurance company showed the following probabilities for the number of bedrooms in each insured home. Find the standard deviation for the distribution

x	2	3	4	5
P(x)	0.3	0.4	0.2	0.1

- A) 0.94
- B) 2.72
- C) 3.1
- D) 0.89

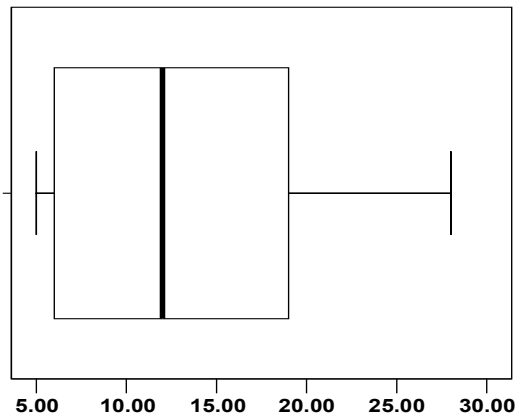
18. Urn 1 contains 5 red balls and 3 black balls. Urn 2 contains 3 red balls and 1 black ball. Urn 3 contains 4 red balls and 2 black balls. If an urn is selected at random and a ball is drawn. Find the probability it will be red?
- A)  $\frac{2}{3}$
  - B)  $\frac{49}{72}$
  - C)  $\frac{23}{72}$
  - D)  $\frac{49}{24}$

If a coin is tossed 4 times, find the following (answer questions 19, 20 and 21)

19. The variance of the number of heads that will be obtained.
- A) 4
  - B) 0.25
  - C) 2
  - D) 1
20. The probability of getting 4 heads.
- A)  $\frac{1}{8}$
  - B)  $\frac{1}{4}$
  - C)  $\frac{1}{2}$
  - D)  $\frac{1}{16}$
21. The probability of getting 2 head..
- A)  $\frac{1}{9}$
  - B)  $\frac{1}{8}$
  - C)  $\frac{3}{4}$
  - D)  $\frac{3}{8}$

22. The average repair cost of a microwave oven is 55\$, with a standard deviation of 8\$. the costs are normally distributed. If 12 ovens are repaired, find the probability that the mean of the repair bills will be greater than 60\$.
- A) 0.0707
  - B) 0.015
  - C) 0.1236
  - D) 0.3707
23. The average height of a certain age group of people is 53 inches and the standard deviation is 4 inches. If the variable is normally distributed, find the probability that a selected individual's will be less than 57 inches.
- A) 1
  - B) 0.3413
  - C) 0.8413
  - D) 0.1587
24. What  $z$  value corresponds to 17% of the data between the mean and the  $z$  value?
- A) 2.1
  - B) 0.52
  - C) 0.125
  - D) 0.44
25. State the null and alternative hypotheses for the following conjecture (claim): The average age of college students is 21.7
- A)  $H_0 : \mu = 21.7, H_1 : \mu < 21.7(\text{claim})$
  - B)  $H_0 : \mu \neq 21.7, H_1 : \mu = 21.7(\text{claim})$
  - C)  $H_0 : \mu > 21.7(\text{claim}), H_1 : \mu < 21.7$
  - D)  $H_0 : \mu = 21.7(\text{claim}), H_1 : \mu \neq 21.7$
26. Find the area under the standard normal distribution curve between the values  $z = 1.72$  and  $z = 1.98$
- A) 0.4761
  - B) 0.4573
  - C) 0.0188
  - D) 0.9334

27. Use the following graph to answer the question



The distribution shape is:

- A) negatively skewed
  - B) symmetrical
  - C) can not determine
  - D) positively skewed
28. Rejecting the null hypothesis,  $H_0$ , when it is true is called a
- A) standard error
  - B) type I error
  - C) type II error
  - D) none of the above
29. A survey claims that the average cost of a hotel room in a city is \$69. To test the claim, a researcher selects a sample of 40 hotel rooms and finds that the average cost is \$67.56. The standard deviation of the population is \$3.86. At  $\alpha = 0.05$ , do we reject  $H_0$  and why?
- A) Yes, because the critical value is 1.96
  - B) No, because the critical value is 1.96
  - C) Yes, because test value falls in the critical region
  - D) No, because the test value doesn't fall in the critical region
30. If a researcher wants to determine if there is a linear relationship between the number of hours a person goes without sleep and the number of mistakes he makes on a simple test. The following data is recorded.  
 $n = 10, \sum x = 46, \sum y = 60, \sum xy = 303$  and  $\sum x^2 = 238$   
 The equation of the regression line is
- A)  $y' = 1.3 + 1.02x$
  - B)  $y' = 1.02 - 1.3x$
  - C)  $y' = 1.02 + 1.3x$
  - D)  $y' = 1.3 - 1.02x$

31. When there is a weak linear relationship between two variables,  $r$  will be close to
- A)  $\pm 1$
  - B)  $-1$
  - C)  $0$
  - D)  $1$
32. Find the area under the standard normal distribution curve to the left of the value  $z = -1.73$
- A)  $0.4582$
  - B)  $0.5280$
  - C)  $0.0418$
  - D)  $0.9582$
33. A student takes a 7 question multiple choice quiz with 4 choices for each question. If the student guesses at random on each question, what is the probability that the student gets exactly 3 questions correct?
- A)  $0.346$
  - B)  $0.043$
  - C)  $0.173$
  - D)  $0.130$
34. If 3% of calculators are defective, find the standard deviation of the defectives in 300 calculators?
- A)  $2.95$
  - B)  $0.79$
  - C)  $8.73$
  - D)  $9$
35. The intercept of the regression line  $y' = -2x + 5$
- A)  $3$
  - B)  $5$
  - C)  $7$
  - D)  $-2$
36. In the standard normal distribution,  $P(Z \leq 0)$  is equal to
- A)  $1$
  - B)  $0.5$
  - C)  $0$
  - D)  $-0.5$



37. An instructor gives a 100 point examination in which the grades are normally distributed. The mean is 60 and the standard deviation is 10. If there are 5% A<sup>+</sup> . find the lowest possible score to get A<sup>+</sup>?
- A) 96
  - B) 76.5
  - C) 43.5
  - D) 61.3
38. To test the hypothesis  $H_o : \mu \leq 24; H_1 : \mu > 24$  at  $\alpha = 0.05$  If the test value = 2.10, P-value = 0.0179, then the decision is
- A) reject  $H_1$
  - B) reject  $H_o$
  - C) can not make a decision
  - D) do not reject  $H_o$
39. If the regression line is given by  $y' = 5 + 3x$  ,then the correlation coefficient (r) is
- A) zero
  - B) positive
  - C) negative
  - D) none of the above
40. Regression line is used to make prediction for the ..... variable.
- A) dependent
  - B) explanatory
  - C) independent
  - D) none of the above

## Answer Key

1. C
2. B
3. C
4. D
5. C
6. C
7. D
8. A
9. B
10. C
11. B
12. A
13. A
14. C
15. B
16. B
17. A
18. B
19. D
20. D
21. D
22. B
23. C
24. D
25. D
26. C
27. D
28. B
29. C
30. A
31. C
32. C
33. C
34. A
35. B
36. B
37. B
38. B
39. B
40. A