Total No. of Questions: 20

Enrollment No : _____

MEDICAPS UNIVERSITY

Faculty of Management Studies

End Semester Examination May 2025

MS5CO30 Business Statistics & Analytics

Programme	:	MBA	**Branch/Specialisation**	:	-
Duration	:	3 hours	**Maximum Marks**	:	60

Note: *All questions are compulsory. Internal choices, if any, are indicated. Assume suitable data if necessary. Notations and symbols have their usual meaning.*

Section 1 (Answer all question(s))

		Marks	CO	BL
Q1.	Which of the following best defines "conditional probability"?	1	1	2

- ○ Probability of one event divided by another
- ◉ Probability of one event occurring given that another has occurred
- ○ Probability of two events occurring simultaneously
- ○ Probability of an event not occurring

Q2.	A coin is tossed twice. What is the probability of getting exactly one head?	1	1	3

- ◉ 1/2
- ○ 1/3
- ○ 1/4
- ○ 1/5

Q3.	What does the Central Limit Theorem state about the sampling distribution of the sample mean?	1	2	2

- ○ It is always uniform
- ○ It becomes normal regardless of sample size
- ◉ It becomes approximately normal as the sample size increases
- ○ It depends on the population distribution

Q4.	A company wants to test a new product using only a few stores before a national launch. What type of sampling is this?	1	2	3

- ○ Simple random sampling
- ○ Stratified sampling
- ◉ Pilot sampling
- ○ Systematic sampling

Q5.	Which of the following errors occurs when a true null hypothesis is rejected?	1	3	4

- ◉ Type I error
- ○ Type II error
- ○ Sampling error
- ○ Non-sampling error

Q6.	You conducted an A/B test and got a p-value of 0.03. What can you conclude at a 5% significance level?	1	3	5

- ○ Accept the null hypothesis
- ○ Increase the sample size
- ◉ Reject the null hypothesis
- ○ The test is inconclusive

Q7.	Which of the following is an absolute measure of dispersion?	1	4	1

- ○ Coefficient of variation
- ◉ Quartile deviation
- ○ Coefficient of range
- ○ Relative mean deviation

Q8.	If the standard deviation of group A is 3 and that of group B is 4, what is the combined standard deviation (assuming equal size)?	1	4	3

- ○ Cannot be determined without more data
- ○ 2
- ◉ 3.5
- ○ 3.1

Q9.	What does a Karl Pearson's correlation coefficient of -0.85 indicate?	1	5	2

- ○ Weak negative relationship
- ◉ Strong negative relationship
- ○ No relationship
- ○ Strong positive relationship

Q10. If the arithmetic mean of a dataset is 50 and a new value 70 is added, what happens to the mean? **1 1 1**

- ○ It remains the same
- ◉ It increases
- ○ It decreases
- ○ It becomes zero

Section 2 (Answer all question(s))

Marks CO BL

Q11. A bag contains 3 red, 4 blue, and 5 green balls. Two balls are drawn at random. Find the probability that both balls are the same color. **4 1 2**

Rubric	Marks
1 mark for given data 1mark for formula 1 mark for process 1 mark for correct output	4

Q12. (a) Describe the characteristics of a probability density function. **6 1 2**

Rubric	Marks
1 mark for each characteristics	6

(OR)

(b) Explain Bayes' Theorem and provide a practical example.

Rubric	Marks
1 marks for definition 3 marks for formula derivation and 2 mark for example	6

Section 3 (Answer all question(s))

Marks CO BL

Q13. Explain the Central Limit Theorem with a real-world example. How does it help in making inferences about the population? **4 2 4**

Rubric	Marks
2 marks for Central Limit Theorem with a real-world example and 2 mark for making inferences about the population	4

Q14. (a) Discuss the different types of sampling methods and their advantages and disadvantages. **6 2 4**

Rubric	Marks
4 marks for sampling types 1 mark for advantage and 1 mark for disadvantages	6

(OR)

(b) A quality control engineer tests a random sample of 50 widgets from a production line. The mean weight of the sample is 5 grams, and the standard deviation is 0.2 grams. Using the Central Limit Theorem, estimate the probability that the sample mean weight is between 4.95 and 5.05 grams.

Rubric	Marks
1 mark for given data 1mark for formula 3 mark for process 1 mark for correct output	6

Section 4 (Answer all question(s))

Marks CO BL

Q15. Describe the steps involved in the critical value method of hypothesis testing with an example. **4 3 2**

Rubric	Marks
2 mark for steps and 2 mark for example	4

Q16. (a) What is the difference between a one-tailed and a two-tailed test in hypothesis testing? Provide examples of scenarios where each would be appropriate. **6 3 4**

Rubric	Marks
4 mark for difference and 2 mark for example	6

(OR)

(b) Describe the process of conducting a two-way ANOVA, including how to interpret the results.

Rubric	Marks
each step carry 1 mark	6

Section 5 (Answer all question(s))

Marks CO BL

Q17. Explain methods of measure of dispersion. **4 4 2**

Rubric	Marks
1 marks for each methods	4

Q18. (a) Calculate Mean deviation for mean and mean deviation for median for individual series and discrete series for measure of dispersion- **6 4 1**

X: 10 , 11, 12, 13, 14, 15, 16,
F: 2, 7, 11, 15, 10, 14, 1

Rubric	Marks
1 mark for given data 1mark for formula 3 mark for process 1 mark for correct output	6

(OR)

(b) Calculate standard deviation for individual series and discrete series for measure of dispersion-

X: 1, 2, 3, 4, 5, 6, 7
F: 6, 12, 18, 26, 16, 10, 8

Rubric	Marks
1 mark for given data 1mark for formula 3 mark for process 1 mark for correct output	6

Section 6 (Answer all question(s))

Marks CO BL

Q19. Explain the different measures of central tendency (Mean, Median, and Mode). Discuss the situations where each measure is most appropriate, and mention at least one merit and demerit of each. **4 5 2**

Rubric	Marks
2 mark for different measure and 2 mark for merit and demerits	4

Q20. (a) What are the qualities of a good measure of central tendency? Analyze how the arithmetic mean meets or fails to meet these criteria when applied to real-world data. **6 5 4**

Rubric	Marks
4 mark for quality and 2 mark for analyzing	6

(OR)

(b) Differentiate between Karl Pearson's coefficient of correlation and Spearman's rank correlation. Under what conditions would you prefer using Spearman's method over Pearson's? Justify your answer with suitable examples.

Rubric	Marks
4 mark for difference and 2 marks for example	6

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