

**BACHELOR OF COMMERCE
THIRD SEMESTER [REPEAT]
BUSINESS STATISTICS
BCM – 304**

[USE OMR SHEET FOR OBJECTIVE PART]

Duration: 3 hrs.

Full Marks: 70

Time: 30 mins.

(Objective)

Marks: 20

Choose the correct answer from the following:

1 × 20 = 20

1. Which of the following is not affected by the extreme values?
 - a. Mean
 - b. Median
 - c. Mode
 - d. Both b and c
2. The correct relationship between AM, GM and HM is
 - a. $AM = GM = HM$
 - b. $AM \geq GM \geq HM$
 - c. $GM \geq HM \geq AM$
 - d. $HM \geq GM \geq AM$
3. The best relative measure of dispersion is _____
 - a. Standard deviation
 - b. Mean deviation
 - c. Coefficient of variation
 - d. Range
4. Out of all the measures of dispersion, the easiest one is _____
 - a. Standard deviation
 - b. Range
 - c. variance
 - d. Quartile deviation
5. For two events A and B, if $P(A \cap B) = 0$, then A and B are _____
 - a. Independent
 - b. Dependent
 - c. Mutually exclusive
 - d. None of the above.
6. Which of the following statement is true for a binomial distribution?
 - a. Mean > Variance
 - b. Mean < Variance
 - c. Mean = Variance
 - d. None of the above.
7. For a Poisson variate X with parameter λ , the standard deviation of X is _____
 - a. λ
 - b. $\sqrt{\lambda}$
 - c. λ^2
 - d. None of the above
8. If Z is a standard normal variate, then the mean of Z is _____
 - a. 0
 - b. 1
 - c. μ
 - d. None of the above
9. If the correlation coefficient between the two variables X and Y is 0, then
 - a. X and Y are dependent
 - b. X and Y are perfect correlation
 - c. X and Y are independent
 - d. None of the above.
10. The two regression lines are identical, when _____
 - a. The product of the two regression coefficients is equal to 1.
 - b. The product of the two regression coefficients is greater than 1.
 - c. The product of the two regression coefficients is less than 1.
 - d. None of the above

11. The product of the two regression coefficients is _____
- a. = 1
 - b. ≥ 1
 - c. ≤ 1
 - d. None of the above
12. Index number is a
- a. Measure of relative changes
 - b. A special type of an average
 - c. A percentage relative
 - d. All of the above.
13. Index numbers reveal the state of
- a. Inflation
 - b. Deflation
 - c. both (a) and (b)
 - d. Neither (a) nor (b)
14. Which of the following averages is used in the construction of an ideal index number?
- a. Arithmetic Mean
 - b. Geometric Mean
 - c. Harmonic Mean
 - d. Mode.
15. The component of time series associated with a lock out in a factory for a month is:
- a. Irregular movement
 - b. Secular trend
 - c. Cyclical variation
 - d. Seasonal variation
16. Decline of mortality rate due to the advance of medical science, is the component of
- a. Irregular movement
 - b. Cyclical variation
 - c. Secular trend
 - d. Seasonal variation
17. The terms prosperity, recession, depression and recovery are in particular attached to :
- a. Secular trend
 - b. Cyclical variation
 - c. Seasonal variation
 - d. Irregular variation.
18. A statistic is a
- a. Sample characteristic
 - b. Population characteristic
 - c. Both (a) and (b).
 - d. Neither (a) nor (b)
19. A parameter is a
- a. Parameter
 - b. Statistic
 - c. Constant
 - d. Both (a) and (b)
20. Estimating the two values of a statistic, in where, the true value lies, is called
- a. Point estimation
 - b. Interval estimation
 - c. Hypothetical values
 - d. None of the above.

(Descriptive)

Time : 2 Hr. 30 Mins.

Marks : 50

[Answer question no.1 & any four (4) from the rest]

1. Calculate mean, median, mode, standard deviation CV and Karl Pearson's coefficient of skewness of the following distribution. 10
Profit (₹000): 10 - 12, 12 - 14, 14 - 16, 16 - 18, 18 - 20, 20 - 22, 22 - 24
No. of companies: 7 15 18 20 25 10 5
2. a) State addition theorem, multiplication theorem and Baye's theorem. 6+4=10
b) A candidate is applied three posts of management trainees. The chance of selecting the first post is $\frac{1}{3}$, the second post is $\frac{1}{4}$ and the third post is $\frac{1}{2}$. What is the probability that the candidate is selected at least one of the post?
3. a) Write the expression of a binomial distribution. State its assumptions. 4+6=10
b) If 5% of the electric bulbs manufactured by a company are defective, find the probability that in a sample of 100 bulbs (i) exactly 3 bulbs are defective; (ii) at least 2 bulbs are defectives. [Given $e^{-5} = 0.007$]
4. a) Enumerate the properties of a normal distribution. 6+4=10
b) The mean weight of 500 male students of a certain college is 151 pounds and the standard deviation is 15 pounds. Assuming the weights to be normally distributed, find how many students weight between 122 pounds and 155 pounds. [Given, $\Phi(2.07) = 0.4808$ and $\Phi(0.27) = 0.1064$]
5. a) What is the difference between correlation and regression? 4+6=10
b) In trying to evaluate the effectiveness in its advertising company, a firm compiled the following data
- Advertising
Expenditure
(₹ in thousand): 12 15 17 23 25 39 42 48
Sales(₹ in lacs): 5.0 5.6 5.8 7.0 8.0 8.8 9.2 9.5
- Calculate the regression line of sales on advertising expenditure and estimate the sales when the advertising expenditure is ₹60,000

6. a) Discuss the various problems involved in the construction of Index Number. 6+4=10
 b) Show with the help of following data, Fisher's index satisfies both Time Reversal Test and Factor Reversal Test.

Items	Base Year		Current Year	
	Price per unit	Quantity	Price per unit	Quantity
A	2	10	4	9
B	4	7	7	7
C	6	8	8	8
D	9	4	9	5

7. a) What is time series? Give an example. Write the usefulness of time series. 1+1+3+5=10
 b) Fit a straight line trend to the time series data and predict sales for the year 2019.

Year:	2013	2014	2015	2016	2017	2018
Sales(₹ in thousand):	25	46	59	60	45	70

8. a) Write in brief the various sampling methods used in Statistics. 4+6=10
 b) A sample of size 100 and mean 35.8 is drawn from a population with unknown mean μ and known standard deviation 3.5. What is the point estimation of the population mean μ ? Find the 95% confidence interval of the population mean μ . [Given, $Z_{0.05} = 1.96$]

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