BUSINESS ANALYTICS
(CSEN 4242)

Time Allotted : 2½ hrs **Full Marks : 60**

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and any 4 (four) from Group B to E, taking one from each group.

Candidates are required to give answer in their own words as far as practicable.

Group – A

1. Answer any twelve: **12 × 1 = 12**

Choose the correct alternative for the following

(i) A statement made about a population for testing purpose is called?
(a) Statistic (b) Hypothesis
(c) Level of Significance (d) Test-Statistic

(ii) A statement whose validity is tested on the basis of a sample is called?
(a) Null Hypothesis (b) Statistical Hypothesis
(c) Simple Hypothesis (d) Composite Hypothesis

(iii) Type 1 error occurs when?
(a) We reject H_0 if it is True (b) We reject H_0 if it is False
(c) We accept H_0 if it is True (d) We accept H_0 if it is False

(iv) Which of the following is true for the coefficient of correlation?
(a) The coefficient of correlation is not dependent on the change of scale
(b) The coefficient of correlation is not dependent on the change of origin
(c) The coefficient of correlation is not dependent on both the change of scale and change of origin
(d) None of the above

(v) Which of the following techniques is an analysis of the relationship between two variables to help provide the prediction mechanism?
(a) Standard error (b) Correlation
(c) Regression (d) None of the above

(vi) Which of the following statements is true about the regression line?
(a) A regression line is also known as the line of the average relationship
(b) A regression line is also known as the estimating equation
(c) A regression line is also known as the prediction equation
(d) All of the above

(vii) Which of the following statements is true about the level of significance?
(a) In testing a hypothesis, we take the level of significance as 2% if it is not mentioned earlier
(b) In testing a hypothesis, we take the level of significance as 1% if it is not mentioned earlier
(c) In testing a hypothesis, we take the level of significance as 10% if it is not mentioned earlier
(d) In testing a hypothesis, we take the level of significance as 5% if it is not mentioned earlier

(viii) Which of the following is not an example of Social Media?
(a) Twitter (b) Google
(c) Instagram (d) Youtube

(ix) Which of the following is not a major data analysis approaches?
(a) Data Mining (b) Predictive Intelligence
(c) Business Intelligence (d) Text Analytics

(x) For improving supply chain management to optimize stock management, replenishment, and forecasting
(a) Descriptive (b) Diagnostic
(c) Predictive (d) Prescriptive

Fill in the blanks with the correct word

(xi) _____ refers to the ability to turn your data useful for business

(xii) The standard normal curve is symmetric about the value _____

(xiii) Skewness of Normal distribution is _____

(xiv) The value of constant 'e' appearing in normal distribution is _____

(xv) In Standard normal distribution, the value of median is _____

Group - B

2. (a) Define analytics. *[(CO1)(REMEMBER/LOCQ)]*
(b) Give 4 benefits of analytics. *[(CO3)(APPLY/IOCQ)]*
(c) Explain any 3 domains of analytics with their functionalities. *[(CO2)(APPLY/IOCQ)]*
2 + 4 + 6 = 12

3. (a) Identify the type of variables
- Number of Bedrooms – 1,2,3
- Size of Shirts – S,M,L,XL,XXL
- Price of house – 30 Lakhs
- Political Party – Congress, CPM, TMC, BJP
- Price of a drug – 50 INR
- Whether customer buys a product – Yes/No. *[(CO3)(APPLY/IOCQ)]*

(b) Find the mean , median for the following data. *[(CO2)(APPLY/IOCQ)]*

(c) Find the outlier. Calculate the mean without the outlier.

Student Name	Weight
Tom	58
Dick	62
Harry	59
John	61
Jane	64
Jenny	56
Ram	89
Shyam	61
Jadu	59
Madhu	56

[(CO2)(APPLY/IOCQ)]

6 + 4 + 2 = 12

Group - C

4. (a) Define standard normal distribution. *[(CO4)(APPLY/APPLY/IOCQ)]*
   (b) Explain the role of Z-scores in normal distribution. *[(CO4)(APPLY/IOCQ)]*
   (c) How can Z-scores be used to compare two different datasets? *[(CO4)(APPLY/IOCQ)]*

4 + 4 + 4 = 12

5. A company wants to understand customer satisfaction scores that follow a normal distribution with $\mu = 75$ and $\sigma = 10$.
   (i) What is the probability a customer scores below 65? *[(CO4)(APPLY/IOCQ)]*
   (ii) What score represents the 90th percentile? *[(CO4)(APPLY/IOCQ)]*
   (iii) Differentiate between left skewed and right skewed distribution. *[(CO4)(REMEMBER/LOCQ)]*
   (iv) If the mean and median of a distribution are 32 and 40 respectively. Is it a normal distribution? *[(CO4)(APPLY/IOCQ)]*

(4 + 4 + 2 + 2) = 12

Group - D

6. Given the following monthly demand data: [120, 135, 142, 150, 160, 175, 180, 190, 200, 215, 220, 230]
   (i) Apply a 3-month moving average. *[(CO5)(APPLY/IOCQ)]*
   (ii) Find the MAD and MSE. *[(CO5)(APPLY/IOCQ)]*
   (iii) Discuss the benefits and limitations of using moving averages. *[(CO5)(APPLY/IOCQ)]*

(4 + 4 + 4) = 12

7. Find the MA(2) and MA(3) and find which is the best forecasting technique.

Month	#	MA(2)	Error	Abs Error	Error Squared	MA(3)	Error	Abs Error	Error Squared
1	9								
2	8								
3	9								
4	12								
5	9								
6	12								
7	11								
8	7								
9	13								
10	9								
11	11								
12	10								
			MAD						
			MSE						

[(CO5)(ANALYSE/HOCQ)]

12

Group - E

8. (a) Differentiate between correlation and regression. *[(CO5)(APPLY/IOCQ)]*

(b) Given two variables, X and Y, calculate the Pearson correlation coefficient(r).
X: [1, 2, 3, 4, 5]
Y: [2, 4, 6, 8, 10]. *[(CO5)(APPLY/IOCQ)]*

(c) What does value of r signifies here?

$$r = \frac{\sum(X-\bar{X})(Y-\bar{Y})}{\sqrt{\sum(X-\bar{X})^2 \sum(Y-\bar{Y})^2}}$$

[(CO5)(APPLY/IOCQ)]

4 + 4 + 4 = 12

9. (a) Define linear regression. *[(CO5)(REMEMBER/LOCQ)]*

(b) Write the equation linear regression. *[(CO5)(REMEMBER/LOCQ)]*

(c) The formula used for linear regressions is, **y = a + bx.** Give the values of coefficient a and b. *[(CO5)(APPLY/IOCQ)]*

(d) Write 4 properties of linear regression. *[(CO5)(REMEMBER/LOCQ)]*

2 + 2 + 4 + 4 = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	12.50	75	12.50