

(2 ½ Hours)

[Total Marks: 75]

- N.B.**
- 1) All questions are compulsory.
 - 2) Figures to the right indicate marks.
 - 3) Illustrations, in-depth answers and diagrams will be appreciated.
 - 4) Mixing of sub-questions is not allowed.

Q. 1 Attempt ANY THREE from the following: (15M)

- (a) Define Business Analytics. Explain its necessity in Data analytics.
- (b) Explain modelling discuss the types of models (graphical, algebraic, spreadsheet) with examples.
- (c) Define datasets, variables, observations with reference to analytics.
- (d) Write a short note on data analytics and decision making.
- (e) Explain in brief the difference between outliers and missing values.
- (f) How to find relation among categorical variables and numeric variables?

Q. 2 Attempt ANY THREE from the following: (15M)

- (a) Explain in brief business intelligence tools used for DA.
- (b) Explain probability distribution of single random variable.
- (c) How to make Decision under uncertainty? Explain.
- (d) Write a short note of conditional mean variance.
- (e) Explain various elements of decision analysis.
- (f) Write a short note on Bayes rule.

Q. 3 Attempt ANY THREE from the following: (15M)

- (a) Define sampling and explain its importance in business analytics, highlighting its role in making inferences about populations based on sample data.
- (b) Explain the central limit theorem and its significance in sampling distributions.
- (c) Discuss the factors that affect the width of a confidence interval, including sample size, level of confidence, and population variability.
- (d) Define hypothesis testing and its importance in business analytics. How it helps in making decisions based on sample data?
- (e) Explain the concepts of Type I and Type II errors in hypothesis testing, discussing their implications for decision-making in business contexts.
- (f) Discuss the difference between simple linear regression and multiple linear.

Q.4 Attempt **ANY THREE** from the following: (15M)

- (a) What is regression analysis? What method is used to fit a straight line in simple linear regression?
- (b) What is T-value? Why is it important in hypothesis testing.
- (c) What are the two models frequently used to train models? Explain.
- (d) Explain random walk model.
- (e) Explain the different methods of forecasting.
- (f) Explain different methods of accuracy.

Q.5 Attempt **ANY THREE** from the following: (15M)

- (a) Define optimization modelling and its significance in business analytics, highlighting its role in decision-making processes.
- (b) Discuss the difference between linear programming and integer programming, providing examples to illustrate each concept.
- (c) Define analysis of variance (ANOVA) and experimental design, elucidating their importance in analyzing and optimizing processes in business settings.
- (d) Discuss the steps involved in the simulation modelling process, highlighting the importance of model validation and verification.
- (e) Explain the process of sensitivity analysis in optimization modelling and how it helps in assessing the robustness of optimal solutions.
- (f) What is two-way ANOVA? Explain with an example.
