(2½ Hours) **[Total Marks: 75]**

N. B.:(1) **All** questions are **compulsory**.
(2) Make **suitable assumptions** wherever necessary and **state the assumptions** made.
(3) Answers to the **same question** must be **written together**.
(4) Numbers to the **right** indicate **marks**.
(5) Draw **neat labelled diagrams** wherever **necessary**.
(6) Use of **Non-programmable** calculators is **allowed**.

Q1. Attempt three of the following. 15 Marks

a. Write a short note on soft computing.
b. What are the premises and guiding principle of soft computing techniques?
c. What is artificial neural network? Explain its components and learning methods.
d. Explain the working of Adaptive Resonance Theory.
e. Explain probabilistic reasoning.

Q2**. Attempt three of the following** 15 marks

a. Mention the characteristics of an artificial neural network.
b. Compare the similarities and differences between biological and artificial neuron.
c. Write a short note on McCulloch Pitts Neuron model.
d. What are the two main types of associative memory?
e. What are Back Propagation networks?

Q3. Attempt three of the following. 15 marks

a. Write a short note on Fixed Weight Competitive Nets.
b. Explain the Architecture of Hamming Network.
c. Write a short note on Kohonen Self-Organizing Feature Maps.
d. What are the Limitations of CNN Model?
e. Write a short note on Deep Learning Neural networks.

Q4. Attempt three of the following. 15 marks

a. Enlist and explain any three fuzzy sets operations.
b. Describe fuzzy logic in detail.
c. Compare classical relations and fuzzy relations
d. What is membership function? Enlist and explain its features.
e. Explain any three methods of membership value assignments in detail.

Q5. Attempt three of the following. 15 marks

a. State Charles Darwin's theory of evulsions
b. What is meant by genetic algorithm?
c. Compare and contrast traditional algorithm and genetic algorithm.
d. List the various cypes of hybrid systems.
e. Explain in detail about the various operators involved in genetic algorithm.

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(2 ½ Hours) **[Total Marks: 75]**

N. B.: (1) **All** questions are **compulsory**.
(2) Make **suitable assumptions** wherever necessary and **state the assumptions** made.
(3) Answers to the **same question** must be **written together**.
(4) Numbers to the **right** indicate **marks**.
(5) Draw **neat labelled diagrams** wherever **necessary**.
(6) Use of **Non-programmable** calculators is **allowed**.

Q. 1 Attempt the three of the following. **15**

a Explain Mesos, Akka and Cassandra as data science processing tools.
b. Explain the basics of Business layer.
c. List and explain different programming languages using in data science processing.
d. What is data vault? Explain hubs, links and satellite with respect to data vault.
e. Explain the Rapid Information Factory ecosystem.

Q. 2 Attempt the three of the following. **15**

a. Give an overview of the functions of Audit, Balance, and Control Layer.
b. Explain the following shipping terms: i. Seller ii. Carrier iii. Port, iv. Ship, v. Terminal, Named Place.
c. Explain the fundamental data science process steps.
d. Explain Data Lakes and Data Swamps.
e. List and explain the different data stores used in data science.

Q. 3 Attempt the three of the following. **15**

a. Explain the different ways to deal with errors.
b. How you will handle missing values in Pandas? Explain
c. Write a python program to keep Only the Rows That Contain a Maximum of Two Missing Values.
d. Explain the principles of data analysis.
e. Write a python program to Drop the Columns Where All Elements Are Missing Values.

Q. 4 Attempt the three of the following. **15**

a. How to Complete the 5 Whys?
b. What are pareto charts? What information can be obtained from pareto charts?
c. Explain the Time section of TPOLE.
d.. Explain hypothesis testing, t-test and chi-square test with respect to data science.
e. Write a short note on data valut.

Q. 5 Attempt the three of the following. **15**

a. What is organize superstep? Explain in brief.sss
b. Where is chi square test used?
c. Explain regression and its types?
d. Why is report superstep important? Explain its importance.
e. Explain Pricipal Component Analysis in details.

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Time: 2½ hrs **Max Marks: 75**

Instructions:

1) **All** questions are **compulsory**.
2) Mixing of sub questions is not allowed.
3) Write in clear, legible, writing.

Q1) Attempt any three: (15)

A) Define Business Research. Discuss the considerations while determining the need to conduct a Business Research.
B) Explain the characteristics of useful and valuable information for Business Research.
C) Define the term theory. Explain the process of theory building, stating its goals.
D) Describe the importance of Business Ethics highlighting various obligations of a Researcher with respect to confidentiality
E) As reputed airlines BOEING wants to conduct performance monitoring research. Describe what aspects will BOEING take into account and how will it conduct the research

Q2) Attempt any three: (15)

A) Explain the importance of Problem Definition and briefly explain the steps of Problem-definition Process.
B) Compare the approaches of Qualitative and Quantitative Research.
C) Discuss the advantages and disadvantages of a Focus Group Interview.
D) Describe the common research objectives of secondary data study using appropriate examples.
E) Describe the major components of a research proposal. What are the risks associated with exploratory research.

Q3) Attempt any three: (15)

A) State and explain the major sources of Errors in Survey Research.
B) What are the advantages of Mail Surveys? Discuss the efforts to be made to increase the response rates for mail surveys.
C) Describe various techniques of Mechanical Observations used for measuring Physiological Reactions.
D) Explain the purpose of the following Experimental Design for research with suitableexamples:
    i. Static Group Design
    ii. One-Shot Design
E) Explain Categories of Survey Errors.

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Q4) Attempt any three: (15)

A) What is a graphic rating scale? Describe the ladder scale with an example. Compare Open-Ended Response and Fixed-Alternative Questions.
B) Define Validity. Discuss various components of construct validity.
C) Discuss the types of Fixed-Alternative Questions stating their purpose. How do the Fixed-Alternative Questions differ from Open-Ended Response Questions?
D) Describe the significance of Probability Sampling. Explain any 4 techniques of Probability Sampling stating their advantages and disadvantages.
E) What is hypothesis testing? Explain steps in it.

Q5) Attempt following any three: (15)

A) Explain stages of Data Analysis.
B) Explain chi square test with example. Hence write steps in it.
C) A sample of 800 male students is found to have a mean height 70.47 inches. Can it be reasonably regarded as a sample from a large population with mean height 67.39 inches and standard deviation 1.30 inches? Test at 5% level of significance.
D) What is Multivariate Statistical Data analysis? What are the steps of interpreting a multiple Regression Analysis results?
E) Distinguish between Type I and Type II error.

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