(2 ½ Hours) **[Total Marks: 60]**

N.B: (1) **All questions are compulsory.**
(2) Figures to the **right** indicate full marks.
(3) **Assume additional data if necessary** but state the same clearly.
(4) Symbols have their usual meanings and tables have their usual standard design unless stated otherwise.

Q.1 Attempt **any two** of the following **(12)**

a) Explain the need of Programming Languages. **06**

b) Write a short note on Compilation. **06**

c) G = ({A, B, C, S}, {a, b, c}, P, S) **06**

P:

(1) S –> ABC

(2) A –> aA A –> aA | ε

(3) A –> ε

(4) B –> bB B –> bB | ε

(5) B –> ε

(6) C –> cC C –> cC | ε

(7) C –> ε

Consider Above Grammar and derive a string aabc

d) Calculate FIRST and FOLLOW of the Following Grammar **06**

S → A

A → aB / Ad

B → b

C → g.

Q.2 Attempt **any two** of the following **(12)**

a) Write a short note on encapsulation with example. **06**

b) Define function overloading and Operator Overloading **06**

c) How is OOP better than traditional programming approaches? **06**

d) Write a short note on Message Inheritance. **06**

Q.3	Attempt **any two** of the following	**(12)**
a)	How Functions are helpful in writing a Program?	**06**
b)	Explain the Concept of Lazy evaluation.	**06**
c)	Explain referential transparency.	**06**
d)	Write a short note on Recursion.	**06**

Q.4	Attempt **any two** of the following	**(12)**
a)	Write a short note on Semantic representation.	**06**
b)	Write a short note on Goal Reduction.	**06**
c)	Write a short note on Clausal Form.	**06**
d)	State and Explain different Logic Operators.	**06**

Q.5	Attempt **any two** of the following	**(12)**
a)	Write a short note on CGI Scripts.	**06**
b)	Write a short note on Javascript HTML DOM objects.	**06**
c)	How Text processing is done in Script Language?	**06**
d)	Explain the concept of Pipes and Redirection in Script	**06**

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(Time : 2 ½ Hours) [Total Marks: 60]

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(3) Assume additional data if necessary but state the same clearly.
(4) Symbols have their usual meanings and tables have their usual standard design unless stated otherwise.
(5) Use of calculators and statistical tables are allowed. / If required keep it.

Q.1	Attempt **any two** of the following.	**(12)**
a)	What is Exploratory Data Analysis? Explain the steps used in exploratory analysis.	**(06)**
b)	What is missing and noisy data? How to handle missing data?	**(06)**
c)	Why data visualization is important? Explain any 3 techniques used in visualization	**(06)**
d)	What is data discretization? What result is produced after performing data discretization on the following data Age 1,5,9,4,7,11,14,17,13,18, 19,31,33,36,42,44,46,70,74,78,77	**(06)**
Q.2	Attempt **any two** of the following.	**(12)**
a)	Explain any three different statistical methods to do point estimation.	**(06)**
b)	The hourly MOMOs output by the "XYZ" fry machine is advertised to be 150 pounds. For the new machine purchased by the "PQR" drive-in, tests were run for 22 different one-hour periods, producing an average production of 143 pounds, with a standard deviation of 17 pounds. At the 5% level of significance, does the PQR management have grounds for complaints? Formulate the Hypothesis and write the steps to perform hypothesis testing.	**(06)**
c)	Explain the use-case of the following in data science. 1. Projection 2. Aggregation	**(06)**

d)	What is XML? Define XML for storing Library data. Write any 3 Xpath query on above XML to extract the data.	**(06)**
Q.3	Attempt **any two** of the following.	**(12)**
a)	What is web scrapping? Explain the use of it.	**(06)**
b)	Differentiate between RDBMS and XML data models.	**(06)**
c)	What is software development tools? What characteristics to be consider for selecting development tools?	**(06)**
d)	What is version control software? Explain the importance of version control?	**(06)**
Q.4	Attempt **any two** of the following.	**(12)**
a)	What is difference between cloud storage and local storage? Which is better for the business?	**(06)**
b)	What is Bayes theorem? What are the applications of Bayes theorem?	**(06)**
c)	Explain the evaluation techniques used in classification model.	**(06)**
d)	What is MongoDB model? Explain with example.	**(06)**
Q.5	Attempt **any two** of the following.	**(12)**
a)	What is AIC? How AIC compares the models?	**(06)**
b)	What is ANOVA? What is the difference between ANOVA and t-test?	**(06)**
c)	Explain in detail what is Ridge Regression	**(06)**
d)	What is cross validation? Why to use cross validation?	**(06)**

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