(2½ 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) How to create a pandas Series from a dictionary? Explain with an appropriate example
b) How to transpose a pandas DataFrame? Give suitable example of it.
c) Describe various data visualization libraries in Python and their features.
d) Why is data visualization important?

Q.2 Attempt *any two* of the following: **12**

a) What are various ways to clean data in pandas DataFrame?
b) Explain reshaping with hierarchical indexing and pivoting between "long" and "wide" formats.
c) What is hierarchical indexing in pandas? How to reorder and sort levels in a DataFrame?
d) What are various ways to combine and merge datasets? Explain anyone with suitable example.

Q.3 Attempt *any two* of the following: **12**

a) How to connect various data sources to Tableau and manage data source metadata?
b) What are different File based data sources in Tableau?
c) What is the role of calculations in Tableau. Explain Aggregate calculations.
d) What is the process of creating and using parameters in Tableau?

Q.4 Attempt *any two* of the following: **12**

a) What are trend models in Tableau? How they are useful to analyze trends in data?
b) What are the primary steps of Tableau Prep?
c) What do you mean by forecasting? What are the considerations for accurate forecast?
d) Explain some advanced geospatial features in Tableau. How they are used to create custom maps?

Q.5 Attempt *any two* of the following: **12**

a) How to select, add, and delete columns in a pandas DataFrame? Provide examples for each operation.
b) Explain the concept of reading data from JSON format. Elaborate with code snippet.
c) How to design effective dashboard in Tableau?
d) What is Clustering? How it is useful in Data Analysis?

X51Y15E152X51Y15E152X51Y15E152X51Y15E152

(2½ 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) How to create a pandas Series from a dictionary? Explain with an appropriate example
b) How to transpose a pandas DataFrame? Give suitable example of it.
c) Describe various data visualization libraries in Python and their features.
d) Why is data visualization important?

Q.2 Attempt *any two* of the following: **12**

a) What are various ways to clean data in pandas DataFrame?
b) Explain reshaping with hierarchical indexing and pivoting between "long" and "wide" formats.
c) What is hierarchical indexing in pandas? How to reorder and sort levels in a DataFrame?
d) What are various ways to combine and merge datasets? Explain anyone with suitable example.

Q.3 Attempt *any two* of the following: **12**

a) How to connect various data sources to Tableau and manage data source metadata?
b) What are different File based data sources in Tableau?
c) What is the role of calculations in Tableau. Explain Aggregate calculations.
d) What is the process of creating and using parameters in Tableau?

Q.4 Attempt *any two* of the following: **12**

a) What are trend models in Tableau? How they are useful to analyze trends in data?
b) What are the primary steps of Tableau Prep?
c) What do you mean by forecasting? What are the considerations for accurate forecast?
d) Explain some advanced geospatial features in Tableau. How they are used to create custom maps?

Q.5 Attempt *any two* of the following: **12**

a) How to select, add, and delete columns in a pandas DataFrame? Provide examples for each operation.
b) Explain the concept of reading data from JSON format. Elaborate with code snippet.
c) How to design effective dashboard in Tableau?
d) What is Clustering? How it is useful in Data Analysis?

X51Y15E152X51Y15E152X51Y15E152X51Y15E152

(2½ 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) How to create a pandas Series from a dictionary? Explain with an appropriate example
b) How to transpose a pandas DataFrame? Give suitable example of it.
c) Describe various data visualization libraries in Python and their features.
d) Why is data visualization important?

Q.2 Attempt *any two* of the following: **12**

a) What are various ways to clean data in pandas DataFrame?
b) Explain reshaping with hierarchical indexing and pivoting between "long" and "wide" formats.
c) What is hierarchical indexing in pandas? How to reorder and sort levels in a DataFrame?
d) What are various ways to combine and merge datasets? Explain anyone with suitable example.

Q.3 Attempt *any two* of the following: **12**

a) How to connect various data sources to Tableau and manage data source metadata?
b) What are different File based data sources in Tableau?
c) What is the role of calculations in Tableau. Explain Aggregate calculations.
d) What is the process of creating and using parameters in Tableau?

Q.4 Attempt *any two* of the following: **12**

a) What are trend models in Tableau? How they are useful to analyze trends in data?
b) What are the primary steps of Tableau Prep?
c) What do you mean by forecasting? What are the considerations for accurate forecast?
d) Explain some advanced geospatial features in Tableau. How they are used to create custom maps?

Q.5 Attempt *any two* of the following: **12**

a) How to select, add, and delete columns in a pandas DataFrame? Provide examples for each operation.
b) Explain the concept of reading data from JSON format. Elaborate with code snippet.
c) How to design effective dashboard in Tableau?
d) What is Clustering? How it is useful in Data Analysis?

X51Y15E152X51Y15E152X51Y15E152X51Y15E152

Time: 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)	Discuss the effective use of Wireless Sensor Network.	**06**
b)	Explain any one Wireless Sensor Network application in detail.	**06**
c)	Explain Wireless Sensor Network architecture.	**06**
d)	Write a short note on Data eccentricity.	**06**
Q.2	Attempt **any two** of the following	**(12)**
a)	Explain advantages of Wireless Optical Network.	**06**
b)	Write a short note on atmospheric channel.	**06**
c)	Write a short note on scintillation.	**06**
d)	How weather conditions affect Wireless Optical Channel?	**06**
Q.3	Attempt **any two** of the following	**(12)**
a)	Compare 3G and 4G.	**06**
b)	Write a short note on MIMO technologies.	**06**
c)	How Modulation increases communication speed?	**06**
d)	What are different challenges associated with 4G.	**06**
Q.4	Attempt **any two** of the following	**(12)**
a)	Explain 5G Air Interface.	**06**
b)	Explain need of 5G.	**06**
c)	Write a short note on Network Slicing.	**06**
d)	Write a short note on CRAN.	**06**
Q.5	Attempt **any two** of the following	**(12)**
a)	Compare General Wireless sensor technology with Mobile Adhoc Network (MANET)	**06**
b)	Explain the term Wireless Optical Network along with Characteristics.	**06**
c)	Define 4G Vision.	**06**
d)	Discuss the use of 5G Protocol stack.	**06**

****

X51YAA5254X51YAA5254X51YAA5254X51YAA5254

Time: 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 Secret Key Cryptoystems.	**06**
b)	Write in detail about Message Authentication Codes	**06**
c)	Write in detail about Cryptographic Protocols	**06**
d)	Write in Detail about Hybird Cryptography.	**06**
Q.2	Attempt **any two** of the following	**(12)**
a)	Explain the concept of Substitution-Permutation Networks	**06**
b)	Explain the Data Encryption Standard (DES) and its significance in the field of data security.	**06**
c)	What are Hash Functions , explain Data Integrity	**06**
d)	What is Piling up Lemma explain in detail	**06**
Q.3	Attempt **any two** of the following	**(12)**
a)	Explain Shanks' Algorithm in detail.	**06**
b)	Write in detail about Security of ElGamal System	**06**
c)	Explain in detail Full Domain Hash (FDH)	**06**
d)	Explain in detail RSA Algorithm	**06**
Q.4	Attempt **any two** of the following	**(12)**
a)	Write about Key Predistribution in Sensor Networks.	**06**
b)	Explain in detail Diffie-Hellman Key Predistribution.	**06**
c)	Explain Elgamal Cryptosystem with example	**06**
d)	Explain the concept of key agreement also distinguish between key distribution and key agreement.	**06**
Q.5	Attempt **any two** of the following	**(12)**
a)	Explain Substitution Cipher in detail.	**06**
b)	Elaborate on Differential Cryptanalysis highlighting is techniques and applications in cryptography?	**06**
c)	Write about Blom Scheme in Detail.	**06**
d)	Write in detail about Kerberos.	**06**

****

X51YC1F173X51YC1F173X51YC1F173X51YC1F173

Time: $2^{1/2}$ 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 them clearly

(4) Symbols have their usual meaning and tables have their usual standard design unless stated otherwise

Q1	**Answer any two from the following**	12
a	Describe in detail the structure of a Blockchain network.	(6)
b	Explain the importance of CAP theorem in Blockchain.	(6)
c	State and explain the the advantages of Bitcoin Protocol.	(6)
d	Discuss how the buying and selling of Bitcoin takes place?	(6)
Q2	**Answer any two from the following**	12
a	State and explain the advantages of DAO?	(6)
b	Explain the templates of smart contract.	(6)
c	Describe the steps in the deployment of smart contract.	(6)
d	Write a short note on Ethereum Virtual Machine.	(6)
Q3	**Answer any two from the following**	12
a	Describe the Serenity development architecture.	(6)
b	Explain any one Token standards in detail.	(6)
c	Write a short note on DeFi.	(6)
d	Discuss he different Token emerging Concepts.	(6)
Q4	**Answer any two from the following**	12
a	Describe structure of Ethereum Contract.	(6)
b	Describe scope and declaration of variables in Solidity.	(6)
c	What are Abstract contracts in Solidity?Explain.	(6)
d	Explain loop control structure in Solidity.	(6)
Q5	**Answer any two from the following**	12
a	What are the features of Blockchain technology?Explain any two	(6)
b	Write a short note on Hyperledger fabric.	(6)
c	Explain the web3 with geth connectivity.	(6)
d	What is Tokenization with respect to blockchain.	(6)

****

X51Y145E6AX51Y145E6AX51Y145E6AX51Y145E6A