

[Time: 3 Hours]

[Marks:80]

N.B.: 1. Question no. 1 is compulsory.

2. Attempt **any Three** from out of remaining **Five** questions.
3. Assume suitable data wherever necessary.
4. Figures at right indicates full marks.

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|-----|---|----|
| Q 1 | a Differentiate between data warehouse and data mart. | 5 |
| | b Explain data transformation with example. | 5 |
| | c Explain Nested loop join algorithm. | 5 |
| | d Explain CAP theorem. Compare and contrast ACID and BASE. | 5 |
| Q 2 | a Explain Discretionary Access Control, Mandatory Access Control and Role-Based Access Control in brief. | 10 |
| | b Explain Significance of each step in ETL Process, also explain types of data extraction with examples. | 10 |
| Q 3 | a Explain Sort-Merge Join and HASH Join with required number of block transfer and seek cost. | 10 |
| | b Compare NOSQL data architectural patterns with examples | 10 |
| Q 4 | a What is general purpose of data warehouse architecture? Explain in detail data warehouse architecture and draw star schema for hospital management system. | 10 |
| | b What is big data? Explain in detail types and characteristics of big data. | 10 |
| Q 5 | a Consider a data warehouse storing sales details of various products sold at different stores, and the time of the sales. For this example analyze the following OLAP operations 1)slice 2)dice 3)rollup 4)drill down 5)pivot. | 10 |
| | b Explain Primary Horizontal, Derived Horizontal and Vertical Fragmentation with example. Comment on Completeness, Reconstruction and Disjointness Properties. | 10 |
| Q 6 | Write Short Note on: | |
| | a Snowflake schema with example | 10 |
| | b Temporal and Spatial Databases | 10 |

Time (3 Hours)

[Total Marks 80]

N. B:

1. Question No. 1 is Compulsory.
2. Solve any THREE from Question No. 2 to 6.
3. Draw neat well labelled diagram wherever necessary

- Q. 1 a) A secure e-voting system is to be designed. Discuss the security goals that must met and enlist mechanisms for the same. (5)
- b) Explain principle elements of NAC (5)
- c) Enlist properties & applications of Hash function. (5)
- d) Describe different types of Denial of service attacks. (5)
- Q2. a) Explain the need of Network Access Control in Enterprise Networks. Explain the major NAC enforcement methods. (10)
- b) Explain in detail with diagram, How Kerberos can be used for authentication. (10)
- Q3. a) How is security achieved in the transport and tunnel modes of IPSEC? Describe the role of AH and ESP. (10)
- b) Define Malware. Explain its types in detail (10)
- Q4. a) Explain Firewall & its types along with advantages and disadvantages (10)
- b) Explain different modes of operation of Block ciphers (10)
- Q5. a) Explain classical encryption techniques with example (10)
- b) In an RSA system, given $N=91$ $e=5$ Calculate $\Phi(n)$, p , q and private key d . What is the cipher text when you encrypt message $m=25$ using the public key. Also perform decryption. (10)
- Q6. Write Short Notes on ANY 4: (20)
- a) SSL protocol stack
 - b) Compare and contrast AES and DES
 - c) IDS and its types
 - d) Use cases for NAC
 - e) Digital Signature

(3 Hours)

Total Marks: 80

N.B. : (1) Question No. 1 is compulsory.

(2) Attempt any three questions out of remaining five questions

Q.1. (a) By using matrices, Solve the following system of linear equation (5)

$$x+y+z=9, \quad 2x+5y+7z=52, \quad 2x+y-z=0.$$

(b) Differentiate between Simple Random Sampling and Stratified Random Sampling (5)

(c) Explain Scatter plots. (5)

(d) Compare constrained and non constrained optimization Techniques (5)

Q.2. (a) Find Singular Value of Decomposition of matrix $A = \begin{bmatrix} 1 & 1 \\ 0 & 1 \\ -1 & 1 \end{bmatrix}$ (10)

(b) A company gave an intensive training to its salesmen to increase the sales. A random sample of 10 salesmen was selected and the value (in lakhs of Rupees) of their sales per month, made before and after the training is recorded in the following table. (10)

Salesman	1	2	3	4	5	6	7	8	9	10
Before	15	22	6	17	12	20	18	14	10	16
After	17	23	16	20	14	21	18	20	10	11

Test whether there is any increase in mean sales at 5% level of significance.

Table Values: $t(\alpha, df, \text{test type})$

$$t(0.05, 10, \text{one-tailed}) = 1.812$$

$$t(0.05, 9, \text{one-tailed}) = 1.833$$

$$t(0.05, 10, \text{two-tailed}) = 2.228$$

$$t(0.05, 9, \text{two-tailed}) = 2.262$$

Q.3. (a) A survey was conducted with 500 female students of which 60% were intelligent, 40% had uneducated fathers, while 30% of the not intelligent female students had educated fathers. Test the hypothesis that the education of fathers and intelligence of female students are independent at 5% level of significance. (Given $\chi^2(1, 0.05) = 3.841$) (10)

(b) What is a Graph? Explain any four types of Graph along with its uses. (10)

Q.4. (a) Explain types of data. Compare and contrast quantitative and qualitative data. (10)

(b) Discuss the need for exploratory data analysis and explain types of Exploratory data analysis. (10)

Q.5. (a) Minimize the function $f(x_1, x_2) = 4x_1 + 8x_2 - x_1^2 - x_2^2$ (10)
subject to $x_1 + x_2 = 4, \quad x_1, x_2 \geq 0$ (b) Find the minimizer of $f(x) = x^2 + \frac{54}{x}$ using bisection method in (2,5) within a range of 0.3 (10)

TIME :03 HRS

MAX MARKS:80

- N.B.**
- 1. Question No 1 is compulsory.**
 - 2. Solve any three questions out of remaining five questions.**
 - 3. Assume suitable data if necessary.**
 - 4. Figures to right indicate marks.**

Q. 1. Solve any **four** out of five. **(4*5=20)**

- a. List the different types of E-Commerce Models.
- b. Define the term “Entrepreneur” and list at least four roles of Entrepreneur.
- c. Explain the term Supply Chain Management.
- d. Explain the steps to be analyzed for planning a new venture.
- e. List the various techniques of motivation by Entrepreneurs for their Employees.

Q. 2. a) Enlist the different types of entrepreneurs with examples. **(10)**

b) Prepare a detailed step by step report on planning a new Venture.

Report should include choice of place of business and machinery, raw material and human resource procurement, production, marketing and sales. **(10)**

Q. 3. a) Describe the evolution, functions, and current trends of Customer Relationship Management. **(10)**

b) Explain the different types of Enterprises based on Ownership structure. **(10)**

Q. 4. a) Explain the different non-financial motivational techniques that can be used by Entrepreneurs to motivate their Employees. **(10)**

b) Briefly explain the different stages where Businesses can require need for financing. **(10)**

Q. 5. a) List the benefits of e-procurement and discuss the e-procurement chain. **(10)**

b) Explain briefly M-Commerce and E-Government type of business. **(10)**

Q. 6. a) Explain the term “Acquisition” and different ways of acquisition. **(10)**

b) Explain the features of a good business plan. **(10)**

(3 Hours)

[Total Marks: 80]

- N.B. : (1) Question No 1 is Compulsory.
(2) Attempt any three questions out of the remaining five.
(3) All questions carry equal marks.
(4) Assume suitable data, if required and state it clearly.

- 1 Attempt any FOUR.
- a Write a note on Lightweight Cryptographic algorithms. [5]
 - b Describe the various vulnerabilities and possible attacks on passwords. [5]
 - c Compare WEP, WPA, WPA-2. [5]
 - d Explain the role of steganography in data hiding. [5]
 - e Write a note on account harvesting. [5]
- 2 a Write a note on VPN security. [10]
- b What is ethical hacking? Describe the steps of the ethical hacking process. [10]
- 3 a Explain various stages in penetration testing. [10]
- b A user has received a link on SMS to claim the bonus prize money that he has won in a lottery. What action does the user take on receiving such SMS? Should he claim the amount by clicking on the link, or not? Justify. What are the various attacks that can happen through the SMS and how do we prevent these attacks? [10]
- 4 a Outline the top ten security projects in OWASP with their analysis. [10]
- b What are physical unclonable functions? How are they implemented? Explain with the help of examples. [10]
- 5 a Write a note on session hijacking and management. [10]
- b What is a side-channel attack? Explain various side-channel attacks with suitable examples. [10]
- 6 a Explain protocol vulnerabilities with the help of examples. [10]
- b Explain phishing and pharming in detail. [10]
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(3 Hours)

(Total Marks: 80)

- N.B.:** 1. Question No.1 is compulsory.
2. Answer any three out of remaining questions.
3. Assume suitable data if necessary.
4. Figures to the right indicate full marks.

- Q1.** a) Explain REST API in detail. (10)
b) Compare XML and JSON. (10)
- Q2.** a) Explain React component life cycle. (10)
b) What are Buffers and Streams in NodeJs? Explain with an example. (10)
- Q3.** a) Explain asynchronous programming in detail. (10)
b) What is DNS? Explain working of DNS. (10)
- Q4.** a) What is NodeJS? Explain features of NodeJS. State different types of NodeJS Modules. (10)
b) Explain Arrow function in ES6 with an example. (10)
- Q5.** a) What are Refs? When to use Refs and when not to use Refs? (10)
b) Explain routing in ExpressJS along with an example. (10)
- Q6.** Short note on: (Any 4) (20)
a) REPL
b) DOM
c) JSX
d) URL
e) NPM
