TE sem V CSE (AIML) R-19 C scheme

Time: 3 Hours **Marks:80**

N:B: 1. Q.1 is compulsory.
2. Attempt any three questions from remaining.
3. Assume Suitable data if any.

Q1. Attempt the following (any 4): (20)

a. Explain following networking devices: Repeater, Hub, Bridge, Switches, Gateway.
b. Draw and explain UDP header format.
c. Calculate Hamming code for data bit 10011010 assuming even parity.
d. A block of addresses is granted to a small organization. We know that one of the addresses is 205.16.37.39/28. What is the first address, last address and number of addresses in the block?

Q2. Attempt the following : (20)

a. Explain OSI reference model and compare it with TCP/IP reference model.
b. Explain Cisco Service Oriented Network Architecture in detail.

Q3. Attempt the following : (20)

a. Explain distance vector routing with suitable example. Discuss count-to-infinity problem.
b. An organization is granted a block of addresses 17.12.14.0/26, which contains 64 addresses. The organization has three offices and needs to divide the addresses into three sub-blocks (subnets) of 32, 16 and 16 addresses. Design the sub-blocks and find the new masks.

Q4. Attempt the following: (20)

a. What is SDN? Explain the concept of control plane and data plane with respect to SDN.
b. What is ALOHA? Explain Pure ALOHA and Slotted ALOHA in detail.

Q5. Attempt the following: (20)

a. Explain in brief Cisco PPDIOO network design methodology.
b. Draw and explain TCP three-way handshaking technique.

Q6. Write short notes on: (20)

a. TCP Timers
b. IPv4 vs IPv6
c. Sliding window protocols
d. Telnet

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TE sem V CSE (AIML) R-19 C scheme

Duration: 3hrs **[Max 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	[20]
	a	Explain JSX with example.	05
	b	Write a short note on REPL.	05
	c	Draw and illustrate web 3-tier architecture	05
	d	Write a Javascript to change the background color of the web page to red color if button named "RED" is clicked and to green color if button named "GREEN" is clicked	05
	e	Write a Javascript code to set a cookie on the user's computer.	05
2	a	Explain the File system of NodeJs in detail.	[10]
	b	Explain event handling in React. Write a react code to create a button "Greet User" and display an alert box saying "Hello World" on clicking. Write the code using UseState() and event handling.	[10]
3	a	Explain how React's useEffect hook can be used to perform side effects in functional components. Provide an example where useEffect is used to fetch data from an API and display it in a component.	[10]
	b	What are buffers and streams in NodeJs. Explain with an example.	[10]
4	a	Explain the architecture of Flux in detail	[10]
	b	Explain routing in ExpressJS along with an example.	[10]
5	a	Explain Promises with examples.	[10]
	b	What are the components in React? Create a class component, "Car" in React and invoke it using index.js.	[10]
6	a	Write a Node.js program using Express to create a basic server that: Handles GET and POST requests Implements basic routing Includes error handling Provide complete code with explanations.	[10]
	b	Explain arrow functions and anonymous functions in ES6 with examples.	[10]

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Apcode : 10096601

TE sem V CSE (AIML) R-19 C scheme

Time: 3 hours **Max. Marks: 80**

N.B. (1) Question one is Compulsory.
(2) Attempt any 3 questions out of the remaining.
(3) Assume suitable data if required.

Q. 1 a) Explain the concept of Data Cube and its operations (Roll-up, Drill-down, Slice, Dice, Pivot). **5**

b) What are the major issues in data mining? **5**

c) Describe the architecture of a Data Warehouse with a neat diagram. **5**

d) Explain data preprocessing with example **5**

Q. 2 a) Give two examples for defining star, snowflake and fact constellation schemas. **10**

b) What are the major applications of Data Mining in Business Intelligence, Healthcare, and Web Usage Mining? **10**

Q. 3 a) Describe the various phases in knowledge discovery process with a neat diagram **10**

b) Explain Decision Tree Induction for classification. Construct a sample decision tree for weather data (play tennis example) **10**

Q. 4 a) A dataset contains the following distance matrix: **10**

Item	A	B	C	D
A	0	2	6	10
B	2	0	5	9
C	6	5	0	4
D	10	9	4	0

Perform **Hierarchical Clustering (Single Linkage)** and draw the dendrogram.

b) Use Apriori Algorithm to find all frequent itemsets with **min support = 2** and generate association rules with **min confidence = 60%**. **10**

T_ID	Items bought
T1	**A, B, C**
T2	**A, C, D**
T3	**B, C, E**
T4	**A, B, C, E**
T5	**B, E**

Q. 5 a) Explain Page Rank Algorithm and illustrate its working **10**

b) Differentiate between Supervised Learning and Unsupervised Learning with respect to data mining tasks. **10**

Q. 6 a) What is K-means clustering? Explain the working of K-means with a step-by-step numerical example. **10**

b) Describe clearly different steps of ETL cycle in data warehousing. **10**

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SMT. INDIRA GANDHI COLLEGE OF ENGINEERING

An Autonomous Institute with NAAC 'A' Grade
Approved by AICTE, Affiliated to the University of Mumbai.

END SEMESTER EXAMINATION (SIGCE R-19 C SCHEME)

QP Code: 3251113

Date: 28/10/2025

Subject Name: **Computer Networks**
Subject Code: **CSC501**

Branch: CSE-AIML

Sem: V

Duration: 3 Hrs

Max Marks: 80

Note:
1) Attempt all questions.
2) Assume suitable data wherever necessary.
3) Figures to the right indicate full marks.

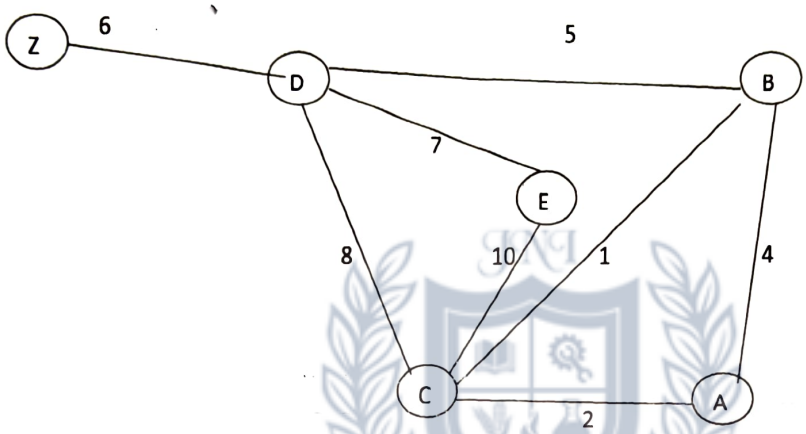
			Marks
Q.1	**Answer the following (any two)**	**CO1**	**(10)**
a.	Explain the characteristics, typical use cases, and differences between the following types of networks: LAN, MAN and WAN respectively. Support your answer with examples for each network type.		5
b.	Explain the primary function of each layer of the TCP/IP model.		5
c.	What is difference between Circuit Switching and Packet Switching?		5
Q.2	**Answer the following (any four)**	**CO2**	**(20)**
a.	Explain the concept of sliding protocols ? Explain the selective repeat protocol with example? Compare the performance of selective repeat and Go-Back-N-ARQ protocol ?		5
b.	What is the difference between CSMA/CD and CSMA/CA ?		5
c.	Compare the OSI Model and the TCP/IP Model by highlighting three major difference between them.		5
d.	List and explain any three major design issues addressed at the Data Link Layer.		5
e.	Explain the format of IEEE 802.3 Ethernet.		5
Q.3	**Answer the following (any three)**	**CO3**	**(15)**
a.	Identify errors from following IP addresses and give reason to that: A. 257.5.6.8 B. 74:22:23:24 C. 192.168.1.1.2 D. 0.0.0.0 E. 10.10.1A.1.B		05
b.	What is difference between Sub-networking and Super-networking ?		05

c. You are given the IP address block 192.168.10.0/24 for a company with the following departments: 05

- HR Department – 30 hosts
- Sales Department – 50 hosts
- IT Department – 20 hosts
- Management – 10 hosts

a) Design a subnetting scheme to allocate IP addresses to each department. Clearly show:
i)Subnet address ii) Subnet mask iii) First and last usable IP iv) Broadcast address

d. Using Dijkstra's Algorithm, find the shortest path from node A to node Z in the given weighted directed graph. 5



Q.4 Answer the following (any three) **CO4** **(15)**

a. What is difference between connection oriented and connection less traffic on transport layer. 5

b. Write source code in C language for UDP client and Server. Assume input and output as per user requirement. 5

c. Explain TCP header fields in detail. 5

d. What is Socket API? Explain all arguments of this call. What three different types of sockets in network communications? 5

Q.5 Answer the following (any one) **CO5** **(10)**

a. Explain Cisco service oriented network architecture. 10

b. What is difference between top down and bottom up approach to design network? 10

Q. 6 Answer the following (any one) **CO6** **(10)**

a. What is control plane and data plane? 10

T.E V^th Sem (R-19-20 C Scheme) CSE(AIML)

Time: 3 hours **Max. Marks: 80**

N.B. (1) Question one is Compulsory.
(2) Attempt any 3 questions out of the remaining.
(3) Assume suitable data if required.

Q. 1	a)	List and describe the different network connection topologies.	05
	b)	Describe the different guided transmission medias used in the network	05
	c)	What is subnetting? What are the default subnet mask?	05
	d)	Explain Three Way Handshaking for connection establishment in TCP.	05
Q 2	a)	Describe in detail OSI reference model with a neat diagram	10
	b)	A bit stream 10011101 is transmitted using standard CRC method. The generator polynomial is X^3+1. i) What is the actual bit stream transmitted? ii) Verify that receiver had received the correct bit stream.	10
Q 3	a)	Compare and contrast between i) IPv4 vs IPv6 ii) Connection oriented protocol vs Connectionless protocol	10
	b)	Explain in brief Cisco PPDIOO Network design Methodology	10
Q 4	a)	Write notes on DNS and Explain components on DNS.	10
	b)	What is Routing? What are desirable characteristics of routing algorithms? Explain distance vector routing with suitable example	10
Q 5	a)	What is SDN? Explain the concept of control plane and data plane with respect to SDN	10
	b)	Elaborate Cisco SONA Architecture in detail	10
Q 6		Write a short note on	
	a)	Sliding Window Protocol	05
	b)	OpenFlow messages	05
	c)	NAT	05
	d)	DHCP	05

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Paper / Subject Code: 48897 / Department Optional Course - 1: Internet of Things

TE sem V CSE (AIML) R-19 Cscheme

Duration: 3hours **[Max 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**	[20]
	a	Define IoT. What are the characteristics of IoT?	
	b	Explain the IoT World Forum (IoTWF) Standardized Architecture with a neat diagram.	
	c	Identify the appropriate RFID tag used for the following situation- An RFID tag that uses a transmitter to return information as opposed to reflecting a signal back from the reader. Most of these tags are battery-powered, though they may gather energy from other sources. These tags can be read from up to 300 feet.	
	d	Is MQTT secure? How can AWS support MQTT implementation?	
	e	How to tackle the Data Diversity challenge in IoT Analytics.	
2	a	Identify the best practices to adopt Data Analytics in industry and specific needs of an organization with proper justification.	[10]
	b	Compare Core IoT Functional Stack and IoT data Management & Compute Stack.	[10]
3	a	Which IoT protocol is used for smart home automation? How will you provide security for these applications with the suggested protocol?	[10]
	b	What is IoB? State the similarities and differences between IoB and IIoT.	[10]
4	a	Explain 6LoWPAN, WLAN and WAN with a neat diagram.	[10]
	b	Differentiate MQTT and COAP.	[10]
5	a	Differentiate Fog, Edge, and Cloud Computing.	[10]
	b	Explain LoRa and LoRaWAN.	[10]
6	a	Explain HTTP, WebSocket in detail.	[10]
	b	Write short note on Smart Parking.	[10]