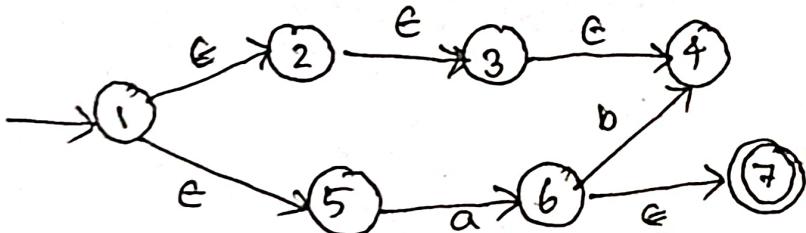


KONGU ENGINEERING COLLEGE, PERUNDURAI 638 060  
 CONTINUOUS ASSESSMENT TEST 1  
 (Regulations 2022)

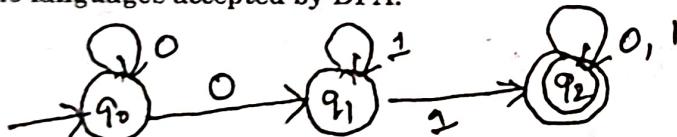
Month and Year : July 2025	Roll Number: 23CSL266
Programme : B.E Branch : CSE Semester : V	Date : 24.07.2025 Time : 09.15 am to 10.45 am
Course Code : 22CST53 Course Name : Theory of Computation	Duration : 1 $\frac{1}{2}$ Hours Max. Marks : 50

PART - A ( $10 \times 2 = 20$  Marks)  
 ANSWER ALL THE QUESTIONS

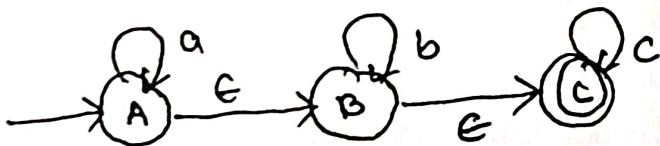
1. Compare  $\delta$  and  $\widehat{\delta}$ .  $(\widehat{\delta})$  [CO1] [K2]
2. Provide the formal definition of NFA with its tuples. [CO1] [K2]
3. Illustrate the steps to be followed to solve problems under mathematical induction. [CO1] [K2]
4. Classify the types of grammar with the equivalent languages and models designed for acceptance. [CO1] [K2]
5. Construct the DFA that accepts the strings containing 010 as substring. [CO1] [K3]
6. If  $\Sigma = \{a, b\}$ , find  $\Sigma^2$  and  $\Sigma^3$ . [CO1] [K3]
7. Find the  $\epsilon$ -closure for all the states of the given NFA. [CO1] [K3]



8. Find the languages accepted by DFA. [CO1] [K3]



9. Consider the given automata and check whether the input "ab" is accepted (or) not. [CO1] [K3]



10. Let  $\Sigma = \{0, 1\}$ , then find  $\Sigma^*$  and  $\Sigma^*$ . [CO1] [K3]

Part - B ( $3 \times 10 = 30$  Marks)  
 ANSWER ANY THREE QUESTIONS

11. i) Using mathematical induction prove that  $1^2 + 2^2 + 3^2 + \dots + n^2 = \frac{n(n+1)(2n+1)}{6}$  [CO1] [K2]
- ii) Prove that the two sets generated in the distributive law of union over intersection are equal. [CO1] [K2]

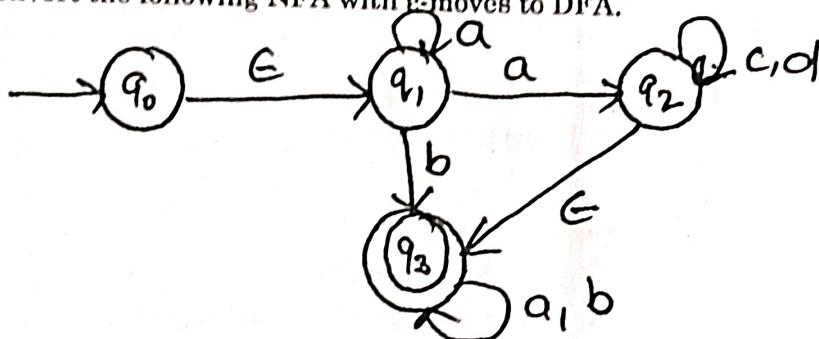
12. Convert the following NFA to DFA.

(10) [CO1] [K3]

State	i/p	
	0	1
$\rightarrow p$	{p, q}	{p}
q	$\emptyset$	{r}
*r	{p, r}	{q}

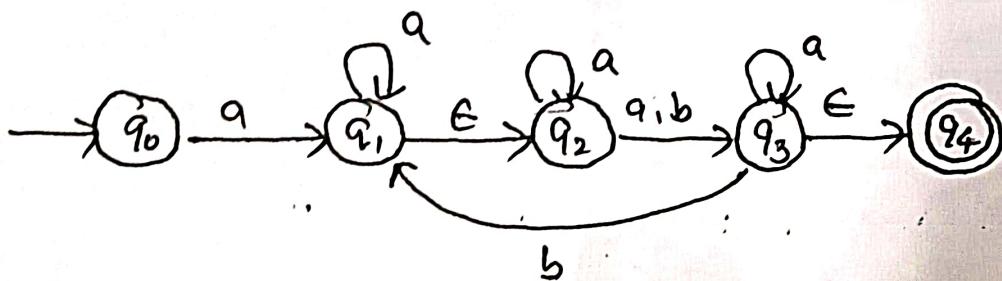
13. Convert the following NFA with  $\epsilon$ -moves to DFA.

(10) [CO1] [K3]



14. For the given  $\epsilon$ -NFA, find the equivalent NFA without  $\epsilon$ .

(10) [CO1] [K3]



Bloom's Taxonomy Level	Remembering (K1)	Understanding (K2)	Applying (K3)	Analysing (K4)	Evaluating (K5)	Creating (K6)
Percentage	-	30	70	-	-	-

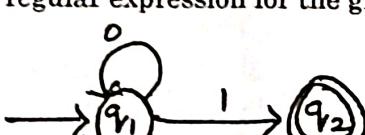
**KONGU ENGINEERING COLLEGE, PERUNDURAI 638 060**  
**CONTINUOUS ASSESSMENT TEST 2**  
(Regulations 2022)

Month and Year : September 2025	Roll Number: <b>2306L266</b>
Programme : B.E Branch : CSE Semester : V	Date : 09.09.2025 Time : 09.15 am to 10.45 am
Course Code : 22CST53 Course Name : Theory of Computation	Duration : 1 $\frac{1}{2}$ Hours Max. Marks : 50

**PART - A (10  $\times$  2 = 20 Marks)**  
**ANSWER ALL THE QUESTIONS**

- Express the following language in regular expression "set of all strings over {0,1} that contain 1011 as a substring". [CO2] [K3]
- For the given regular expression, find the regular language  $0(0+1)^*11$ . [CO2] [K3]
- Outline pumping lemma theorem for regular languages. [CO2] [K2]
- Infer the term sentential form. [CO2] [K2]
- Provide any two applications of CFG [CO3] [K2]
- Find the context free grammar for the language  $L = \{0^m \mid m > 0\}$ . [CO3] [K3]
- Prove that the following grammar is ambiguous for  $w = aab$   $S \rightarrow aS \mid aSbS \mid \epsilon$  [CO3] [K3]
- Sketch the graphical notation for the PDA  $L = \{0^n 1^n \mid n \geq 1\}$ . [CO3] [K3]
- Indicate the different ways of acceptance by PDA. Define them. [CO3] [K2]
- If  $S \rightarrow aSb \mid aAp; A \rightarrow bAa, A \rightarrow ba$ . Find the language generated by the grammar. [CO3] [K3]

**Part – B (3  $\times$  10 = 30 Marks)**  
**ANSWER ANY THREE QUESTIONS**

- Determine the regular expression for the given DFA using  $R_{ij}^k$  method. (10) [CO2] [K3]
- 
- Convert the following regular expressions to  $\epsilon$ -NFA using Thomson construction (10) [CO2] [K3] method.
  - $(a \mid b)^*abb$
  - $10+(0+11)0^*1$
- i) Prove that  $L = \{0^p \mid p \text{ is prime}\}$  is not a regular language. (5) [CO2] [K2]
- ii) Elaborate on any two closure properties of regular languages. (5) [CO2] [K2]
- Construct a PDA for the language  $L = \{a^n b^n \mid n > 0\}$  with empty stack and final state. (10) [CO3] [K3]

Bloom's Taxonomy Level	Remembering (K1)	Understanding (K2)	Applying (K3)	Analysing (K4)	Evaluating (K5)	Creating (K6)
Percentage	-	30	70	-	-	-

**KONGU ENGINEERING COLLEGE, PERUNDURAI 638 060**  
**CONTINUOUS ASSESSMENT TEST 3**

(Regulations 2022)

Month and Year : October 2025	Roll Number: 23CSL266
Programme : B.E Branch : CSE Semester : V	Date : 13.10.2025 Time : 09.15 am to 10.45 am
Course Code : 22CST53 Course Name : Theory of Computation	Duration : 1 ½ Hours Max. Marks : 50

**PART - A (10 × 2 = 20 Marks)**

**ANSWER ALL THE QUESTIONS**

- How will you identify whether given grammar in CNF or not? [CO4] [K2]
- Outline the formal definition of Turing Machine. [CO4] [K2]
- Consider the following grammar and identify useful and useless production.  
 $S \rightarrow aS \mid B, A \rightarrow aa, B \rightarrow bb.$  [CO4] [K3]
- Design Turing machines the given language  $L = \{a^n b^n c^n \mid n > 0\}$  [CO4] [K3]
- Draw the Turing machine to perform the function  $f(m, n) = m + n.$  [CO4] [K3]
- Differentiate recursive language from recursively enumerable language. [CO5] [K2]
- Let  $\Sigma = \{0, 1\}$ , Let A and B be strings. Find the instance of PCP. [CO5] [K2]

	List A	List B
i	wi	xi
1	1	111
2	10111	10
3	10	0

- Prove that: If both a language L and its complement  $\bar{L}$  are recursively enumerable then L is recursive. [CO5] [K2]
- Outline undecidable problem and provide any two examples. [CO5] [K2]
- Compare tractable and intractable problems. [CO5] [K2]

**Part – B (3 × 10 = 30 Marks)**

**ANSWER ANY THREE QUESTIONS**

- Find the CFG for the language whose PDA is given as  $M = (\{q_0, q_1\}, \{0, 1\}, Z_0 x, \delta, q_0, z_0, q)$  with  $\delta$  as  
 $(i) \delta(q_0, 0, z_0) = \{(q_0, xz_0)\}$   
 $(ii) \delta(q_1, \epsilon, x) = \{(q_1, \epsilon)\}$   
 $(iii) \delta(q_0, 1, x) = \{(q_1, \epsilon)\}$   
 $(iv) \delta(q_0, 0, x) = \{(q_0, xx)\}$   
 $(v) \delta(q_1, \epsilon, z_0) = \{(q_1, \epsilon)\}$   
 $(vi) \delta(q_1, 1, x) = \{(q_1, \epsilon)\}$
- Convert the given CFG into GNF: [CO4] [K3]  
 $S \rightarrow AB$   
 $A \rightarrow BS \mid b$   
 $B \rightarrow SA \mid a$
- Convert the following CFG into CNF: [CO4] [K3]  
 $S \rightarrow AAA \mid B$   
 $A \rightarrow aA \mid B$   
 $B \rightarrow \epsilon$
- Explain in detail about MPCP with suitable example. [CO5] [K2]

*construction of turing  
machine multiplication  
of 2 int numbers*

Bloom's Taxonomy Level	Remembering (K1)	Understanding (K2)	Applying (K3)	Analysing (K4)	Evaluating (K5)	Creating (K6)
Percentage	-	40	60	-	-	-

**KONGU ENGINEERING COLLEGE, PERUNDURA, 638 060**  
**CONTINUOUS ASSESSMENT TEST 1**  
**(Regulations 2022)**

Month and Year : July 2025	Roll Number: 23CS1266
Programme : B.E Branch : CSE Semester : V	Date : 24.07.2025 Time : 02.45 pm to 4.15 pm
Course Code : 22CSC51 Course Name : Agile Methodologies	Duration : 1 $\frac{1}{2}$ Hours Max. Marks : 50

**PART - A (10  $\times$  2 = 20 Marks)**  
**ANSWER ALL THE QUESTIONS**

- Identify the collections of a process that are performed when some work products are to be created. [CO1] [K2]
- Recall the umbrella activities that occur throughout the software process. [CO1] [K2]
- Provide an example of software project that would be amenable to the prototyping model on your perspective. Be specific. [CO1] [K3]
- Infer the various requirement engineering task. [CO1] [K2]
- Draw a use case model for activities involved in ordering food in a restaurant from the point when customer enters into the restaurant to the point when he leaves the restaurant. [CO1] [K3]
- Prepare the class-responsibility-collaborator (CRC) card for Bank Account class. [CO1] [K3]
- Show the diagrammatic representation of agile task board with its elements. [CO2] [K2]
- Outline the project manager's practices in agile project development. [CO2] [K2]
- Predict some common values of agile manifesto that leads to an effective team. [CO2] [K2]
- Outline the most popular methodologies that are followed in agile development. [CO2] [K2]

**Part – B (3  $\times$  10 = 30 Marks)**  
**ANSWER ANY THREE QUESTIONS**

- You are developing a customer management system where the core functionalities need to be delivered first, but additional features can be added over time. Apply and explain the suitable software development model for this project and prioritise which functionalities to develop in the initial increments? (10) [CO1] [K3]
- Explain in detail about class based modeling. Draw the class diagram for library management system. (10) [CO1] [K2]
- With neat sketch, explain in detail about requirement elicitation and analysis. (10) [CO1] [K2]
- Describe the various steps involved in scrum in detail with example. (10) [CO2] [K2]

Bloom's Taxonomy Level	Remembering (K1)	Understanding (K2)	Applying (K3)	Analysing (K4)	Evaluating (K5)	Creating (K6)
Percentage	-	73	27	-	-	-

**KONGU ENGINEERING COLLEGE, PERUNDURAI 638 060**  
**CONTINUOUS ASSESSMENT TEST 2**  
**(Regulations 2022)**

Month and Year : September 2025	Roll Number: 23CSL266
Programme : B.E Branch : CSE Semester : V	Date : 09.09.2025 Time : 02.45 pm to 4.15 pm
Course Code : 22CSC51 Course Name : Agile Methodologies	Duration : 1 ½ Hours Max. Marks : 50

**PART - A (10 × 2 = 20 Marks)**  
**ANSWER ALL THE QUESTIONS**

1. A Scrum team has completed three consecutive sprints. The done story points per sprint [CO2] [K3] are:  
 Sprint 1: 50 story points  
 Sprint 2: 25 story points  
 Sprint 3: 35 story points  
 Compute the team's actual velocity across these three sprints.
2. Determine the conditions of satisfaction to nominate a video for achievements among the friends list.
3. Identify the characteristics of a good user story. [CO2] [K2]
4. Compare XP (Extreme Programming) model with waterfall and iterative model. [CO3] [K2]
5. A software development company developing online railway ticket booking system is experiencing delays due to excessive work in progress and long lead times. Prepare a value stream map for an online railway ticket booking system.
6. Infer the role of Metaphor in XP (Extreme Programming) project development. [CO3] [K2]
7. Indicate the importance of value stream map and area chart. [CO3] [K2]
8. Identify the different Lean values supported for successful development. [CO3] [K2]
9. Mention the five Whys to figure out the root cause of a problem. [CO3] [K2]
10. Outline the Kanban principles and practices. [CO3] [K2]

**Part – B (3 × 10 = 30 Marks)**  
**ANSWER ANY THREE QUESTIONS**

11. Demonstrate the role of a burndown chart in Agile project management with a suitable example. Plot the actual progress against the expected progress and explain how different risks (no risk, low risk, and high risk) can be identified from the chart. (10) [CO2] [K2]
12. Describe the various XP (Extreme Programming) practices that need to be supported for successful product development. Highlight their importance in addressing frequent requirement changes and ensuring high code quality. (10) [CO3] [K2]
13. Discuss the techniques used to identify wastes in product development and propose strategies to enhance efficiency. Further, illustrate with a suitable example how lean principles can be effectively tracked and measured in real time. (10) [CO3] [K2]
14. Consider your project team is tasked with developing a mobile app over 6 weeks. Apply Kanban principles to set up a visual workflow board. Describe how you would organize the board, limit WIP (Work in Progress), and monitor task flow to maximize efficiency. (10) [CO3] [K3]

Bloom's Taxonomy Level	Remembering (K1)	Understanding (K2)	Applying (K3)	Analysing (K4)	Evaluating (K5)	Creating (K6)
Percentage	-	73.33	26.67	-	-	-

**KONGU ENGINEERING COLLEGE, PERUNDURAI 638 060**  
**CONTINUOUS ASSESSMENT TEST 3**  
**(Regulations 2022)**

Month and Year : October 2025	Roll Number: 23CSL266
Programme : B.E Branch : CSE Semester : V	Date : 13.10.2025 Time : 02.45 pm to 4.15 pm
Course Code : 22CSC51 Course Name : Agile Methodologies	Duration : 1 ½ Hours Max. Marks : 50

**PART - A (10 × 2 = 20 Marks)**  
**ANSWER ALL THE QUESTIONS**

1. Compare verification and validation. [CO4] [K2]
2. Infer the use of stubs and drivers. [CO4] [K2]
3. Identify the types of debugging strategies. [CO4] [K2]
4. Differentiate between white box testing and black box testing. [CO4] [K2]
5. A control flow graph has 15 edges and 12 nodes. Calculate the cyclomatic complexity. [CO4] [K3]
6. Indicate the 4 P's of software project management spectrum. [CO5] [K2]
7. Interpret the metrics for software quality. [CO5] [K2]
8. Estimate the effort required for the software development of an ATM which has 4 screens, 8 reports and 13 software components. Assume average complexity and average developer maturity. [CO5] [K3]
9. Average productivity based on historical data is 620 LOC/pm and average labour rates is ₹8000 pm. Calculate the cost of LOC. [CO5] [K3]
10. Identify the capability levels of CMMI. [CO5] [K2]

**Part - B (3 × 10 = 30 Marks)**  
**ANSWER ANY THREE QUESTIONS**

11. Discuss in detail about the methodologies for testing a conventional software. (10) [CO4] [K2]
12. Summarize the types of testing in validation testing and system testing. (10) [CO4] [K2]
13. Explain the concepts of basis path testing in white box testing with suitable examples. (10) [CO4] [K2]
14. For the following project calculate Scheduled Variance (SV), Cost Variance (CV), Schedule Performance Index (SPI) and Cost Performance Index (CPI) at the end of the second month. Also determine whether the project is on the schedule and within the budget. (10) [CO5] [K3]

Task	Planned Value	Earned Value	Actual Cost
1	12,10,000	11,00,000	13,50,000
2	7,00,000	8,50,000	6,00,000
3	26,00,000	-	-
4	9,00,000	-	-

Bloom's Taxonomy Level	Remembering (K1)	Understanding (K2)	Applying (K3)	Analysing (K4)	Evaluating (K5)	Creating (K6)
Percentage	-	73	27	-	-	-

Month and Year : July 2025	Roll Number: 23C9L266
Programme : B.E Branch : CSE Semester : V	Date : 23.07.2025 Time : 09.15 am to 10.45 am
Course Code : 22CST52 Course Name : Computer Networks	Duration : 1 $\frac{1}{2}$ Hours Max. Marks : 50

PART - A (10  $\times$  2 = 20 Marks)

## ANSWER ALL THE QUESTIONS

1. Difference between guided and unguided medium. [CO1] [K2]
2. Infer the merits and demerits of packet-switched networks. [CO1] [K2]
3. Consider sending a packet from a source host to a destination host over a fixed route. Determine the delay components in the end-to-end delay and which of these delays are constant and which are variable? [CO1] [K3]
4. If a link has a capacity of 10 Mbps and transfers 1000 bytes in 1 ms, compute the throughput? [CO1] [K3]
5. Suppose Host A wants to send a large file to Host B. The path from Host A to Host B has three links, of rates  $R_1 = 700$  kbps,  $R_2 = 1$  Mbps and  $R_3 = 5$  Mbps. Suppose the file is 4 million bytes. Dividing the file size by the throughput, roughly how long will it take to transfer the file to Host B? [CO1] [K3]
6. A user is trying to load a webpage using a browser. Predict the layers responsible for each of the following: [CO1] [K2]
  - a. Establishing a reliable connection
  - b. Routing the data to the destination
7. Identify the layer in the Internet protocol stack responsible for forwarding process and process-to-process delivery. [CO1] [K2]
8. Interpret the importance of application-layer in network applications. [CO2] [K2]
9. Difference between HTTP GET and POST methods. [CO2] [K2]
10. Give the domain name and IP address relationship with an example. [CO2] [K2]

Part – B (3  $\times$  10 = 30 Marks)

## ANSWER ANY THREE QUESTIONS

11. Classify the different types of access networks. Provide a brief explanation of each type. (10) [CO1] [K2]
12. Draw the TCP/IP protocol stack for a typical network. Highlight the role of each layer in the protocol stack. (10) [CO1] [K2]
13. Consider a packet of length L that begins at end system A and travels over three links to a destination end system. These three links are connected by two packet switches. Let  $d_i$ ,  $s_i$ , and  $R_i$  denote the length, propagation speed and transmission rate of link  $i$ , for  $i = 1, 2, 3$ . The packet switch delays each packet by  $d_{proc}$ . Assuming no queuing delays in terms of  $d_i$ ,  $s_i$ ,  $R_i$  and  $L$ . Calculate the total end-to-end delay for the packet. Suppose now the packet is 1,500 bytes, the propagation speed on all three links is  $2.5 \times 10^8$  m/s, the transmission rates of all three links are 2.5 Mbps, the packet switch processing delay is 3 msec, the length of the first link is 5,000 km, second link is 4,000 km and last link is 1,000 km. For these values, calculate the end-to-end delay. (10) [CO1] [K3]
14. i) The client needs to access a file that contains a link to an image. The text file and the image are located on the same server. Demonstrate how this file is downloaded to client using HTTP with: (5) [CO2] [K3]
  - a) Persistent connection
  - b) Non-Persistent connection
- ii) Illustrate the role of SMTP in electronic mail system with a neat diagram. (5) [CO2] [K2]

Bloom's Taxonomy Level	Remembering (K1)	Understanding (K2)	Applying (K3)	Analysing (K4)	Evaluating (K5)	Creating (K6)
Percentage	-	65	35	-	-	-

**KONGU ENGINEERING COLLEGE, PERUNDURAI 638 060**  
**CONTINUOUS ASSESSMENT TEST 2**  
(Regulations 2022)

Month and Year : September 2025	Roll Number: <b>23CSL2bb</b>
Programme : B.E Branch : CSE Semester : V	Date : 08.09.2025 Time : 09.15 am to 10.45 am
Course Code : 22CST52 Course Name : Computer Networks	Duration : 1 $\frac{1}{2}$ Hours Max. Marks : 50

**PART - A (10  $\times$  2 = 20 Marks)**  
**ANSWER ALL THE QUESTIONS**

1. Review trackers in bit torrent with its functionalities. [CO2] [K2]
2. Interpret the cluster selection strategy in the CDN. [CO2] [K2]
3. Suppose you are browsing the world wide web using a web browser and trying to access the web servers. Mention the underlying protocol and port number that are being used. [CO2] [K3]
4. Interpret the following statements of TCP socket programming  

```
serverSocket.bind(“”, serverPort)
serverSocket.listen(1)
```

 [CO2] [K2]
5. A router receives a TCP packet with header length of  $(0011)_2$  and discards the packet. Calculate the valid header length without any options. [CO3] [K3]
6. Differentiate multiplexing and demultiplexing happening in the transport layer. [CO3] [K2]
7. Suppose host A is sending a file (x bytes) to host B over a TCP connection. If the sequence number for a segment of this connection is m, then give sequence number for the subsequent segment. [CO3] [K2]
8. Apply the sequence and acknowledgement numbers for a simple telnet application over TCP with your own choice of numbering. [CO3] [K3]
9. Suppose that the roundtrip delay between sender and receiver is constant and known to the sender, assuming that packets can be lost. Would a timer still be necessary in protocol rdt 3.0? [CO3] [K3]
10. Is TCP's AIMD algorithm fair, when different TCP connections may start at different times and have different window size at a given point in time? [CO3] [K3]

**Part – B (3  $\times$  10 = 30 Marks)**  
**ANSWER ANY THREE QUESTIONS**

11. Develop a TCP socket programming application in which the client programme initiates ordering of grocery items and the server receiving a request calculates the cost and gives the detailed bill to the client. (10) [CO2] [K3]
12. Explain the TCP segment structure with a neat diagram. (10) [CO3] [K2]
13. Demonstrate the Go-Back-N and selective repeat considering 5 packets with window size 3 to be transmitted. (10) [CO3] [K3]
14. Express the operation of protocol rdt 3.0 for the given scenarios (10) [CO3] [K2]
  - Operation with no loss
  - Operation with loss
  - Lost ACK
  - Premature timeout..

Bloom's Taxonomy Level	Remembering (K1)	Understanding (K2)	Applying (K3)	Analysing (K4)	Evaluating (K5)	Creating (K6)
Percentage	-	50	50	-	-	-

**KONGU ENGINEERING COLLEGE, PERUNDURAI 638 060**  
**CONTINUOUS ASSESSMENT TEST 3**  
**(Regulations 2022)**

Month and Year : October 2025	Roll Number: 23CSL266
Programme : B.E Branch : CSE Semester : V	Date : 11.10.2025 Time : 09.15 am to 10.45 am
Course Code : 22CST52 Course Name : Computer Networks	Duration : 1 ½ Hours Max. Marks : 50

**PART - A (10 × 2 = 20 Marks)**

**ANSWER ALL THE QUESTIONS**

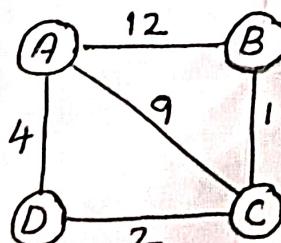
1. Infer the role of ICMP in error reporting and congestion control. Give an example of [CO4] [K2]  
ICMP error message for congestion control.
2. Differentiate between IPv4 and IPv6 addressing schemes. [CO4] [K2]
3. An organization has the allocation of network block of address as 127.36.100.0/25. [CO4] [K3]  
Calculate the first address, last address and subnet mask.
4. A router receives a datagram with TTL field value as 1. Interpret the action taken by [CO4] [K2]  
the router.
5. A packet arrives at a router with destination IP 192.168.10.5/24, the router has the [CO4] [K3]  
following forwarding table:  

192.168.10.0/24 → Interface 0
192.168.0.0/16 → Interface 1
Default → Interface 2

Identify the interface that will be chosen by the router.
6. Calculate the two-dimensional odd parity for the given data: [CO5] [K3]
  - 1001011
  - 0111000
  - 0110100
  - 1101010
7. Infer what is meant by a 'plug-and-play' or 'zeroconf' protocol. [CO5] [K2]
8. Compare the behaviour of a hub and a switch. [CO5] [K2]
9. Analyze a received 7-bit data word 1011011 transmitted with even parity. Identify and [CO5] [K3]  
correct any errors.
10. Encrypt the plaintext "NETWORK" using a Caesar Cipher with a shift of 3 and show [CO5] [K3]  
the cipher text.

**Part – B (3 × 10 = 30 Marks)**  
**ANSWER ANY THREE QUESTIONS**

11. Write a distance vector routing algorithm and apply the same for finding the (10) [CO4] [K3]  
best path and routing table.



12. i) Draw the header format of IP datagram and explain the purpose of each field. (5) [CO4] [K2]
- ii) Suppose a router receives an IP packet containing 600 bytes of payload and has to forward the packet to a network with MTU = 200 bytes. Assume the IP header is 20 bytes long. Determine the fragment offset, flag and total length values for each fragmented packet. (5) [CO4] [K2]
13. Apply CRC error detection technique for the data 1011101011 with the divisor 100 at the sender side. Analyse how does receiver ensures the data received is correct or not. (10) [CO5] [K3]
14. Illustrate the different symmetric key cryptographic algorithm with suitable example. (10) [CO5] [K2]

Bloom's Taxonomy Level	Remembering (K1)	Understanding (K2)	Applying (K3)	Analysing (K4)	Evaluating (K5)	Creating (K6)
Percentage	-	50	50	-	-	-

Month and Year : July 2025	Roll Number: 23CS1266
Programme : B.E Branch : CSE Semester : V	Date : 23.07.2025 Time : 02.45 pm to 4.15 pm
Course Code : 22CST51 Course Name : Internet of Things and Cloud Computing	Duration : 1 ½ Hours Max. Marks : 50

## PART - A (10 × 2 = 20 Marks)

## ANSWER ALL THE QUESTIONS

- Outline the essential characteristics of an IoT system. [CO1] [K2]
- Differentiate between REST API and web socket API. [CO1] [K2]
- Assume a vehicle sends information about its location to cloud based service. Does the vehicle apply the IOT concept? Justify your answer with reasons. [CO1] [K3]
- Compare IoT and M2M. [CO1] [K2]
- Interpret how service discovery enables interaction between IoT devices. [CO2] [K2]
- A smart refrigerator tracks item quantity and expiry using sensors and sends realtime updates to user via a mobile app. It also suggests shopping lists and sends expiry reminders. Examine the above IoT system and identify the appropriate physical and virtual entities in an IoT system. [CO1] [K4]
- A Smart Watch monitors health parameters such as heart rate, sleep patterns and physical activity. It connects to a mobile application to provide real-time feedback, health alerts and personalized suggestion. Sketch the use case diagram for the above IoT system. [CO1] [K3]
- Outline the communication technologies involved in object abstraction layer and their purpose. [CO2] [K2]
- Determine the importance of the business layer in decision-making and analytics. [CO2] [K2]
- Infer how data moves through the 5 layers of IoT architecture with neat sketch. [CO2] [K2]

## Part – B (3 × 10 = 30 Marks)

## ANSWER ANY THREE QUESTIONS

- Design a real time traffic monitoring system using IoT that collects data from traffic cameras and sensors, optimizes traffic light timings based on real-time conditions, provides automated guidance to drivers through a mobile app and offers live updates to manage urban congestion. Examine the most suitable IoT level applicable to this system and justify your selection. (10) [CO1] [K4]
- A smart energy metering system monitors and controls power consumption in real time. The system should include sensors, wireless communication and cloud-based analytics for automation and alerts. For this IoT system apply the following design methodologies.
  - Purpose and requirement specification
  - Process specification
  - Domain model specification
(10) [CO1] [K3]
- A smart home security system consist of individual cameras and sensors that communicate directly with a central hub. Each camera or sensor establishes a communication channel with hub for secure data transmission. For instance, when a motion sensor detects movement, it sends a notification directly to the central hub, which then triggers an alert to the homeowner. Apply the most suitable IoT communication model for this smart home security system. Compare it with other communication models and defined why the chosen model is the most appropriate for this application. (10) [CO1] [K3]
- A smart home with multiple IoT light bulbs installed in different rooms. You want your smartphone app to automatically discover these devices on the local Wi-Fi network without manually configuring IP addresses.
  - List the types of IoT service discovery protocols
  - Identify the most suitable protocol for this scenario
  - Explain how the selected protocol works
(10) [CO1] [K2]

Bloom's Taxonomy Level	Remembering (K1)	Understanding (K2)	Applying (K3)	Analysing (K4)	Evaluating (K5)	Creating (K6)
Percentage	-	40	40	20	-	-

**KONGU ENGINEERING COLLEGE, PERUNDURAI 638 060**  
**CONTINUOUS ASSESSMENT TEST 2**  
**(Regulations 2022)**

Month and Year : September 2025	Roll Number: 23CS1266
Programme : B.E	Date : 08.09.2025
Branch : CSE	Time : 02.45 pm to 4.15 pm
Semester : V	
Course Code : 22CST51	Duration : 1 ½ Hours
Course Name : Internet of Things and Cloud Computing	Max. Marks : 50

**PART - A (10 × 2 = 20 Marks)**

**ANSWER ALL THE QUESTIONS**

- Mention the important parameters that need to be considered for implementing LPWAN [CO2] [K2] technology.
- Indicate the role of primary controller in Z-Wave protocol. [CO2] [K2]
- Show any two use cases where Long-Term Evolution-Advanced (LTE) finds its application. [CO2] [K3]
- Assume that you are developing a smart identity system for a hardware manufacturing company. The system should identify the materials using RFID system. Find the process that takes place in an RFID system to identify the materials. [CO2] [K3]
- Outline the main features of ZigBee protocol that makes it suitable for IoT applications. [CO2] [K2]
- Write a Python code to set the Raspberry Pi GPIO pins 18 and 22 as input and output [CO3] [K3] respectively.
- Develop a simple automatic night light system using Python code. The code should read the room brightness level through LDR sensor and make the LED glow when brightness is low. [CO3] [K3]
- Assume that the details about products of a grocery store are available in products.xml file. Write a Python code to read the details from the file and display it on the console. [CO3] [K3]
- Infer the purpose of the following commands in Raspberry Pi: [CO3] [K2]
  - \* cat
  - \* grep
  - \* ifconfig
  - \* pwd
- Identify the different linux flavours that are supported by Raspberry Pi. [CO3] [K2]

**Part – B (3 × 10 = 30 Marks)**

**ANSWER ANY THREE QUESTIONS**

- The Erode district collector has decided to build a smart city air quality monitoring system. The district administration has planned to provide rented bikes attached with air-quality sensors. The goal is to provide real-time, location-tagged air quality data to the citizens to help them plan their healthier routes during pollution periods in the region. The plan involves deploying a network of stationary sensors across the district including urban centers and major transportation corridors.
  - \* Demonstrate the purpose of suitable infrastructure protocol for connecting these sensors to a central cloud platform. Also, use the key components to form the network and model the data flows from sensors to the central application server in the cloud.
- Outline the key characteristics of Bluetooth Low Energy protocol and explain the functionality of each layer in its protocol stack. (10) [CO2] [K2]
- i) Discuss in detail about the pin configuration and the interfaces of Raspberry Pi (6) [CO3] [K2] with a neat sketch.
- ii) Illustrate the purpose of smtplib package in Python with an example code (4) [CO3] [K2] snippet.
- Utilize Python code and Thingspeak platform to develop a smart application for the scenarios given in question (11). The application should fetch the data from air quality sensor and write the data to a channel in Thingspeak. Also identify the steps that are required to create a channel with necessary fields in Thingspeak and visualize the sensor data as a graph. (10) [CO3] [K3]

Bloom's Taxonomy Level	Remembering (K1)	Understanding (K2)	Applying (K3)	Analysing (K4)	Evaluating (K5)	Creating (K6)
Percentage	-	50	50	-	-	-

**KONGU ENGINEERING COLLEGE, PERUNDURAI 638 060**  
**CONTINUOUS ASSESSMENT TEST 3**  
**(Regulations 2022)**

Month and Year : October 2025	Roll Number: 23CSL266
Programme : B.E	Date : 11.10.2025
Branch : CSE	Time : 2.45 pm to 4.15 pm
Semester : V	
Course Code : 22CST51	Duration : 1 $\frac{1}{2}$ Hours
Course Name : Internet of Things and Cloud Computing	Max. Marks : 50

**PART - A ( $10 \times 2 = 20$  Marks)**

**ANSWER ALL THE QUESTIONS**

- Identify any four cloud service providers. [CO4] [K2]
- Is Hybrid cloud is flexible? Justify. [CO4] [K3]
- Depict the architecture of Eurotech Everyware Device Cloud. [CO4] [K3]
- Highlight the role of special purpose cloud and specify any two special purpose clouds. [CO4] [K2]
- A smart traffic management system uses edge devices and fog nodes to process data from road sensors in real time. Identify the significance of using edge and fog computing in this system. [CO4] [K3]
- Determine the role of AWS Lambda functions for developing IoT application. [CO5] [K2]
- How does MQTT differ from COAP. [CO5] [K2]
- A startup wants to connect a new smart temperature sensor to AWS IoT, so that it can send real time data to the cloud. Indicate the steps to create a resource in AWS IoT core to register and manage this sensor device. [CO5] [K3]
- Multiple smart home devices exchange data securely via the cloud. Identify and define the communication model that is used in AWS IoT between the clients through a message broker. [CO5] [K3]
- State the use of list-topic rules command. Give an example for using it. [CO5] [K2]

**Part – B ( $3 \times 10 = 30$  Marks)**

**ANSWER ANY THREE QUESTIONS**

- A hospital plans to develop a cloud-based patient management system. Sensitive medical records must be stored securely, while services like appointment booking and messaging can use public cloud resources. [CO4] [K3]
  - Select the most suitable cloud deployment model and justify your choice. (4) (6)
  - Compare it with any other deployment model and illustrate the key differences.
- i) Describe the different cloud federation approaches and illustrate them with neat sketch. (5) [CO4] [K2]
   
ii) A smart environment system is embedded with sensors. List the components of system and summarize how it helps in real-time data capture. (5) [CO4] [K2]
- A smart home system uses sensors to monitor temperature and lighting. The sensor data send to cloud platform for processing. Identify any four IoT core services in this system. For each service explain its significance in processing sensor data and controlling smart home devices. (10) [CO5] [K3]
- How does AWS IoT Device shadow allow us to manage and interact with IoT devices more effectively by creating a persistent virtual representation of the state of the device in cloud? (10) [CO5] [K2]

Bloom's Taxonomy Level	Remembering (K1)	Understanding (K2)	Applying (K3)	Analysing (K4)	Evaluating (K5)	Creating (K6)
Percentage	-	50	50	-	-	-

Roll No 2 3 C S L 2 6 6

KONGU ENGINEERING COLLEGE (AUTONOMOUS), PERUNDURAI 638060  
 ODD SEMESTER 2025-2026  
 CONTINUOUS ASSESSMENT TEST - I - JULY -2025  
 (Regulations 2022)

Programme : B.E/B.Tech Branch : CSD, CSE, AIDS, AIML, IT Semester : V	Date : 25.07.2025 Time : 02.45 p.m. to 04.15 p.m.
Course Code: 22GEO18 Course Name: Fundamentals of Hindi Language (OE)	Duration: 1.30 minutes Max. Marks: 50

<b>PART A</b> Answer all the questions (10 *2 = 20 marks)	
1. Write the vowels from अ to अः:	(CO1,K1)
2. Write the English names for the given words. i) घड़ी ii) मैदान iii) माला iv) दीवार	(CO2,K1)
3. Mention the Time in words for the following numbers given below. i) 12:00 ii) 04:30 iii) 01:30 iv) 01:15	(CO1,K2)
4. Name any four parts of the body in Hindi.	(CO1,K1)
5. Mention the correct Gender for the given words in Hindi. i) बेटा ii) राजा iii) दादा iv) भाइ	(CO1,K2)
6. Mention any TWO birds and TWO animals name in Hindi.	(CO1,K1)
7. Write the correct plural form for the following words in Hindi. i) कलम ii) घोड़ा iii) लता iv) बालक	(CO1,K2)
8. Match the following. i) तरबूज – Potato ii) सेब – Carrot iii) आलू – Water melon iv) गाजर – Apple	(CO2,K1)
9. List any four tastes in Hindi.	(CO3,K2)
10. Write the Hindi names for the given seasons. i) Winter ii) Rainy iii) Autumn iv) Summer	(CO2,K2)
<b>PART B</b> Answer any three questions (3 *10 = 30 marks)	
11. Write the Consonants from प to ह and the Barah khadi for the letters क, ट, ह in Hindi.	(CO3,K1)
12. Write the numbers from 11 to 20 and the names of the days in a week in words in Hindi.	(CO3,K1)
13. Write the correct opposite for the words given below in Hindi. i) जीत ii) सुख iii) दिन iv) ऊपर v) सच iv) जन्म vii) हँसना viii) बाहर ix) प्रश्न x) मोटा	(CO3,K1)
14. Mention any ten colours in Hindi along with its Equivalent English names.	(CO1,K2)

Bloom's Taxonomy Level	Remembering (K1)	Understanding (K2)	Applying (K3)	Analyzing (K4)	Evaluating (K5)	Creating (K6)
Percentage	66	34	-	-	-	-

Roll No

2	3	C	B	1	2	6	6
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KONGU ENGINEERING COLLEGE (AUTONOMOUS), PERUNDURAI 638060

ODD SEMESTER 2025-2026

CONTINUOUS ASSESSMENT TEST -II- SEPTEMBER-2025  
(Regulations 2022)

Programme : B.E/B.Tech Branch : CSD, CSE, AIDS, AIML & IT Semester : V	Date : 10.09.2025 Time : 02.45 p.m. to 04.15 p.m.
Course Code: 22GEO18 Course Name: Fundamentals of Hindi Language (OE)	Duration : 1.30 minutes Max.Marks : 50

<b>PART A</b> <b>Answer all the questions</b>		<b>(10*2=20marks)</b>
1. Mention any four pronoun words in Hindi.		(CO3,K1)
2. Write the English names for the given words. i) बाहर ii) जल्दी iii) ऊपर iv) वहाँ		(CO3,K2)
3. Give any four examples for commanding verbs in Hindi.		(CO3,K1)
4. Write the Hindi equivalent for the given professions. i) Teacher ii) Advocate iii) Goldsmith iv) Shopkeeper		(CO1,K2)
5. Match the following:- i) March - फाल्गुन ii) January - वैशाख iii) April - चैत्र iv) February - माघ		(CO1,K1)
6. Fill in the blanks with appropriate conjunctions. i) किताब मेज़ _____ है। ii) मेरे घर में दादा _____ दादी हैं। iii) मैं कलम _____ लिखता हूँ। iv) तुम बाद _____ आओ।		(CO2,K2)
7. Give the Hindi equivalent for the following words: i) Hate ii) Sorrow iii) Fear iv) Peace		(CO1,K2)
8. Name any four formal greeting words in Hindi.		(CO2,K1)
9. Re-arrange the given sentences in correct order. i) है मेज अखबार पर। ii) हूँ से कलम मैं लिखता। iii) कहाँ हैं आपकी किताब ? iv) पसंद दोसा मुझे है।		(CO2,K2)
10. Change the following sentences from present continuous to past continuous tense. i) राजू खा रहा है। ii) मैं देख रहा हूँ। iii) पिताजी खत लिख रहे हैं। iv) मामीजी खाना बना रही है।		(CO3,K2)

**PART B**  
**Answer any three questions**

(3\*10=30marks)

11.	Answer the following questions in Hindi. i) आज कौन-सा दिन है ? ii) डाक-घर कहाँ है ? iii) आपके साथ कौन हैं ? iv) बैंक कितने बजे खुलेगा ? v) आप क्या करते हैं ?	(CO3,K2)
12.	Construct a conversation between a shopkeeper and a customer. (10 exchanges)	(CO3,K3)
13.	Frame one sentence each using the words given below: i) खाना ii) जाना iii) देखना iv) पढ़ना v) लिखना vi) खेलना vii) उठना viii) खरीदना ix) पीना x) हँसना	(CO3,K2)
14.a)	Translate the following sentences into English: i) मुझे बुखार है। ii) हम फ़िर मिलेंगे। iii) मुझे चीनी और काफ़ी पाउडर चाहिए। iv) गोपाल को बुलाओ। v) आपका परिवार कैसा है?	(CO3,K2)
b)	Translate the following sentences into Hindi. i) The cow is in the ground. ii) I like paani puri. iii) There is a newspaper on the table. iv) My father goes to Kerala every month. v) Apple is a sweet fruit.	

Bloom's Taxonomy Level	Remembering (K1)	Understanding (K2)	Applying (K3)	Analyzing (K4)	Evaluating (K5)	Creating (K6)
Percentage	13	70	17	-	-	-

**KONGU ENGINEERING COLLEGE, PERUNDURAI 638 060**  
**CONTINUOUS ASSESSMENT TEST 1**  
**(Regulations 2022)**

Month and Year : July 2025	Roll Number: 23CSL266
Programme : B.E Branch : CSE Semester : V	Date : 25.07.2025 Time : 09.15 am to 10.45 am
Course Code : 22CSE01 Course Name : Mobile Communication	Duration : 1 $\frac{1}{2}$ Hours Max. Marks : 50

**PART - A (10 × 2 = 20 Marks)**  
**ANSWER ALL THE QUESTIONS**

1. Classify the following applications to the appropriate frequency band used [CO1] [K2]
  - a) WiFi
  - b) FM Radio
  - c) Radar
  - d) Submarines
2. Justify the usage of directional antennas in mobile phones. [CO1] [K2]
3. Calculate the spread factor if the user bit period is 10 and chip duration is 2. [CO1] [K3]
4. Differentiate FDMA and TDMA in terms of channel allocation. [CO1] [K2]
5. Compare and contrast line-of-sight and non-line-of-sight signal propagation. [CO1] [K2]
6. Construct a 3 bits/hop fast hopping for the user to transmit the data 1011010. [CO1] [K3]
7. Will frequency reuse lead to interference in cellular systems? Justify. [CO1] [K2]
8. Identify the appropriate satellite handover when you move from India to Dubai. [CO2] [K3]
9. Relate the delay and reliability classes used and map them with suitable applications. [CO2] [K3]
10. Indicate the type of handover that occurs when a mobile user travels from Agra to Redfort in Delhi. Justify your answer with network behaviour. [CO2] [K3]

**Part – B (3 × 10 = 30 Marks)**  
**ANSWER ANY THREE QUESTIONS**

11. Interpret the working principle of TDMA, FDMA, and SDMA with appropriate examples. (10) [CO1] [K2]
12. Illustrate the concept of multiplexing with its types in the context of mobile networks. (10) [CO1] [K2]
13. Assume 2 senders A and B want to send data. CDMA assigns the following unique and orthogonal key sequences: (10) [CO1] [K3]
 

Key Ak = 010011 for sender A.  
 Sender A wants to send data Ad = 101

  1. Show the resulting signal as of data from sender A.
  2. Show the reconstruction of A's data on receiver side.
  3. Show what happens if a receiver has the wrong key.
14. Assume there is a theft of a 2G mobile phone, the user wants to request the service provider to trace the location of the mobile phone. Design a GSM architecture to satisfy the user request. (10) [CO2] [K3]

Bloom's Taxonomy Level	Remembering (K1)	Understanding (K2)	Applying (K3)	Analysing (K4)	Evaluating (K5)	Creating (K6)
Percentage	-	50	50	-	-	-

**KONGU ENGINEERING COLLEGE, PERUNDURAI 638 060**  
**CONTINUOUS ASSESSMENT TEST 2**  
**(Regulations 2022)**

Month and Year : September 2025	Roll Number: 23CSL266
Programme : B.E Branch : CSE Semester : V	Date : 10.09.2025 Time : 09.15 am to 10.45 am
Course Code : 22CSE01 Course Name : Mobile Communication	Duration : 1 ½ Hours Max. Marks : 50

**PART - A (10 × 2 = 20 Marks)**  
**ANSWER ALL THE QUESTIONS**

1. Differentiate between SGSN & GGSN. [CO2] [K2]
  2. HEO satellites are useful for polar regions. Justify. [CO2] [K2]
  3. A person does online banking using mobile data. Tell how mobile data ensures security in financial transactions. [CO2] [K3]
  4. Compare and contrast circuit switched and packet switched data. [CO2] [K2]
  5. Predict the use of CCA signal in WLAN. [CO3] [K2]
  6. Interpret the MAC addresses given below and identify what happens during this situation. [CO3] [K3]
- | To DS | From DS | Address 1 | Address 2 | Address 3 | Address 4 |
|-------|---------|-----------|-----------|-----------|-----------|
| 1     | O       | BSS ID    | SA        | DA        | -         |
7. Give the purpose of Host controller interface (HCI). [CO3] [K2]
  8. Draw the frame format of IEEE 802.11 MAC packet structure and write the significance of each field. [CO3] [K2]
  9. State the usage of ACK, RTS and CTS in WLAN. [CO3] [K2]
  10. A fitness tracker pauses data transmission when the user is inactive. Identify the mode, the tracker may enter into, temporarily stopping data transfer to save energy. [CO3] [K3]

**Part – B (3 × 10 = 30 Marks)**  
**ANSWER ANY THREE QUESTIONS**

11. Outline the architecture of GPRS with neat diagram. (10) [CO2] [K2]
12. A cargo ship at sea uses satellite communication for navigation and data transfer while moving across different coverage areas. (10) [CO2] [K3]
  - i) Apply routing to explain how the ship's data reaches the control center.
  - ii) Show how handover maintains the ship's connection during movement.
13. Build the following types of networks for your campus. (10) [CO3] [K3]
  - i) Infrastructure based wireless network contains 5 access points, 5 wireless networks, 10 communication devices like laptop, tablet, smartphone and one wired network.
  - ii) 3 Adhoc networks with 3 nodes each. Nodes may be laptop, tablet and smartphone.
14. Illustrate the functionalities of various elements in the bluetooth protocol stack architecture. (10) [CO3] [K2]

Bloom's Taxonomy Level	Remembering (K1)	Understanding (K2)	Applying (K3)	Analysing (K4)	Evaluating (K5)	Creating (K6)
Percentage	.	53	43	-	-	-

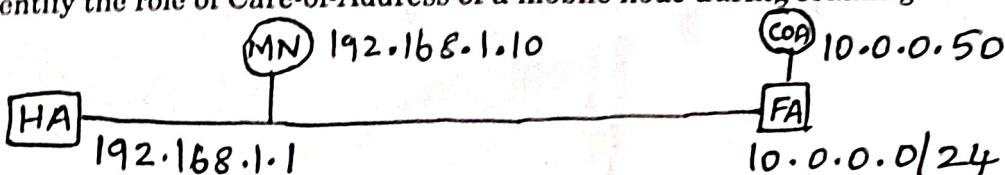
**KONGU ENGINEERING COLLEGE, PERUNDURAI 638 060**  
**CONTINUOUS ASSESSMENT TEST 3**  
(Regulations 2022)

Month and Year : October 2025	Roll Number: 23C9L 266
Programme : B.E Branch : CSE Semester : V	Date : 14.10.2025 Time : 09.15 am to 10.45 am
Course Code : 22CSE01 Course Name : Mobile Communication	Duration : 1 ½ Hours Max. Marks : 50

**PART - A (10 × 2 = 20 Marks)**  
**ANSWER ALL THE QUESTIONS**

1. Identify the role of Care-of-Address of a mobile node during roaming with mobile IP. [CO4] [K2]

2. [CO4] [K3]



Identify each component and report how COA works during roaming.

3. Interpret the purpose of sending a broadcast DHCPREQUEST after receiving multiple DHCPOFFER messages. [CO4] [K3]

4. Difference between good link routing and weak link routing in MANETs. [CO4] [K2]

5. Snooping TCP improves performance in wireless networks with frequent packet loss. [CO4] [K3]  
Justify.

6. Show how RAN resources are assigned when two users demand video streaming simultaneously. [CO5] [K3]

7. Infer the use of network slicing. [CO5] [K2]

8. Differentiate licensed and unlicensed spectrum. [CO5] [K2]

9. What is beamforming? How does it enhance wireless communication? [CO5] [K2]

10. Show how 5G can be implemented to provide better connectivity than 4G. [CO5] [K2]

**Part – B (3 × 10 = 30 Marks)**  
**ANSWER ANY THREE QUESTIONS**

11. Illustrate the following mobile IP scenarios. [CO4] [K2]

- i) Entities and terminology for simple mobile IP network. (5)  
ii) packet delivery to and from the mobile node using mobile IP network. (5)

12. Apply the concept of Indirect TCP to show how the TCP connection is split between a fixed host and mobile host during mobility. (10) [CO4] [K3]

13. Explain the overall architecture of an LTE Radio-Access Network (RAN) and the associated Core network. (10) [CO5] [K2]

14. Construct the spider web diagram to show the key components/capability of IMT-2020 technology which supports 5G network. (10) [CO5] [K3]

Bloom's Taxonomy Level	Remembering (K1)	Understanding (K2)	Applying (K3)	Analysing (K4)	Evaluating (K5)	Creating (K6)
Percentage	.	53	47	-	-	-