SRM VALLIAMMAI ENGINEERING COLLEGE

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF INFORMATION TECHNOLOGY
(Common to Department of CSE and AI&DS)

QUESTION BANK

VI SEMESTER
IT3662 – MOBILE COMPUTING
Regulation – 2023

Academic Year 2025-2026 (Even- Semester)

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SUBJECT: **IT3662-MOBILE COMPUTING**
SEM / YEAR: VI / III

UNIT I – INTRODUCTION

Introduction to Mobile Computing - Architecture of Mobile Computing – Novel Applications – Limitations - GSM System Architecture - Radio Interface –Protocols - Localization and Calling - Handover – Security-GPRS.

PART-A			
Q.No.	Questions	BT Level	Competence
1	Define Mobile computing.	BTL1	Remembering
2	List the components of mobile computing architecture.	BTL1	Remembering
3	Infer the role of the Mobile Support Station in the architecture.	BTL2	Understanding
4	Outline the functions of MSC in GSM.	BTL2	Understanding
5	State the function of BTS.	BTL1	Remembering
6	What is radio interface?	BTL1	Remembering
7	Contrast hard handover with soft handover.	BTL2	Understanding
8	Find the core functions of Home Location Register (HLR).	BTL1	Remembering
9	What is meant by localization?	BTL1	Remembering
10	Summarize on Visitor Location Register (VLR).	BTL2	Understanding
11	Compare mobile computing with traditional computing.	BTL2	Understanding
12	Illustrate the role of mobility in mobile computing.	BTL2	Understanding
13	Relate how mobile computing supports real-time applications.	BTL2	Understanding
14	Interpret the concept of frequency reuse in GSM.	BTL2	Understanding
15	Recall the role of TDMA in GSM.	BTL1	Remembering
16	Classify the types of handover.	BTL2	Understanding
17	What is intra-cell handover?	BTL1	Remembering
18	What is IMEI?	BTL1	Remembering
19	What is SGSN?	BTL1	Remembering
20	How inter-system handover works?	BTL1	Remembering
21	Define PDP context.	BTL1	Remembering

22	Illustrate the working of GPRS.	BTL2	Understanding
23	Demonstrate the role of SGSN and GGSN in GPRS.	BTL2	Understanding
24	Outline the steps in GSM call setup.	BTL2	Understanding

PART-B

Q.No.	Questions	Marks	BT Level	Competence
1	(i) Evaluate whether mobile computing can replace traditional desktop computing. (ii) Justify your answer with two supporting reasons.	(8) (8)	BTL5	Evaluating
2	(i) Explain the layered architecture of mobile computing. (ii) Determine improvements to increase data transfer efficiency.	(8) (8)	BTL5	Evaluating
3	Illustrate the flow of a call using the GSM architecture.	(16)	BTL3	Applying
4	Apply GSM components to explain message routing.	(16)	BTL3	Applying
5	Compare the functionalities of BTS and BSC in GSM.	(16)	BTL4	Analyzing
6	Distinguish between FDMA, TDMA, and CDMA approaches.	(16)	BTL4	Analyzing
7	Explain the MAP protocol used in mobility management.	(16)	BTL5	Evaluating
8	(i) Examine the characteristics of mobile computing. (ii) Describe the 3-tier structure of mobile computing application.	(8) (8)	BTL4	Analyzing
9	Compose an improved encryption scheme for GSM.	(16)	BTL6	Creating
10	Design a packet scheduling technique for efficient GPRS usage.	(16)	BTL6	Creating
11	Evaluate the role of HLR/VLR in minimizing call drop.	(16)	BTL5	Evaluating
12	Recommend improvements for faster user localization.	(16)	BTL5	Evaluating
13	(i) Evaluate the strength of A3/A5/A8 algorithms in securing GSM communication. (ii) Recommend enhancements to improve GSM authentication.	(8) (8)	BTL5	Evaluating
14	Classify the different types of GSM channels.	(16)	BTL3	Applying
15	(i) Analyze the strengths and weaknesses of GSM security algorithms. (ii) Compare authentication and encryption in GSM systems.	(8) (8)	BTL4	Analyzing
16	Formulate a multi-level authentication method for mobile networks.	(16)	BTL6	Creating
17	Compare control protocols and signaling protocols in GSM.	(16)	BTL4	Analyzing

	UNIT II- DATA LINK LAYER		
	Medium Access Control Protocol - Wireless MAC Issues - Hidden and exposed terminals- near and far terminals – SDMA – FDMA – TDMA – CDMA.		
	PART-A		
Q.No.	**Questions**	**BT Level**	**Competence**
1	List any two functions of the MAC layer.	BTL1	Remembering
2	What is channel allocation?	BTL1	Remembering
3	Infer the need for MAC in wireless communication.	BTL2	Understanding
4	What is multipath fading?	BTL1	Remembering
5	Demonstrate why collision detection is difficult in wireless networks.	BTL2	Understanding
6	Summarize the hidden terminal problem with an example.	BTL2	Understanding
7	Recall the two problems in wireless MAC.	BTL1	Remembering
8	Illustrate the exposed terminal problem in wireless networks.	BTL2	Understanding
9	Outline the near–far terminal issue.	BTL2	Understanding
10	Define contention-based MAC.	BTL1	Remembering
11	Illustrate how RTS/CTS helps avoid hidden terminal problems.	BTL2	Understanding
12	Define near terminal problem.	BTL1	Remembering
13	What is SDMA?	BTL1	Remembering
14	Compare FDMA with TDMA.	BTL2	Understanding
15	Interpret the basic concept of CDMA spreading code.	BTL2	Understanding
16	What is frequency reuse?	BTL1	Remembering
17	Define CDMA.	BTL1	Remembering
18	Summarize the effect of mobility on MAC performance.	BTL2	Understanding
19	Illustrate how FDMA divides the available bandwidth.	BTL2	Understanding
20	Explain the basic concept of CDMA spreading code.	BTL2	Understanding
21	Classify the types of Multiple Access Techniques used in wireless communication.	BTL2	Understanding
22	What is a time slot in TDMA?	BTL1	Remembering
23	Recall any two advantages of FDMA.	BTL1	Remembering
24	State any two problems caused by hidden terminals.	BTL1	Remembering

	PART-B

Q.No.	Questions	Marks	BT Level	Competence
1	(i) Apply the concept of MAC protocols to explain how channel access is managed in a Wi-Fi network. (ii) Illustrate how the hidden terminal problem affects data transmission with a real-world example.	(8) (8)	BTL3	Applying
2	(i) Examine SDMA, FDMA, TDMA, and CDMA and analyze how each technique utilizes channel resources. (ii) Compare the advantages and limitations of CDMA in modern wireless systems.	(8) (8)	BTL4	Analyzing
3	(i) Analyze the near–far problem in CDMA and explain how power control mechanisms solve it. (ii) Compare the collision handling methods in MAC protocols: CSMA/CA vs CSMA/CD.	(8) (8)	BTL4	Analyzing
4	Inspect the various wireless MAC issues and explain their impact on the efficiency of wireless communication.	(16)	BTL4	Analyzing
5	Apply RTS/CTS mechanism to reduce collision issues in ad hoc networks. Evaluate its effectiveness with an example scenario.	(16)	BTL3	Applying
6	Examine the performance of wireless MAC protocols under different mobility and traffic load conditions.	(16)	BTL4	Analyzing
7	Critically evaluate the role of MAC protocols in solving hidden, exposed, and near–far problems in modern wireless systems.	(16)	BTL5	Evaluating
8	Analyze the differences between wired and wireless Data Link Layer MAC issues with suitable examples.	(16)	BTL4	Analyzing
9	Assess the role of Data Link Layer reliability mechanisms (ARQ, FEC) in improving wireless MAC performance.	(16)	BTL5	Evaluating
10	Propose a Data Link Layer architecture for next-generation IoT that ensures low latency, minimal collisions, and high energy efficiency.	(16)	BTL6	Creating
11	Evaluate the effectiveness of Data Link Layer MAC protocols (CSMA/CA, TDMA, CDMA) in reducing collisions in wireless networks.	(16)	BTL5	Evaluating
12	Analyze the random assignment schemes used in MAC protocols and compare their performance in terms of collision rate, channel utilization and delay in CDMA protocol.	(16)	BTL4	Analyzing
13	Design a complete Data Link Layer model including framing, MAC, error control, and flow control.	(16)	BTL6	Creating
14	Determine the importance of each Data Link Layer service and justify why they are essential.	(16)	BTL4	Analyzing
15	Justify the need for adaptive MAC protocols in heterogeneous wireless networks.	(16)	BTL5	Evaluating
16	Develop a power-controlled CDMA system to overcome the near–far problem. Include algorithm steps and expected performance improvements.	(16)	BTL6	Creating
17	Demonstrate how FDMA, TDMA, and CDMA techniques can be applied to maximize channel utilization in a multi-user wireless network scenario.	(16)	BTL3	Applying

UNIT III- MOBILE NETWORK LAYER

Mobile IP – Goals – Assumption - Entities and Terminology - IP Packet Delivery – Agent Advertisement and Discovery – Registration - Tunneling and Encapsulation -Dynamic Host Configuration Protocol.

	PART-A		
Q.No.	Questions	BT Level	Competence
1	Define Mobile IP.	BTL1	Remembering
2	Find the goal of Mobile IP.	BTL1	Remembering
3	What is a Home Agent (HA)?	BTL1	Remembering
4	Compare Home Agent with Foreign Agent.	BTL2	Understanding
5	Illustrate why tunnelling is needed in Mobile IP.	BTL2	Understanding
6	Explain how CoA supports mobility.	BTL2	Understanding
7	What is meant by mobility binding?	BTL1	Remembering
8	Outline any two assumptions of Mobile IP.	BTL2	Understanding
9	What is agent advertisement in Mobile IP?	BTL1	Remembering
10	Interpret the purpose of agent advertisements.	BTL2	Understanding
11	Infer the role of registration in Mobile IP.	BTL2	Understanding
12	How does encapsulation ensure packet delivery to a mobile node?	BTL1	Remembering
13	What is IP-in-IP encapsulation?	BTL1	Remembering
14	What is tunneling in Mobile IP?	BTL1	Remembering
15	Define registration request.	BTL1	Remembering
16	Contrast the concept of home address with care-of address.	BTL2	Understanding
17	Why is dynamic IP allocation important in Mobile IP?	BTL1	Remembering
18	How does Mobile IP support seamless communication?	BTL1	Remembering
19	Summarize the difference between tunneling and encapsulation.	BTL2	Understanding
20	Explain how does a Mobile Node detect movement.	BTL2	Understanding
21	Demonstrate IP packet forwarding in Mobile IP.	BTL2	Understanding
22	What is an agent discovery message?	BTL1	Remembering
23	What is DHCP used for?	BTL1	Remembering
24	Mention any two entities of Mobile IP.	BTL1	Remembering
	PART-B		
Q.No.	Questions	Marks	BT Level	Competence

1	(i) Describe Mobile IP in detail, discussing its need, architecture, and working principles. (ii) Identify the role of different entities involved with a neat diagram.	(8) (8)	BTL3	Applying
2	(i) List the goals of Mobile IP. (ii) Inspect how Mobile IP achieves transparency, compatibility, scalability, and security in mobile communication.	(6) (10)	BTL4	Analyzing
3	(i) Interpret the assumptions of Mobile IP. (ii) Explain how these assumptions influence the design and operation of Mobile IP.	(6) (10)	BTL5	Evaluating
4	Examine the roles of Mobile Node (MN), Home Agent (HA), Foreign Agent (FA), Care-of Address (CoA), and Correspondent Node (CN).	(16)	BTL4	Analyzing
5	Explain in detail, both packet delivery from Correspondent Node to Mobile Node and from Mobile Node to Correspondent Node with suitable diagrams.	(16)	BTL4	Analyzing
6	(i) Model the agent advertisement and agent discovery process in Mobile IP. (ii) Identify and explain how a mobile node detects movement and identifies a foreign agent.	(8) (8)	BTL3	Applying
7	Explain the registration process in Mobile IP with registration request, registration reply, and authentication mechanisms in detail.	(16)	BTL5	Evaluating
8	Compare different encapsulation techniques such as IP-in-IP, Minimal Encapsulation, and GRE, with diagrams.	(16)	BTL4	Analyzing
9	Interview the triangular routing in Mobile IP along with its advantages, disadvantages, and possible solutions.	(16)	BTL3	Applying
10	Inspect the handoff process in Mobile IP and explain how seamless mobility is achieved during movement between networks.	(16)	BTL4	Analyzing
11	(i) List the security issues in Mobile IP. (ii) Inspect authentication, replay protection, and key management mechanisms used.	(8) (8)	BTL4	Analyzing
12	Explain the Dynamic Host Configuration Protocol (DHCP) describing its purpose, architecture, and operation in IP networks.	(16)	BTL5	Evaluating
13	Examine the DHCP message exchange process preserving its sequence with a neat diagram.	(16)	BTL4	Analyzing
14	(i) Assess the role of DHCP in Mobile IP. (ii) Explain how DHCP assists in care-of address allocation for mobile nodes.	(8) (8)	BTL5	Evaluating
15	Compare Mobile IP and traditional IP routing and highlight the challenges of mobility and how Mobile IP overcomes them.	(16)	BTL4	Analyzing
16	(i) Interpret the advantages and limitations of Mobile IP. (ii) Assess performance issues such as latency, routing inefficiency, and scalability.	(8) (8)	BTL5	Evaluating
17	Write a detailed note on Mobile IP packet encapsulation and decapsulation. Explain the complete data flow with suitable diagrams.	(16)	BTL6	Creating

UNIT IV- MOBILE TRANSPORT LAYER

Traditional TCP - Indirect TCP - Snooping TCP - Mobile TCP - Fast Retransmit and Fast Recovery - Transmission /Time-Out Freezing - Selective Retransmission – Transaction Oriented TCP.

	PART-A		
Q.No.	Questions	BT Level	Competence
1	What is Traditional TCP?	BTL1	Remembering
2	Why does Traditional TCP perform poorly in mobile networks?	BTL1	Remembering
3	Define Indirect TCP (I-TCP).	BTL1	Remembering
4	Infer the main objective of Indirect TCP?	BTL2	Understanding
5	What is Snooping TCP?	BTL1	Remembering
6	Demonstrate how Snooping TCP handles packet losses.	BTL2	Understanding
7	Summarize on Mobile TCP (M-TCP).	BTL2	Understanding
8	Outline any two features of Mobile TCP.	BTL2	Understanding
9	What is meant by Fast Retransmit in TCP?	BTL1	Remembering
10	When is Fast Retransmit triggered?	BTL1	Remembering
11	Explain Fast Recovery in TCP.	BTL2	Understanding
12	Mention one advantage of Fast Recovery.	BTL1	Remembering
13	What is Transmission Freezing in mobile TCP?	BTL1	Remembering
14	What is Time-Out Freezing?	BTL1	Remembering
15	Why is Freezing required during handoff?	BTL1	Remembering
16	Define Selective Retransmission.	BTL1	Remembering
17	Illustrate how does Selective Retransmission differ from Go-Back-N.	BTL2	Understanding
18	Outline the two advantages of Selective Retransmission.	BTL2	Understanding
19	What is Transaction Oriented TCP (T-TCP)?	BTL1	Remembering
20	Explain why T-TCP is suitable for short transactions.	BTL2	Understanding
21	Interpret the role of acknowledgements in T-TCP.	BTL2	Understanding
22	Mention one limitation of Indirect TCP.	BTL1	Remembering
23	How does Snooping TCP maintain end-to-end semantics?	BTL1	Remembering
24	Compare Traditional TCP and Mobile TCP.	BTL2	Understanding
	PART-B		

Q.No.	Questions	Marks	BT Level	Competence
1	(i) Examine Traditional TCP and its limitations in mobile wireless environments. (ii) Analyze issues such as packet loss, handoff delay, and congestion misinterpretation.	(8) (8)	BTL4	Analyzing
2	Explain Indirect TCP (I-TCP) in detail with its architecture, working, advantages, and disadvantages.	(16)	BTL5	Evaluating
3	Inspect how Snooping TCP improves TCP performance over wireless links and explain its packet caching and local retransmission mechanisms.	(16)	BTL4	Analyzing
4	Compare Traditional TCP, Indirect TCP, and Snooping TCP in terms of end-to-end semantics, performance, scalability, and deployment complexity.	(16)	BTL5	Evaluating
5	Identify the design principles of Mobile TCP (M-TCP) and explain its operation, advantages and limitations.	(16)	BTL3	Applying
6	Assess the Fast Retransmit and Fast Recovery mechanisms in TCP and explain how they help improve throughput in mobile networks.	(16)	BTL5	Evaluating
7	(i) Infer the concept of Transmission/Time-Out Freezing in mobile TCP. (ii) Analyze how freezing timers helps during temporary disconnections and handoffs.	(8) (8)	BTL4	Analyzing
8	Experiment with the working of Selective Acknowledgment (SACK) and identify its role in improving TCP performance over wireless links.	(16)	BTL3	Applying
9	(i) Appraise the performance of Transaction Oriented TCP (T-TCP). (ii) Interpret its connection establishment, data transfer, and connection termination processes.	(8) (8)	BTL5	Evaluating
10	(i) Identify the challenges faced by TCP in mobile networks. (ii) Interview how various mobile TCP enhancements attempt to overcome these challenges.	(8) (8)	BTL3	Applying
11	(i) Explain handoff management at the transport layer. (ii) Infer the impact of handoffs on TCP performance and the solutions adopted.	(8) (8)	BTL5	Evaluating
12	(i) Examine the role of buffering and caching in Mobile TCP variants. (ii) Discover how they reduce packet loss and improve throughput.	(8) (8)	BTL4	Analyzing
13	(i) Explain congestion control mechanisms in mobile transport protocols. (ii) Compare Traditional TCP congestion control with mobile-aware TCP mechanisms.	(8) (8)	BTL5	Evaluating
14	Discuss the advantages and disadvantages of splitting TCP connections in mobile environments with reference to Indirect TCP.	(16)	BTL6	Creating
15	Explain how wireless link errors affect TCP performance and discuss the techniques used to distinguish congestion losses from wireless losses.	(16)	BTL5	Evaluating
16	Compare Mobile TCP with Transaction Oriented TCP in terms of use cases, performance, and suitability for mobile applications.	(16)	BTL4	Analyzing

17	Write a detailed note on TCP performance optimization techniques for mobile networks, including Fast Retransmit, Fast Recovery, Selective Retransmission, and Timeout Freezing.	(16)	BTL6	Creating

UNIT V - MOBILE APPLICATION LAYER

WAP Model- Mobile Location based services -WAP Gateway –WAP protocols – WAP user agent profile-caching model-wireless bearers for WAP - WML – WML Scripts – WTA.

PART-A			
Q.No.	Questions	BT Level	Competence
1	What is the benefit of WAP?	BTL1	Remembering
2	Illustrate the need to introduce WAP.	BTL2	Understanding
3	List the basic objectives of WAP.	BTL1	Remembering
4	Infer the components of WAP.	BTL2	Understanding
5	What is the function of a WAP gateway?	BTL1	Remembering
6	Recall the protocol stack in WAP.	BTL1	Remembering
7	Show some applications of WAP.	BTL1	Remembering
8	Outline the basic features of WML.	BTL2	Understanding
9	What is WTLS?	BTL1	Remembering
10	Name the classes of wireless transaction protocol.	BTL1	Remembering
11	Summarize the general features of WSP.	BTL2	Understanding
12	Outline the standard libraries for WML script.	BTL2	Understanding
13	Interpret the service request structure of WTP class 0.	BTL2	Understanding
14	Draw the time sequence chart for WSP /B session termination.	BTL2	Understanding
15	Define wireless application environment.	BTL1	Remembering
16	Where i-mode is used?	BTL1	Remembering
17	Why we used SyncML?	BTL1	Remembering
18	Demonstrate how can we extend basic WAE to WTA.	BTL2	Understanding
19	Infer the capabilities of WML script.	BTL2	Understanding
20	Draw the basic transaction of WTP class 0.	BTL1	Remembering
21	Show the need for WTLS.	BTL1	Remembering
22	Illustrate WDP service primitives.	BTL2	Understanding
23	Interpret the idea behind WAE.	BTL2	Understanding
24	List the features offered by WSP/B.	BTL1	Remembering

	PART-B			
Q.No.	Questions	Marks	BT Level	Competence
1	What is wireless markup language? Identify its features.	(16)	BTL3	Applying
2	Organize the concept of WSP/B over WTP.	(16)	BTL3	Applying
3	Elaborately explain about Push architecture.	(16)	BTL5	Evaluating
4	Assess the WTP class 2 protocols.	(16)	BTL4	Analyzing
5	Draw and explain the logical model of wireless application environment.	(16)	BTL4	Analyzing
6	Evaluate the wireless transport layer security.	(16)	BTL5	Evaluating
7	List the components of WAP architecture and inspect in detail.	(16)	BTL4	Analyzing
8	Explain the following i) i- mode protocol stack ii) SyncML	(8) (8)	BTL5	Evaluating
9	Organize the wireless application protocol architecture.	(16)	BTL3	Applying
10	Analyze the service primitives of WDP.	(16)	BTL4	Analyzing
11	Judge and assess the WML script complements to WML.	(16)	BTL5	Evaluating
12	(i) What is Wireless Telephony application? Explain WTA logical architecture. (ii) Evaluate the several standard libraries for WML script specified by WAP.	(8) (8)	BTL5	Evaluating
13	(i) Examine the architecture of Wireless Telephony application in detail. (ii) Assess the following: (1) WML (2)WML scripts.	(8) (4) (4)	BTL4	Analyzing
14	Recent days Internet sites offer facilities to download music files from video store directly and get the payment billed to our mobile phones. Sketch a Wireless Telephony Application(WTA) architecture that would provide a similar facility for Mobile games.	(16)	BTL5	Evaluating
15	What is the fundamental difference of WML compared to HTML? Recommend a WML Script to design a page for online food ordering.	(16)	BTL5	Evaluating
16	(i) Examine Wireless Datagram Protocol (WDP) of WAP stack. (ii) Write a WML script that asks the user to enter his name and age. Write validation function(s) that ensure that name has only alphabets and age has only numeric.	(8) (8)	BTL4	Analyzing
17	Analyze the various classes in wireless transaction protocol, how does it improve the higher layer performance.	(16)	BTL4	Analyzing

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