



## **IT6601- Mobile Computing** **Question Bank**

### **UNIT I**

#### **Part A**

1. Define Mobile computing.
2. List the advantages of mobile computing.
3. Distinguish between mobile computing and wireless networking.
4. List the wireless networking standards used in Mobile computing.
5. Distinguish between infrastructure-based network and infrastructure less network.
6. Define Mobile Communication.
7. Analyze the challenges in Wireless Communication.
8. Classify the types of wireless networks
9. Illustrate Ad hoc Networks with pictorial representation.
10. Give the uses of Ad-Hoc networks?
11. Mention the applications of Mobile computing.
12. Point out the Characteristics of Mobile computing
13. Describe the function of presentation, application and data tier of mobile environment.
14. What is the role of a MAC protocol?
15. Identify the issues of Wireless MAC Protocol.
16. Classify the types of MAC Protocol.
17. Explain hidden terminal problems in infrastructure-less network.
18. When does the exposed terminal problem arise? Compose a role which is played by Radio/Infrared signals play in Mobile Computing?
19. Summarize the reasons as to why the MAC protocol designed for infrastructure based wireless may not work satisfactory in infrastructure
20. Formulate a reason why Collision Detection based protocol is not suitable for wireless networks?
21. What is MACA protocol? In which environment is it suitable?

#### **Part B**

1. (i) What is Mobile Computing? Explain its applications in the real world scenario. (8)  
(ii) Differentiate between mobile computing and wireless networking. (8)
2. (i) Explain the characteristics of Mobile Computing. (8)  
(ii) Explain the structure of Mobile Computing Application. (8)
3. (i) Describe the architecture of Mobile Computing Environment (8)  
(ii) Define the functions of the presentation tier, application tier and data tier of Mobile Computing Environment. (8)
4. (i) Name one MAC protocol that is used in mobile ad hoc networks. Briefly explain its working. (8)  
(ii) Name 1 MAC protocol that is used in sensor networks. Briefly explain its working. (8)
5. (i) Illustrate the taxonomy of MAC protocols. (10)  
(ii) Discuss about one popular protocol from each of these categories. (6)
6. (i) Summarize the issues in the Wireless MAC Protocols. (8)



- (ii) Identify the situations under which protocols from one category would be preferable over the other categories. (8)
7. (i) Describe the various Fixed assignment schemes. (8)  
(ii) Discuss the various Reservation Based schemes. (8)
8. Describe in detail about TDMA, FDMA, and CDMA and tabulate the differences among them. (16)
9. (i) Discuss the basic scheme of the CDMA protocol. (8)  
(ii) What is the role of a pseudorandom generator in the working of the CDMA protocol? (8)
10. (i) What are the principle responsibilities of the MAC Protocol? (8)  
(ii) How does MAC protocol for wireless networks differ from those in wired network? (8)
11. (i) Illustrate the working of a contention-based MAC protocol with suitable examples. (8)  
(ii) Explain the various random assignment schemes that are used in MAC protocol. (8)
12. (i) What is MACA protocol? In which environment is it suitable. Briefly explain its working. (8)  
(ii) How does MACA protocol solve the hidden/exposed terminal problem? (8)
13. (i) Explain why MAC scheme in wired network fail in wireless networks. (8)  
(ii) How does the multiple access with collision avoidance (MACA) scheme work? (8)
14. (i) Prepare a brief account of scheduled based MAC protocol. (8)  
(ii) Name any one scheduled based MAC protocol and explain in detail. (8)

## **UNIT II**

### **Part A**

1. Differentiate between Traditional IP and Mobile IP?
2. What is encapsulation in mobile IP?
3. List the advantages and disadvantages of mobile IP?
4. What do you mean by the term binding of mobile node?
5. Compare tunneling and reverse tunneling.
6. What do you mean by agent advertisement?
7. Compare Agent solicitation and Agent discovery
8. Formulate a plan to create mobile IP along with basic requirements?
9. Illustrate the schematic model of Mobile IP with the neat sketch.
10. What is DHCP?
11. Point out the Advantages and Disadvantages of Mobile TCP
12. Show the pictorial representation of indirect TCP model.
13. State the functions of SMTP and SNMP protocols
14. Describe the structure of TCP segment
15. Define Adaptive transmission control mechanism
16. Develop a solution to reduce the congestion in a mobile network.
17. Why does congestion occur in a network?
18. Define slow start in mobile computing.
19. Illustrate about snooping TCP with suitable examples.
20. Summarize the features of Freeze-TCP

### **Part B**

1. Write Short notes on: (16)



- (i) Home Address
  - (ii) Mobile Node
  - (iii) Foreign Agent
  - (iv) Foreign Network
  - (v) Home Network
2. Describe the following terms in detail: (16)
    - (i) Corresponding Node
    - (ii) Care of Address
    - (iii) Agent Discovery
    - (iv) Tunneling and Encapsulation.
  3. (i) Explain the operation of mobile IP with the help of a suitable schematic diagram and by suitable examples.(8)
    - (ii) Explain the agent advertisement procedure of mobile IP(8)
  4. (i) Explain why the traditional IP cannot be used in a mobile network. (8)
    - (ii) What are the main differences between the traditional IP and the mobile IP? How does mobile IP support mobile hubs? (8)
  5. (i) Explain the limitations of IPv4 and how are they overcome by IPv6. (8)
    - (ii) Describe the evolution of Mobile IP. (8)
  6. Give a brief account of route optimization in Mobile IP. (16)
  7. (i) With the diagram explain DHCP and its protocol architecture. (8)
    - (ii) Describe IP-in-IP, Minimal IP and GRE encapsulation methods. (8)
  8. (i) Compare the architecture of TCP/IP protocol suite with the ISO/OSI architecture.(8)
    - (ii) Explain the adaptation of TCP window in detail. (8)
  9. (i) With the neat diagram explain the Architecture of TCP/IP. (8)
    - (ii) Explain the various improvements in TCP performance with diagram. (8)
  10. (i) Define I-TCP and explain with the help of a suitable schematic diagram. (8)
    - (ii) What is the snooping TCP approach in mobile wireless networks? Discuss its advantages. (8)
  11. (i) What is slow start in TCP operation? Explain its working. (8)
    - (ii) How does slow start help improve the performance of TCP? (8)
  12. (i) Briefly discuss the M-TCP approach of extending TCP to work efficiently in mobile wireless networks. (8)
    - (ii) How does M-TCP maintain end to end semantics? (8)
  13. (i) Why does congestion occur in a network? Explain how does TCP detect and handle congestion. (8)



- (ii) Explain the working of freeze-TCP. (8)
14. Discuss the popular TCP Congestion Control Algorithms. (16)

### **UNIT III**

#### **Part A**

3. Is 3G cellular wireless technology superior to 2G technology? Justify your answer.
4. Show the characteristics of 4G and 5G Cellular Networks.
5. List the 3 important features of GSM security.
6. Define MSC and BSC
7. Define Call Routing
8. Define OMC.
9. List the Services of GSM.
10. Describe the function of HLR and VLR.
11. What are the subsystems of GSM?
12. Point out the major functions in NSS.
13. Analyse the need for EIR.
14. Define GPRS.
15. Give the Functions of GGSN?
16. Classify the categories of GPRS services.
17. GPRS is advantageous than GSM. Justify the statement.
18. Generalize the limitations of GPRS.
19. What are the main elements of UMTS?
20. How UMTS networks are different from 2G network?
21. Can UMTS networks easily work with the existing GSM/GPRS networks? Justify your answer.
22. Create different ways to develop anonymity

#### **Part B**

1. Illustrate about cellular Mobile Communication with the neat sketch. (16)
2. Briefly explain how the mobile cellular communication has evolved over different generations of technology. (16)
3. (i) Compare 1G and 2G cellular wireless communication technologies. (8)  
(ii) What do you understand by 2.5G? How is it different from 2G and 3G technologies? (8)
4. (i) Describe the important functional difference between 1G, 2G and 3G cellular networks. (10)  
(ii) Is 3G cellular wireless technology superior to 2G technology? Justify your answer. (6)
5. Explain the transport technologies used across Generations of Cellular Networks. (16)
6. (i) Describe GSM architecture and its services in detail. (8)  
(ii) Explain GSM Authentication and Security. (8)
7. Identify at least four similarities and four dissimilarities between a GSM network and UMTS network. (16)
8. Illustrate how a GSM network provides security to the customers. (16)
9. (i) Describe the GPRS procedure in detail. (8)  
(ii) State its Advantages and Disadvantages. (8)
10. (i) Explain GPRS protocol architecture in detail. (8)  
(ii) Explain in detail about UMTS architecture. (8)



11. What do you mean by Virtual Home Environment (VHE)? Explain how VHE is realized in 3G networks?
12. (i) Discuss the services of GPRS. (8)  
(ii) What are the advantages of GPRS over GSM? (8)
13. What is UMTS? Describe the functions of HLR and VLR in call routing & roaming? (16)
14. Do mobile phones affect the human body negative? Explain your answer.(16)

#### UNIT IV

##### Part A

1. What is ad hoc network?
2. Analyse the need for Ad Hoc networks.
3. List the characteristics of MANETs.
4. Identify the issues that are addressed by routing protocol in MANET?
5. What is hybrid routing protocol?
6. List the advantages in DSR.
7. What do you mean by dynamic topology of MANET?
8. Interpret count to infinity problem.
9. Give some popular Routing Protocols.
10. Give the applications of MANET.
11. Classify the MANET routing algorithms.
12. Classify the types of communication in a MANET?
13. Relate the MANET routing strategies with routing strategies of traditional networks.
14. Why traditional routing strategies cannot be deployed in a MANET?
15. Summarize about security issues in MANET.
16. Compare DSDV and DSR
17. Give examples of typical Applications of Unicast and Multicast communication
18. Can cellular network and wireless LAN be considered as adnetworks? Justify
19. Define VANET.
20. Compare MANET Vs VANET.

##### Part B

1. (i) Explain Characteristics, Applications of MANET.(4+4)  
(ii) Explain DSR Routing Protocols in detail.(8)
2. (i) What do you mean by size and node density of MANET? (8)  
(ii) Explain any two terms and discuss how these two parameters impact the design of a MANET. (8)
3. What is a Hybrid Routing protocol? What is its advantage over the other classes of routing protocols? (16)
4. Write short notes on:  
(i) Ad Hoc On-demand Distance Vector(AODV) (8)  
(ii) Zone Routing Protocol. (8)
5. Mention the important differences between a mobile ad hoc network and a Cell phone network. (16)
6. (i) Discuss DSDV routing in detail. (8)  
(ii) Mention the advantages and Disadvantages of DSDV(8)
7. (i) Describe at least three applications of mobile ad hoc networks. (8)  
(ii) Discuss some routing attacks that are possible at the application layer of a MANET. (8)



8. A major task of the designer of a wireless sensor network is prolonging the life of the network. Explain how this is achieved while designing a MANET. (16)
9. (i) Illustrate the classification of unicast MANET Routing Protocols. (8)  
(ii) Explain how multicast routing is carried out in ad-hoc networks. (8)
10. (i) What are the security threats in a MANET? What are the factors responsible for limited security in MANETs? (4+4)  
(ii) For every layer of MANET protocol stack, show at least one type of security attack that exploits vulnerability at that layer. (8)
11. (i) How is an Ad hoc Network set up without the infrastructure support?(8)  
(ii) Why is Routing in a MANET a complex Task? (8)
12. What are the competing issues that are addressed by a routing protocol in a MANET? How are these achieved? (16)
13. (i) Briefly explain why traditional packet routing protocol for wired network cannot be used straightaway in a MANET. (8)  
(ii) Discuss how the routing protocols for traditional wired network have been extended to work in a MANET. (8)
14. (i) Draw and explain the architecture of VANET. (8)  
(ii) Discuss the various security and attacks on VANET. (8)

## **UNIT V**

### **Part A**

1. Give four examples of Mobile OS.
2. What is microkernel operating system?
3. Name any three commercial operating system for mobile phones.
4. What are the disadvantages in the context of the design of mobile operating system?
5. List any two features of Symbian.
6. Describe UIQ interface.
7. Give any two features of window Phone.
8. Why is microkernel preferred for developing a mobile OS?
9. Show the different versions of Android
10. Relate monolithic and microkernel design with a neat sketch
11. Differentiate between OS for sensor Network with Traditional OS.
12. How is the operating system for mobile phone different from the operating system for desktop?
13. Compare any two features of android, Symbian OS and Window Phone7.
14. Draw a structure of sensor operating system.
15. Develop an android software stack with a neat diagram.
16. What is M-Commerce?
17. List the applications of M-commerce.
18. What is micropayment in M-Commerce?
19. Point out the uses of mobile payment system.



**Part B**

1. (i) Describe the components of Mobile Operating Systems.(8)  
(ii) Write short notes on Android SDK.(8)
2. (i) Describe the principle functions of the operating system of a mobile device. (8)  
(ii) Discuss how an example application can be implemented on a mobile device and the specific operating system service that it makes use of. (8)
3. (i) Discuss the architecture of the Android operating system. (8)  
(ii) Briefly identify the possible reasons as to why it has been able to rapidly improve its market share compared to its peers since its introduction few years ago. (8)
4. Compare the features provided by the following mobile operating system: Android, symbian and windows Phone7. (16)
5. (i) Describe microkernel operating system. (6)  
(ii) Why microkernel based design is being preferred for developing a mobile OS? (10)
6. Write short notes on:  
(i) Special constraints and Requirements of Mobile OS.(8)  
(ii) Special Service Requirements. (8)
7. Briefly illustrate the important ways in which the operating system for a sensor network is different from a traditional operating system. (16)
8. (i) Compare Java byte code with Android Dalvik byte code. (8)  
(ii) Explain how an application can be developed using the Android SDK. (8)
9. Describe the special features that an operating system for mobile device needs to support, compared to the features provided by a traditional operating system. (16)
10. Using at least one suitable example, explain the flexibilities that a user would be required to sacrifice when a single tasking operating system is used in the mobile device. (16)
11. (i) Explain the various applications of M-Commerce.(8)  
(ii) Explain the mobile payment schemes and security issues.(4+4)
12. (i) What do you mean by B2B and B2C commerce? (8)  
(ii) Give examples of M-Commerce for these two categories of Commerce. (8)
13. (i) What do you understand by M-commerce? (6)  
(ii) What are the advantages and disadvantages of M-commerce? (10)
14. (i) What is Micropayment in M-commerce? How is micropayment achieved? (8)  
(ii) What are the different ways that m-payments can be settled? (8)