

**BASICS OF MOBILE COMPUTING
(CSEN 4282)**

Time Allotted : 3 hrs

Full Marks : 70

Figures out of the right margin indicate full marks.

*Candidates are required to answer Group A and
any 5 (five) from Group B to E, taking at least one from each group.*

Candidates are required to give answer in their own words as far as practicable.

**Group – A
(Multiple Choice Type Questions)**

1. Choose the correct alternative for the following: **10 × 1 = 10**
- (i) Which of the following is not a connected state of a Bluetooth device?
(a) Parked (b) Sniff (c) Standby (d) Hold.
 - (ii) How many slaves can be connected to the master using SCO links in Bluetooth?
(a) 3 (b) 4 (c) 5 (d) 7.
 - (iii) In a cellular system, $i=2$, $j=3$. How many cells are there in a cluster?
(a) 5 (b) 7 (c) $\sqrt{19}$ (d) 19.
 - (iv) Among the following which one is used when two WLAN stations are in a dialog exchange?
(a) SIFS (b) DIFS (c) EIFS (d) PIFS.
 - (v) Which of the following IEEE standard can be associated with WiFi?
(a) 802.3 (b) 802.5 (c) 802.11 (d) 802.15.
 - (vi) The process in which a Home Agent intercepts packets destined to one of its members and forwards it over the network to the Foreign Agent, is known as:
(a) Tunnelling (b) Encapsulation
(c) Discovery (d) None of the above.
 - (vii) Full form of NAV is:
(a) Network Assisted Values (b) Network Addressing Variables
(c) Network Access Vectors (d) None of the above.
 - (viii) In Global System for Mobile (GSM), each band is divided into 124 channels of:
(a) 200 KHz (b) 150 KHz (c) 100 KHz (d) 50 KHz.
 - (ix) The appearance of an AVD (Android Virtual Device) is known as:
(a) Resource Manager (b) System Settings
(c) Skin (d) Storage Area.

- (x) Which of the following routing protocols are not used in MANETs?
(a) DSDV (b) DSR (c) AODV (d) OSPF.

Group – B

2. (a) Describe one distinguishing feature in each case of 1G, 2G and 3G networks.
(b) How does Frequency reuse help channel allocation of cellular systems?
(c) Cell splitting and Cell sectoring differ in the ways of capacity enhancements of cellular systems. Explain this.
(d) Write a short note on Soft Handoff and Hard Handoff strategies.

3 + 3 + 3 + 3 = 12

3. (a) In the context of a 2G cellular system, briefly mention the roles played by any Mobile Station (MS), Base Station (BSS) and the MSC element.

In a 2G CDMA based system, an MS is in the soft handover state with two BSS. Describe how it sends and receives data from another MS.

Name two CDMA protocols available in a 3G system.

- (b) What are the main reasons 5G can provide a much higher data rate compared to earlier technologies?

The amount of interference in 5G cells is more, esp. around the boundary zone of these cells. What are the causes of this problem? How can this be handled properly?

Point out a frequency band supporting Millimetre (MM) wave technology. How can absorption loss of MM wave be used to the advantage of 5G call quality?

(3 + 2 + 1) + (2 + 2 + 2) = 12

Group – C

4. (a) Explain various Inter Frame Spacing (IFS) times present in the WLAN protocol. Describe with a diagram the roles they play in resolving collision in the WLAN MAC layer.

- (b) Write short notes on: (i) PCF and DCF. (ii) BEBO algorithm. (iii) NAV.

(3 + 3) + (2 × 3) = 12

5. (a) What is meant by core and adapted protocols in Bluetooth? Give an example of each.

- (b) What is meant by Bluetooth baseband channels having the characteristic FH-TDD-TDMA? Compare between SCO and ACL channels. Which layer is responsible for managing these channels?

- (c) Mention the roles played by the RFCOMM and L2CAP layers in a Bluetooth environment. How can more than seven slaves be supported in a Piconet?

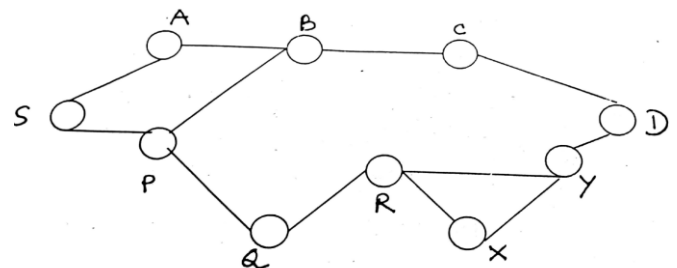
$$3 + (2 + 2 + 1) + (2 + 2) = 12$$

Group – D

6. (a) What are the three main steps needed to handle mobile IP based networking? Briefly explain.
- (b) A mobile station M1 has home location in network A. It is visiting another network B. Show how another mobile station M2 can send an IP packet to A with a suitable diagram.
- (c) Explain with a diagram what happens to source and destination address fields of an IP packet undergoing encapsulation and de-encapsulation stages (you may assume IP within IP encapsulation).
- (d) Mention the modifications of I-TCP over conventional TCP (for wireline environment). What are the reasons for these modifications?

$$3 + 3 + 3 + (1 + 2) = 12$$

7. (a) State the routing challenges of MANET.
- (b) What is the difference between DSDV and AODV?
- (c) Consider the above network and the following situations:



Case 1: S wants to send traffic to D for the first time. Show the Reverse Path and Forward Path setup if AODV protocol is used.

Case 2: Around the same time P wants to send traffic to D. Show the Reverse and Forward Path setup in this case also.

You may assume the link cost between any two nodes is a fixed value (say 1).

$$3 + 3 + (3 \times 2) = 12$$

Group – E

8. (a) Show the high level diagram of various software components organized as a stack inside an Android OS.
- (b) Name any five Android library components and in one sentence each explain their roles.
- (c) Name and explain the three concepts related to Android Event Handling mechanism.

$$3 + 5 + 4 = 12$$

9. (a) Mention the key services provided by the Android Application Framework.

B.TECH/ECE/8TH SEM/CSEN 4282/2021

- (b) In the Android architecture diagram, clearly mention the role played by the Activity component. What is its relation with Fragments?
- (c) What role does the AVD concept play in Android app development? What are the two states of an Android Service?

$$4 + (3 + 1) + (2 + 2) = 12$$

Department & Section	Submission Link
ECE	https://classroom.google.com/c/Mjk5MzY5OTg2ODI4/a/MzYwNjYxNjMyNzIx/details