

9. (a) Compare and contrast UWB communication with conventional wide band communication techniques based on spread spectrum techniques.
- (b) What are the advantages of using Wi-Fi systems?
- (c) Discuss the pros and cons of increasing the mobility margin in the power control scheme for hybrid wireless networks.
- (d) Explain how eavesdropping can contribute to the vulnerability of Wi – Fi systems.

3 + 3 + 3 + 3 = 12

B.TECH/IT/6TH SEM/INFO 3242/2017
WIRELESS & MOBILE COMPUTING
(INFO 3242)

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) Unmodulated signal coming from a transmitter is known as
 (a) carrier signal (b) baseband signal
 (c) primary signal (d) none of the above.
- (ii) GSM uses which of the following access technique?
 (a) TDMA (b) FDMA (c) FDMA/TDMA (d) CDMA.
- (iii) Start and Stop bits are used in serial communication for
 (a) error detection (b) error correction
 (c) synchronization (d) slowing down communication.
- (iv) MACA-BI is a hand-shake mechanism with
 (a) 3 steps (b) 4 steps (c) 2 steps (d) 5 steps.
- (v) The _____ measures the number of lost or garbled messages as a fraction of the total sent in the sampling period
 (a) residual error rate
 (b) transfer failure probability
 (c) connection release failure probability
 (d) connection establishment failure probability.
- (vi) The network topology that supports bi-directional links between each possible node is
 (a) ring (b) star (c) tree (d) mesh.
- (vii) WLANs use which of the following frequency band?
 (a) 900 MHz (b) 1800 MHz (c) 2.4 MHz (d) 2.4 GHz.

- (viii) The maximum output transmit power level in Bluetooth networks is
 (a) 1 W (b) 100 mW (c) 2.5 mW (d) 1 mW.
- (ix) MACAW, the MAC protocol for wireless Ad Hoc networks uses a control packet, called DS. It consists of
 (a) 30 bytes (b) 3 bytes (c) 300 bytes (d) 3 Kbytes.
- (x) Sharing of medium and its path is known as
 (a) encoding (b) multiplexing (c) modulation (d) line discipline.

Group – B

2. (a) What are the functions of Physical layer, Data-linking layer and Network layer in OSI model? Name the two types of voice coders. How do PCM and Linear Predictive coders work?
- (b) If a transmitter produces 50W of power, express the power in dBm and dBW. If 50W is applied to an unity gain antenna, determine the received power at a distance of 100m from the transmitting antenna in dBm. The carrier frequency is 900 MHz. Assume the gain of the receiving antenna to be unity.

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

3. (a) Differentiate between the analog modulation and the digital modulation schemes.
- (b) With respect to pulse code modulation, what is quantization error? Explain how it is caused.
- (c) Distinguish between TDMA and CDMA.

$$6 + 4 + 2 = 12$$

Group – C

4. (a) Explain how FHSS principle is applied in Bluetooth technology. What are piconet and scatternet? Explain their operation.
- (b) How authentication and authorization are implemented in Bluetooth networks? Explain clearly.

$$(2 + 4) + 6 = 12$$

5. (a) Think of four scenarios where wireless networks can replace wired networks in order to improve the efficiency of people at their workplace. Briefly describe how in each case a wireless network will fit the role better than a wired network.

- (b) Compare IP and Mobile IP.
- (c) Distinguish between the second generation and third generation cellular networks.

$$6 + 3 + 3 = 12$$

Group – D

6. (a) Justify the suitable type of multiple access technology in the following situations:
 (i) a military adhoc network environment.
 (ii) a home adhoc network environment.
- (b) What role does the routing protocol play in the provisioning of QoS guarantees for adhoc wireless networks?
- (c) What is replay attack?

$$(2 \times 3) + (4 + 2) = 12$$

7. (a) Explain GSM architecture with suitable figure and the role of its components.
- (b) What are the trade-offs to be considered in the design of power management schemes for adhoc wireless networks?
- (c) Distinguish between hard hand-off and soft hand-off.

$$6 + 3 + 3 = 12$$

Group – E

8. (a) What are the advantages of a clustered architecture over a layered architecture in a sensor network?
- (b) Distinguish between the Gossiping and Rumor Routing methods of data dissemination in wireless sensor networks.
- (c) What are the major differences between ad-hoc wireless networks and wireless sensor networks?
- (d) Distinguish between the SET UP phase and STEADY phase in LEACH protocol for wireless sensor networks.

$$3 + 3 + 3 + 3 = 12$$