



M.E DEGREE EXAMINATIONS: JUNE 2017

(Regulation 2015)

Second Semester

APPLIED ELECTRONICS

P15AETE23: Cellular and Mobile Communications

COURSE OUTCOMES

- CO1:** Summarize the various mobile communication techniques.
- CO2:** Demonstrate the cellular radio concepts.
- CO3:** Assess the various mobile radio propagation models.
- CO4:** Analyze the performance of different modulation, diversity and coding techniques.
- CO5:** Compare the different multiple access techniques in mobile communication.
- CO6:** Identify design issues for wireless networks.

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Assertion (A): Satellite systems are used in Wireless Mobile Communications CO2 [K₂]
Reason (R): Because cell towers are not necessary
 - a) Both A and R are individually true and R is the correct explanation for A
 - b) A is true but R is false
 - c) Both A and R individually true but R is Not correct explanation of A
 - d) A is true but R is false

2. 3 G means CO1 [K₂]
 - a) Third Generation
 - b) Third GMSK
 - c) Third GSM
 - d) Third Graph

3. One type of Multiple access scheme is CO5 [K₂]
 - a) PM
 - b) FM
 - c) TDMA
 - d) AM

4. Match list I with list II and select the correct answer using the codes given below the list CO2 [K₂]

| List I | List II |
|--------------|-------------------|
| A.Cell Tower | i.off |
| B.Hand | ii Infrastructure |
| C. Frequency | iii.Capacity |
| D.Erlang | iv.reuse |

| | A | B | C | D |
|----|----|-----|-----|-----|
| a) | ii | i | iv | iii |
| b) | i | ii | iii | iv |
| c) | ii | iv | iii | i |
| d) | iv | iii | ii | i |

5. Assertion (A): Antenna is not used in mobile phone CO2 [K₂]

Reason (R): Because only voltages and currents are present in cell phone.

a) Both A and R are individually true and R is the correct explanation for A b) A is true but R is false

c) Both A and R individually true but R is Not correct explanation of A d) A is false but R is true

6. Propagation model in mobile radio propagation CO3 [K₂]

- | | |
|-----------------|------------------|
| a) WLL model | b) GSM model |
| c) Paging model | d) Two ray model |

7. Consider the following statements. CO4 [K₂]

1. MSK is a digital modulation technique.
2. Bit Error is a parameter for digital modulation
3. AM is a digital modulation technique
4. Spectral efficiency is not a parameter for digital modulation

Which of these statements are correct

- | | |
|--------|--------|
| a) 2,3 | b) 1,2 |
| c) 1,3 | d) 3,4 |

8. Assertion (A) Speech coding is used in mobile Phones CO4 [K₂]

Reason (R): Channel coding is not necessary for mobile phones.

a) Both A and R are individually true and R is the correct explanation for A b) A is true but R is false

c) Both A and R individually true but R is Not correct explanation of A d) A is false but R is true

9. FDMA TDMA and CDMA are all CO5 [K₂]

- | | |
|--|---|
| a) Antenna techniques in mobile technology | b) Keying methods for mobile transmission |
| c) Multiple access techniques | d) Erlang capacity calculations. |

10. Consider the following possible sequence of steps for mobile communication CO1 [K₂]

1. Dial the number
2. Calling tone is heard in the mobile of caller
3. Signal goes from mobile phone of caller to tower
4. The received person answers the caller

The correct sequence of steps for connecting between two persons is

- | | |
|------------|------------|
| a) 1,2,3,4 | b) 1,4,3,2 |
| c) 4,3,2,1 | d) 1,3,2,4 |

PART B (10 x 2 = 20 Marks)

- | | | |
|---|-----|-------------------|
| 11. How is wired network different from wireless network? | CO1 | [K ₂] |
| 12. Summarize the features of GSM. | CO2 | [K ₄] |
| 13. Distinguish between FDMA and TDMA. | CO2 | [K ₂] |
| 14. Explain reasons for hand off failures. | CO2 | [K ₂] |
| 15. Compare line of sight model (LOS single Path) and two ray model for mobile radio propagation. | CO3 | [K ₂] |
| 16. Select a suitable antenna for your mobile phone. | CO3 | [K ₅] |
| 17. Differentiate between analog and digital modulation techniques. | CO4 | [K ₂] |
| 18. What are the advantages of diversity techniques? | CO4 | [K ₁] |
| 19. Explain the importance FDMA. | CO5 | [K ₂] |
| 20. What is Blue tooth is it a wired network or wireless network? | CO6 | [K ₁] |

PART C (10 x 5 = 50 Marks)

- | | | |
|--|-----|-------------------|
| 21. Describe history and evolution of mobile radio systems. | CO1 | [K ₂] |
| 22. Distinguish between 2G and 3G wireless. | CO1 | [K ₂] |
| 23. Describe Channel assignment. | CO2 | [K ₂] |
| 24. Explain Cellular concept in mobile communication. | CO2 | [K ₂] |
| 25. Explain impulse response model. | CO3 | [K ₂] |
| 26. Describe radio wave propagation issues in personal wireless systems. | CO3 | [K ₂] |
| 27. Compare analog and digital modulation schemes. | CO4 | [K ₂] |
| 28. Describe channel coding methods and various channels available for wireless communication. | CO4 | [K ₂] |
| 29. What are various wireless networks available for communication? | CO6 | [K ₂] |
| 30. Describe Code division multiple access schemes. | CO5 | [K ₂] |

Answer any TWO Questions

PART D (2 x 10 = 20 Marks)

- | | | |
|---|-----|-------------------|
| 31. Describe the concepts of speech coding and explain how it is made effective in signal processing. | CO4 | [K ₂] |
| 32. Explain with neat diagram the performance of a rake receiver. | CO4 | [K ₂] |
| 33. Explain the two ray ground reflection model and obtain an expression for the received power at a distance d from the transmitter. | CO3 | [K ₂] |
