

THE OPEN UNIVERSITY OF SRI LANKA
DEPARTMENT OF COMPUTER SCIENCE
BSC IT DEGREE PROGRAMME – 2024/2025
FINAL EXAMINATION
ITU5304: WIRELESS AND CELLULAR NETWORK
DURATION: TWO HOURS (2 HOURS)



Date: 23.06.2025

Time: 1.30 pm – 3.30 pm

General Instructions

1. Read all instructions carefully before answering the questions.
2. This question paper consists of 06 questions on 04 pages.
3. Answer any 04 questions only. All questions carry equal marks.
4. The answer for each question should commence on a new page.
5. Draw fully labeled diagrams where necessary.
6. Involvement in any activity that is considered an exam offense will lead to punishment.
7. Use blue or black ink to answer the questions.
8. Clearly state your index number in your answer script.

Q1.

- i. Differentiate the characteristics between analog baseband signal and the digital baseband signal. (04 marks)
- ii. What is signal modulation, briefly explain it with the examples. (03 marks)
- iii. Consider the following binary signal,

1 0 0 1 1 0 1 0 1

Draw the respective signal diagrams for the following encoding/modulation systems, considering the above binary waveform. (18 marks)

- a. Amplitude shift keying(ASK).
- b. Frequency shift keying(FSK).
- c. Phase shift keying(PSK).
- d. Quadrature shift keying(QPSK).
- e. Pulse amplitude modulation(PAM).
- f. Pulse width modulation(PWM).

Q2.

- i. What is WLAN Architecture? Briefly explain. (05 marks)
- ii. Sketch the diagram of the WLAN architecture and identify the four (04) major components in it. (05 marks)
- iii. Discuss the five (05) fundamental architectural elements in the WLAN with their specific functions for each. (10 marks)
- iv. Briefly explain the evolution of security in the WLAN architecture. (05 marks)

Q3.

- i. Briefly explain the four (04) signal factors which affect the functionality of an antenna system. (05 marks)
- ii. What are the five critical processes that must operate effectively to ensure the proper functioning of the antenna system. (05 marks)
- iii. Briefly discuss how those processes should align with the antenna system. (05 marks)
- iv. List five(05) types of antennae with significance application for each. (10 marks)

Q4.

- i. What is the significance of security measures in wireless communication? (04 marks)
- ii. Explain the Authentication process in GSM Architecture using a diagram? (05 marks)
- iii. Identify and explain five (05) major security aspects introduced in 3G security Architecture. (10 marks)
- iv. Describe the three (03) core security functions provided in 4G-LTE networks. (06 marks)

Q5.

- i. What is satellite technology in the wireless communication system? Briefly explain. (04 marks)
- ii. Identify and explain the four (04) major components of satellite technology. (08 marks)
- iii. Discuss the pros and cons in satellite technology. (08 marks)
- iv. List five (05) applications of satellite technology and explain why those applications have evolved satellite technology. (05 marks)

Q6.

- i. Briefly discuss TDMA frame structure. (04 marks)
- ii. Identify and discuss the four (04) major components of TDMA frame structure. (08 marks)
- iii. What is the GSM multi-frame? , and briefly discuss the four(04) GSM multi-frame structures. (08 marks)
- iv. Explain the advantages of GSM frame architecture. (05 marks)

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