THE OPEN UNIVERSITY OF SRI LANKA
B.SC. DEGREE PROGRAMME – 2024/2025
DEPARTMENT OF COMPUTER SCIENCE
CSU 5312 – WIRELESS AND CELLULAR NETWORKS
FINAL EXAMINATION
DURATION: **TWO HOURS ONLY** (2 HOURS)

Date: 23.11.2024 **Time: 01.30 p.m. – 03.30 p.m.**

Answer **QUESTION 01 AND FOUR (04) OTHER QUESTIONS**. ALL QUESTIONS CARRY EQUAL MARKS

Q1.

I. A tuning fork generates a sound wave in such a way that 17 complete waves pass a particular point in each second. If the speed of sound in air is 340 m/s, calculate the wavelength of the wave. (2 marks)

II. Describe the meaning of a **Baseband Signal**. (2 Marks)

III. Draw AM & FM (Analog Data to Analog Signal) waveforms. (4 Marks)

IV. Draw ASK, FSK & PSK (DigitalData to Analog Signal) for the following digital data pattern. (6 Marks)

1 0 1 1 0

V. Draw MANCHESTER, RZ & AMI (Digital Data to Digital Signal) for the following digital data pattern. (6 Marks)

1 0 1 1 0

Q2.

I. Draw GSM Outgoing Call flow indicating the nodes. (5 Marks)

II. Explain each step in GSM Outgoing Call flow. (12 Marks)

III. Give **Three (03) Benefits of Frequency Reuse** with brief explanations. (3 Marks)

Q3.

I. Draw **4G Network Architecture.** Name the nodes. (5 Marks)

II. Describe **ONE (01) node** from RAN side and **THREE (03) nodes** from EPC side. (12 Marks)

III. Give **Three (03)** key features/advancements in 4G technology. (3 Marks)

Q4.

I. Apert from Yagi-Uda antenna, name **THREE (03)** other antenna types. (3 Marks)

II. Draw a Yagi-Uda antenna and name the parts. Describes the functionality of these parts. (12 Marks)

III. From the given antenna types, select the most suitable type for each occasion. (5 Marks)

a. **Microwave Communication**
b. **Satellite Communication**
c. **TV/Radio**
d. **5G Technology**
e. **Drones**

Antenna Types: Yagi-Uda antenna, Horn Antenna, MIMO antenna, Patch antenna, Parabolic Reflector antenna

Q5.

I. Draw **GSM Authentication Process** diagram, naming necessary nodes. (5 Marks)

II. Explain each step. (12 Marks)

III. What are the three sectors in LTE security. (3 Marks)

Q6.

I. Draw and describe the components of **Satellite Communication**. (10 Marks)

II. Draw **Mobile IP diagram** and describe the components. (10 Marks)

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