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**PRESIDENCY UNIVERSITY**

**Bengaluru**

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| **End - Term Examinations – JANUARY 2025** |
| **Date:** 09- 01- 2025 **Time:** 09:30am – 12:30pm |

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| **School:** SOE | **Program:** B. Tech - ECE | |
| **Course Code :** ECE3054 | **Course Name :** Mobile Communication | |
| **Semester**: VII | **Max Marks**: 100 | **Weightage**: 50% |

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| **CO - Levels** | **CO1** | **CO2** | **CO3** | **CO4** | **CO5** |
| **Marks** | **14** | **14** | **36** | **36** | **-** |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Do not write anything on the question paper other than roll number.*

**Part A**

|  |  |  |  |  |  |
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| **Answer ALL the Questions. Each question carries 2marks. 10Q x 2M=20M** | | | | | |
| **1** | What is the primary difference between hard handoff and soft handoff? | **2 Marks** | **L2** | **CO1** | | |
| **2** | List two advantages of using a wireless network over a wired network. | **2 Marks** | **L1** | **CO1** | | |
| **3** | Differentiate between space-division multiplexing (SDM) and code-division multiplexing (CDM) in one sentence. | **2 Marks** | **L2** | **CO2** | | |
| **4** | What is the main objective of Medium Access Control (MAC)? | **2 Marks** | **L1** | **CO2** | | |
| **5** | What does GPRS stand for, and what generation of mobile communication does it belong to? | **2 Marks** | **L1** | **CO3** | | |
| **6** | What is the primary function of the Home Location Register (HLR) in GSM? | **2 Marks** | **L2** | **CO3** | | |
| **7** | What are the two primary functions of the Gateway GPRS Support Node (GGSN)? | **2 Marks** | **L2** | | **CO3** |
| **8** | List two key requirements of Mobile IP. | **2 Marks** | **L1** | | **CO4** |
| **9** | What is the difference between proactive and reactive routing protocols? | **2 Marks** | **L2** | | **CO4** |
| **10** | What are agent advertisements in Mobile IP? | **2 Marks** | **L1** | | **CO4** |

**Part B**

|  |  |  |  |  |  |  |  |
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| **Answer the Questions Total 80 Marks.** | | | | | | | |
| **11.** | **a.** | | | Discuss the propagation effects (reflection, refraction, diffraction, and scattering) in wireless communication and how they impact signal quality. | **10 Marks** | **L2** | **CO1** |
| **b.** | | | A base station uses SDMA in a dense urban area where interference between channels is high. Explain how the smart antenna technology would handle this scenario, and analyze the trade-offs involved. | **10 Marks** | **L4** | **CO2** |
| **or** | | | | | | | |
| **12.** | **a.** | | | With an example, illustrate diagrammatically how frequency reuse works in a 7-cell cluster. Calculate the frequency reuse factor. | **10 Marks** | **L3** | **CO1** |
| **b.** | | | Compare and contrast the following multiplexing schemes: SDM, FDM, TDM, and CDM. Provide examples where appropriate. | **10 Marks** | **L3** | **CO2** |
|  |  | | |  |  |  |  |
| **13.** | **a.** | | | Discuss the evolution of mobile communication technologies from 1G to 5G. Highlight the major advancements in each generation. | **10 Marks** | **L3** | **CO3** |
| **b.** | | | Explain the architecture of GSM, detailing the roles of key components like the MSC, BTS, and BSC. | **10 Marks** | **L3** | **CO3** |
| **or** | | | | | | | |
| **14.** | **a.** | | | A cellular operator plans to upgrade a GSM network with GPRS capabilities. Outline the necessary architectural changes and their impact on performance. | **10 Marks** | **L4** | **CO3** |
| **b.** | | | Explain the classification of GSM channels and describe their roles in ensuring effective communication within the GSM network. | **10 Marks** | **L3** | **CO3** |
|  | |  |  | |  |  |  |
| **15.** | | **a.** | Explain the registration process in Mobile IP when the care-of address is obtained via a foreign agent and also elaborate on the concepts of tunneling and encapsulation in Mobile IP with examples. | | **10 Marks** | **L3** | **CO4** |
| **b** | A mobile node with IP address 192.168.1.10 is moving from its home network to a foreign network. Explain the process of tunnelling the packets from a correspondent node to this mobile node using the care-of address 10.0.0.5. Illustrate with a step-by-step process and include diagrams. | | **10 Marks** | **L4** | **CO4** |
| **Or** | | | | | | | |
| **16.** | | **a.** | Consider a network where Source S1 needs to find a route to Destination S6. The intermediate nodes are S2, S3, S4, and S5.If two paths are discovered, (S1 → S2 → S4 → S6) and (S1 → S2 → S3 → S5 → S6), explain the process of route discovery and how the source selects the best path. | | **10 Marks** | **L4** | **CO4** |
| **b.** | Apply your understanding of proactive protocols like DSDV with examples to demonstrate scenarios like new node update, Link failure. | | **10 Marks** | **L3** | **CO4** |

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| **17.** | **a.** | Explain the various channel types in GSM, including Traffic Channels (TCH), Control Channels (CCH), and Broadcast Channels (BCH). Discuss their roles, functionality, and significance in ensuring efficient network operations. | **10 Marks** | **L3** | **CO3** |
| **b.** | Describe the concepts of tunneling and encapsulation in Mobile IP. Additionally, explain the registration process for Mobile IP, including the steps for both foreign-agent and co-located Care-of Address (COA). | **10 Marks** | **L3** | **CO4** |
| **Or** | | | | | |
| **18.** | **a.** | Using your knowledge of GSM services, explain the key services provided by GSM. Additionally, assess the benefits and limitations of GSM data services . | **10 Marks** | **L3** | **CO3** |
| **b.** | Discuss the key challenges in routing within Mobile Ad-Hoc Networks (MANETs) and explain how various routing protocols are designed to overcome these challenges. | **10 Marks** | **L3** | **CO4** |

**\*\*\*\*\* BEST WISHES \*\*\*\*\***