

Total number of printed pages:2

Programme(D)/V-Semester/DECE-502

2024

**Mobile and Wireless Communication**

Full Marks : 100

Time : Three hours

*The figures in the margin indicate full marks for the questions.*

*Answer any five questions.*

Central Institute Of Technology  
Kokrajhar :: Bodoland

1.	(a) Discuss the concept of frequency reuse in cellular network. Compare FDMA, TDMA, and CDMA techniques, highlighting their advantages and applications. (b) Explain the Kepler's law. (c) Write a short note on geostationary satellite and graveyard orbit.	10+6+4
2.	a) With a neat block diagram, describe the components and working of a fibre optic communication system. Highlight the roles of the optical source, fibre medium, and optical detector. b) Explain the construction and types of optical fibers. Compare mono-mode and multi-mode fibers with respect to structure, performance, and applications. c) Define the bandwidth-distance product and transmission loss in optical fibres. If a fibre has a bandwidth-distance product of 400 MHz·km, calculate the maximum bandwidth available for a transmission distance of 20 km. d) Discuss the principle and applications of wavelength division multiplexing (WDM) in optical fibre networks.	6+6+4+4

3		<p>a) Explain the differences between symmetric-key and asymmetric-key cryptography. Discuss their respective advantages and limitations with examples.</p> <p>b) Using a simple numerical example, explain the RSA encryption and decryption process.</p> <p>c) Define the concepts of digital signature and message authentication. Discuss their importance in ensuring message integrity and entity authentication.</p>	6+6+8
4.		<p>a) What is a PN sequence? Explain its properties and role in spread spectrum communication. Illustrate with an example how a PN sequence is generated.</p> <p>b) Differentiate between direct sequence spread spectrum (DSSS) and frequency hop spread spectrum (FHSS). Discuss the concepts of slow frequency hopping and fast frequency hopping with examples.</p>	10+10
5.		<p>Explain the working principle of a facsimile (FAX) machine. Discuss how a Charged Coupled Device (CCD) is used in image processing during the fax transmission process.</p> <p>b) What is ISDN? Explain its concept, components, and advantages in communication systems.</p> <p>c) Compare the key features and advancements of 1G, 2G, 3G, 4G, and 5G technologies. Highlight their impact on wireless communication.</p> <p>d) Define the basic concepts of Wi-Fi and Wi-Max. Discuss their applications in wireless communication systems.</p>	5+5+5+5
6.		<p>Explain the components of the GSM architecture in detail. Your answer should cover the following aspects and allocate marks accordingly:</p> <p>(1) Base Station Subsystem (BSS)</p> <p>(2) Network Switching Subsystem (NSS)</p> <p>(3) Operations and Maintenance Center (OMC)</p> <p>(4) Mobile Station (MS)</p> <p>(5) Home Location Register (HLR)</p> <p>(6) Visitor Location Register (VLR)</p>	5+5+3+3+2+2