Ref. No.: Ex/ET/PC/H/T/322/2022

B.E. ELECTRONICS AND TELECOMMUNICATION ENGINEERING

THIRD YEAR SECOND SEMESTER EXAM 2022

DIGITAL SWITCHING AND COMPUTER NETWORKS (HONS.)

Time: 3 hours **Full Marks: 100**

Answer any five questions. **All questions carry equal marks:**

1.	(a) Illustrate human speech strength at various frequencies with the help of a speech spectrum when the electrical oscillations of the voice is so designed to be transmitted over the telephone channel. (b) If input power is 16 μW and output power is 30 mW, find the power ratio and express it in decibel and nepers. (c) With reference to the Grade of Service (GOS) in traffic engineering assess the importance of the concept of the blocking criteria, delay criteria, and congestion in the determination of the same.	7 + 5 + 8
2.	(a) With a sketch substantiate the Distributed and the Centralized model of a switching system. (b) Present a touch tone dialing system and compute the frequencies selected to interpret the tone represented when the digit '7' is selected. (c) What is the maximum feasible rate with an inter-digit pause of 40ms? (d) What are the various sources of impulse noise that may corrupt the transmission in a telephone network?	7 + 7 + 2 + 4
3.	(a) With a simple representation of a two-wire and four-wire transmission arrangement, calculate the total gain and trans-hybrid loss from one side of a four-wire circuit and present a block diagram to explain the echo path for the same. How can one compute the balance-return loss and delay for the same. (b) If the minimum current required for carbon microphone is 23 mA, battery voltage is 50 V, the battery resistance is 400 ohm and the telephone set resistance is 200 ohms, calculate the loop resistance limit.	16 + 4
4.	(a) Based on the functions and requirements, analyze the fundamental classification of a Switching System. (b) For a Synchronous duplex mode calculate the unavailability of the dual processor systems. (c) Given that MTBF = 2000 hrs and MTTR = 4 hrs. Calculate the unavailability for single and dual processor systems for 10 years and 30 years. (d) A three stage switching structure is to accommodate N = 128 input and 128 output terminals. For 16 first stage and 16 last stage, determine the number of cross points for non-blocking.	6 + 5 + 4 + 5
5.	(a) Critically study the salient features and differentiate between circuit switching, message switching and packet switching. (b) Compare between: (i) In-channel signalling and Common channel signalling (ii) Bus, Star and Ring topologies	12 + 4 + 4

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6.	(a) Enlist the common three components of a browser. What is a URL and what are its components? How is HTTP related to WWW? Why do we need POP3 or IMAP4 for electronic mail? (b) With reference to the Geographic span, fault tolerant capabilities, Congestion, Propagation delay and Transmission speed compare in brief LAN, MAN and WAN architectures.	(3 + 2 + 2 + 3) + 10
7.	With reference to the protocols associated, explain the different layers of the OSI model. Compare the layers with reference to the evolution from the TCP/IP Suite.	20
8.	(a) Explain the different types of links in Signalling Link architecture and present a scheme to map the protocol architecture (SS7) with that of the OSI model. (b) What is the difference between a port address, logical address and physical address? Why the standard of an OSI model is termed as 802.xx?	12 + 8