

**III B.Tech II Semester Supplementary Examinations,
November/December 2005
TELECOMMUNICATION SWITCHING SYSTEMS & NETWORKS
(Electronics & Telematics)**

Time: 3 hours

Max Marks: 80

**Answer any FIVE Questions
All Questions carry equal marks**

1. A 1000-line exchange is partly folded and partly nonfolded. Forty percent of the subscribers are active during peak hour. If the ratio of local to external traffic is 4:1, estimate the number of trunk lines required. [16]
2. What are the different configurations of combinational switches? Explain the working of 2- stage TS switch. [16]
3. (a) Define Traffic Intensity? Distinguish between erlang (E), centum call second (CCS) , call minutes (CM).
(b) A subscriber makes three phone calls of three minutes, four minutes and six Minutes in a one-hour period. Calculate the subscriber traffic in erlang, CCS and CM. [8+8]
4. (a) What is an echo in Telecommunications? Write in detail about echo canceller and its operation
(b) In a national transmission system the characteristic impedances of the 4-wire circuit and the 2-wire circuit are 1000Ω and 1200Ω respectively. The average phase velocity of the signal in the circuit is $3 \times 10^7 \text{m/s}$. If the largest distance of a connection is 300Km, determine the attenuation to be inserted in the circuit? [10+6]
5. Write about Data Link Layer in data networks. Explain about ARQ protocols? [16]
6. Write in detail about Satellite Based Data Networks? [16]
7. (a) Distinguish between Electronic Mail and Telex services in ISDN?
(b) Explain the functions of a facsimile system with a neat diagram in ISDN? [8+8]
8. Write in detail about voice – data integration in ISDN? [16]

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1. (a) Mention the typical centralized stored program control organization and mention various levels of controls
(b) Given that MTBF = 2000 hours and MTTR = 4 hours calculate the unavailability for single dual processor. [10+6]
2. What are the different configurations of combinational switches? Explain the working of 2- stage TS switch. [16]
3. (a) Define the following terms Busy hour call attempts(BHCA), Time Consistent busy Hour, Call completion rate (CCR), Traffic intensity.
(b) An exchange serves 2000 subscribers. If the average BHCA is 10,000 and CCR is 60% , calculate the busy hour calling rate, average busy hour calls. [8+8]
4. (a) Write about Coaxial Cable Communication? Describe the steps involved in the design of coaxial system in Telecommunications?
(b) What is the necessity for Equalization? Explain about coaxial cable amplitude equalizers in Telecommunications? [8+8]
5. (a) Explain about Message Switching and Packet Switching in data transmission?
(b) Explain about Data Communication Architecture? [8+8]
6. (a) Discuss the advantages and disadvantages of LANs?
(b) Discuss internetworking in Data Networks? [6+10]
7. (a) Explain about the motivation for ISDN?
(b) What are bearer service functions? Explain about the layers that support bearer service functions in ISDN? [6+10]
8. (a) Write in detail about the Physical Symbol System modeling technique to construct intelligent system in ISDN?
(b) Explain in detail about Knowledge representation techniques in ISDN? [8+8]

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1. (a) Mention the typical centralized stored program control organization and mention various levels of controls
(b) Given that MTBF = 2000 hours and MTTR = 4 hours calculate the unavailability for single dual processor. [10+6]
2. Describe briefly the following
 - (a) Sequential write/ random read
 - (b) Random write/ sequential read
 - (c) Random input/ random output [5+5+6]
3. (a) Define the following terms Busy hour call attempts(BHCA), Time Consistent busy Hour, Call completion rate (CCR), Traffic intensity.
(b) An exchange serves 2000 subscribers. If the average BHCA is 10,000 and CCR is 60% , calculate the busy hour calling rate, average busy hour calls. [8+8]
4. (a) Write about the architecture of SS7. Describe about the three types of signaling units defined in SS7 in Telecommunications?
(b) Discuss about Cellular Mobile Telephony? [8+8]
5. (a) Explain about Message Switching and Packet Switching in data transmission?
(b) Explain about Data Communication Architecture? [8+8]
6. What is meant by Protocol Stacks? Explain the protocol stacks used in Data Networks? [16]
7. (a) Explain about the typical configuration of an electronic mail system and X.400 in the context of OSI model in ISDN?
(b) Explain the two compression techniques in facsimile transmission standardized by CCITT in ISDN? [8+8]
8. (a) Explain about ISDN– Bearer services?
(b) Write about coexistence of ISDN with other networks? [10+6]

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1. (a) Distinguish between local battery and central battery exchanges?
(b) A central battery exchange is powered with 48V battery. The carbon microphone requires a minimum of 24 mA as energizing current. The battery has a 400Ω resistance in series for short circuit protection. The d.c resistance of microphone is 50Ω . If the cable used for subscriber lines offers of $50\Omega/\text{Km}$, determine the maximum distance at which a subscriber station can be located. [8+8]
2. Give the basic time division time switching principle with the help of neat sketch. Distinguish between phased operation and slotted operation. [16]
3. A traffic load of 2 erlangs is offered to a full availability group of five trunks. (Full availability implies there is no restriction on the way in which calls are allocated particular trunks). The average call holding time is three minutes.
(a) What is the probability that no calls arrive during five-minute period?
(b) Determine the value of call congestion
(c) Consider the case when the trunk numbered 1,2,3,4,5 and a call is allocated to the lowest numbered free trunk always. How much traffic does the first trunk carry? How much traffic does the last trunk carry? [6+5+5]
4. Explain in detail about Cellular Mobile Telephony? [16]
5. What is modulation? What is a modem? Discuss in detail about modems and modulation techniques used for data transmission in PSTNS? [16]
6. (a) Explain about Token Passing Fiber Optic Networks in data networks?
(b) Explain about Token Passing Ring LAN? [8+8]
7. (a) What are the principles on which ISDN is based?
(b) Write about the services provided by ISDN? [8+8]
8. (a) What are the important objectives of interworking functions to ensure inter-operatibility between ISDN and other networks?
(b) Explain in detail about the two methods for interworking between the ISDN numbering plan and other networks? [6+10]
