Code No: R05320401 **Set No. 1**

III B.Tech II Semester Regular Examinations, Apr/May 2008
TELECOMMUNICATION SWITCHING SYSTEMS AND NETWORKS
(Common to Electronics & Communication Engineering and Electronics & Telematics)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Why is it necessary to keep the magnetic diaphragm in an earphone displaced from its unstressed position? How is this achieved?
   (b) What happens if the ratio ϕ/ϕ_0 is not very small in case of an earphone?
   (c) Estimate the bandwidth requirements of a single satellite that is to support 20 million telephone conversations simultaneously. [8+4+4]

2. (a) Explain the operation of input controlled and output controlled time division space switch with the help neat sketches?
   (b) A PABX is designed using an output-controlled digital time division space switch for supporting 128 subscribers. The transmission between the subscribers and the exchange is analog. On an average, 25 % of the subscribers are active simultaneously, compare the cost of output- controlled and memory-controlled configurations. [8+8]

3. (a) A subscriber loop of 18km is to be supported from an exchange that uses a 40 V battery with a 400 Ω short-circuit protection resistance. Electronic telephones are used as the subscriber instruments. Determine the wire gauge that needs to be used.
   (b) Explain in detail about telecommunication network topologies? [8+8]

4. (a) Define grade of service? Give expression for grade of service and explain why it is called as call congestion.
   (b) The traffic statistics of a company using a PABX indicates that 180 out-going calls are initiated every hour during working hours. Equal number of calls comes in. Each call lasts for 200 seconds on the average . If the GOS required is 0.05, determine the number of lines required between the PABX and the main exchange. [8+8]

5. (a) Describe data communication circuit configurations.
   (b) What are the components of Data Communication network ? Explain. [8+8]

6. (a) Define open system interconnection. Name and explain functions of each of the Layers of the OSI model.
   (b) Describe the operation of star, bus ring and hybrid Network topologies [8+8]

7. (a) What are the data link protocols used by ISDN ? Explain.

(b) Describe the four categories of messages in the ISDN network layer [8+8]

8. (a) Explain the format of STS 1 frame in details.
   (b) What are the functions of STS- Multiplexes and add / drop multiplexers.
   (c) Explain device layer relationship in SONET [6+6+4]

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Code No: R05320401 **Set No. 2**

III B.Tech II Semester Regular Examinations, Apr/May 2008
TELECOMMUNICATION SWITCHING SYSTEMS AND NETWORKS
(Common to Electronics & Communication Engineering and Electronics & Telematics)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Compare the features of single stage and multistage switching network configurations?
   (b) A fully connected network supports full duplex communication using unidirectional links. Show that the total number of links in such a network with n nodes, is given by $2\times{}^{n}C_{2}$. [8+8]
2. (a) Define each of the following terms: program, procedure, processor, process, user, task, job and subroutine.
   (b) Find the blocking probability of a three stage network for M=N=2048,p=q=16 and $\alpha = 0.1$ for S= 16, 24 and 32. [8+8]
3. (a) What are the major components of telecommunication network? Explain in detail about subscriber loop systems.
   (b) An exchange uses a -40 V battery to derive subscriber lines. A resistance of 250Ω is placed in series with the battery to protect it from short circuits. The subscribers are required to use a standard telephone set which offers a d.c. resistance of 50Ω. The microphone requires 23mA for proper functioning. Determine the farthest distance from the exchange at which a subscriber can be located if 26 AWG conductor is used. [8+8]
4. (a) What are the different types of busy hours defined by CCITT? Explain.
   (b) In a group of 10 servers, each is occupied for 30 minutes in an observation interval of two hours. Calculate the traffic carried by the group. [8+8]
5. (a) Explain the functions and features of data communication network components.
   (b) Discuss peer to peer client / server networks. [8+8]
6. (a) Compare and contrast standard Ethernet, Fast Ethernet and Gigabit Ethernet.
   (b) What is looping problem in transparent Bridges? How is it avoided using spanning tree algorithm [8+8]
7. (a) Compare HDLC and LAPD protocols.
   (b) Describe ISDN, functional architecture and standards of ISDN Channels. [6+10]
8. (a) Explain the operation of cable modem

(b) Discuss features of HFC Networks. [8+8]

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Code No: R05320401 **Set No. 3**

III B.Tech II Semester Regular Examinations, Apr/May 2008
TELECOMMUNICATION SWITCHING SYSTEMS AND NETWORKS
(Common to Electronics & Communication Engineering and Electronics & Telematics)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain the principle and advantages of touch tone dialing scheme?
   (b) What is the importance of a steady current flowing through a carbon microphone? Is the harmonic distortion affected by a change in the energizing current? [8+8]
2. (a) Define each of the following terms: program, procedure, processor, process, user, task, job and subroutine.
   (b) Find the blocking probability of a three stage network for M=N=2048,p=q=16 and $\alpha = 0.1$ for S= 16, 24 and 32. [8+8]
3. (a) What are the functions performed by subscriber line interface? Explain.
   (b) A national network uses 4 wire and 2 wire circuits with impedances of 500 ohms and 750 ohms. The phase velocity of 3.2×10^7 m/S. The longest circuit length is 500km. Find the echo time and return loss. Is it necessary to employ an echo suppressor. [8+8]
4. (a) Explain outband signaling scheme with E and M control with the help of neat sketch.
   (b) 10,000 subscribers are connected to an exchange. If the exchange is designed to achieve a call completion rate of 0.8 when the busy hour calling rate is 4.8, What is the BHCA that can be supported by the exchange? What should be the call processing time for this exchange? [8+8]
5. (a) Explain the operation of Multipoint data communications circuit.
   (b) What is a protocol? Distinguish between connection less and connection oriented protocols [8+8]
6. (a) Explain in detail Mesh, Ring, Star and Bus network topologies in detail . What are its merits and demerits. [16]
7. (a) Describe functional groupings and reference points of ISDN.
   (b) Discuss numbering and addressing formats of ISDN. [10+6]
8. (a) How does ADSL divide the band width of a twisted pair cable ?
   (b) How does ADSL Modulate a Signal?.
   (c) What is FTTC and who uses it. [5+5+6]

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Code No: R05320401 **Set No. 4**

III B.Tech II Semester Regular Examinations, Apr/May 2008
TELECOMMUNICATION SWITCHING SYSTEMS AND NETWORKS
(Common to Electronics & Communication Engineering and Electronics & Telematics)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Why is it necessary to keep the magnetic diaphragm in an earphone displaced from its unstressed position? How is this achieved?
   (b) What happens if the ratio ϕ/ϕ_0 is not very small in case of an earphone?
   (c) Estimate the bandwidth requirements of a single satellite that is to support 20 million telephone conversations simultaneously. [8+4+4]
2. (a) What are the disadvantages of single stage networks and explain how they can be overcome by adopting a multi stage network?
   (b) Explain about complete SPC control software with block diagram. [8+8]
3. (a) What are the objectives of numbering plan? How are they classified?
   (b) How international and national telephone numbering plan is defined and Give telephone number structure? [8+8]
4. (a) Define blocking probability and explain why it is called as time congestion.
   (b) An exchange is designed to handle 2000 calls during the busy hour. One day, the number of calls during the busy hour is 2200. What is the resulting GOS? [8+8]
5. (a) What are the functions of LCU? explain.
   (b) With the help of a block diagram, explain the operation of UART Receiver. [6+10]
6. (a) Explain in detail Mesh, Ring, Star and Bus network topologies in detail . What are its merits and demerits. [16]
7. (a) Explain ISDN architecture with a neat block schematics.
   (b) What are the services of NISDN ? Explain ISDN channels and transmission rates. [8+8]
8. (a) Explain the format of STS 1 frame in details.
   (b) What are the functions of STS- Multiplexes and add / drop multiplexers.
   (c) Explain device layer relationship in SONET [6+6+4]

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