M.TECH/ECE/1st SEM/ECEN 5132/2017
TELECOMMUNICATION SYSTEMS & ENGINEERING
(ECEN 5132)

Time Allotted: 3 hrs **Full Marks: 70**

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and
Any 5 (five) from Group B to E, taking at least one from each group.

Candidates are required to give answer in their own words as far as practicable.

Group – A
(Multiple Choice Type Questions)

1. Choose the correct alternative for the following: **10 × 1=10**

(i) QoS is measured in terms of
(a) clarity of voice heard (b) percentage of lost calls
(c) ease of connectivity (d) all of these.

(ii) Grade of service signifies services offered by the
(a) trunk groups (b) network
(c) line repeaters (d) signaling system.

(iii) In a Voice Frequency 2 w repeater, an LBO is used at each port for
(a) Impedance matching (b) echo cancellation
(c) signal amplification (d) billing purpose.

(iv) A 4 wire voice frequency repeater consists of
(a) a Hybrid at the input (b) a Hybrid at the output
(c) no Hybrid (d) a Hybrid at both input and output.

(v) VSAT networks are
(a) transmitting stations (b) receive only terminals
(c) relay terminals (d) none of these.

(vi) In SONET, the basic transmission rate is
(a) 103.68 Mbps (b) 155.52 Mbps
(c) 552.67 Mbps (d) 51.84 Mbps.

(vii) E1 system has a framing sequence of
(a) 1100110 (b) 0101001
(c) 0011011 (d) none of these.

(viii) Basic building block for ISDN is
(a) 64 kbps (b) 128 kbps
(c) 4 kbps (d) 32 kbps.

(ix) European standard for PCM data transmission provides
(a) 38 channels (b) 42 Channels
(c) 24 channels (d) 32 channels.

(x) ATM cell consists of
(a) 50 octets (b) 54 octets
(c) 53 octets (d) 55 octets.

Group - B

2. (a) Explain 3 ways of handling lost calls in a telecom network.

(b) Distinguish between Traffic flow, Traffic density & Traffic Intensity.

(c) What is meant by Blockage in a telecom network? How do we measure grade of service from blockage parameter?

5 + 3 + 4 = 12

3. (a) What are the essential considerations in determining shape and size of a serving area? Why is hexagonal shape preferred over others as the chosen shape?

(b) Highlight the concepts of in band and out of band signalling.

(5 + 1) + 6 = 12

Group - C

4. (a) Explain, how a VSAT network is connected with a diagram. What are its specific advantages?

(b) Highlight the concept of ADSL technology and its operation in terms of digital data transmission in a telephone network.

(4 + 2) + 6 = 12

5. (a) Explain with a schematic diagram, the operation of a Time-space-time switch.

(b) Calculate the number of trunks that can be supported on a time multiplexed space switch, given that (i) 32 chls are multiplexed in each stream (ii) Control memory access time is 100 ns (iii) bus switching and transfer time is 100 ns per transfer.

7 + 5 = 12

Group - D

6. (a) What do you understand by Synchronous optical Networking? Explain how a SONET network is organized to transmit voice, data and video service.

   (b) What is cross talk in a telecom network? What are the types and significant reasons of crosstalk being present in a telecom network?

(2 + 4) + (3 + 3) = 12

7. (a) Why a regenerative repeater is needed in a digital transmission system? What are its main functions?

   (b) Explain, with the help of a diagram, how samples are switched between inlet and outlets in a combination switch.

   (c) In a group of 10 servers, each is occupied for 30 mts in an observation interval of 2 hrs. Calculate the traffic carried by the group.

(2 + 3) + 5 + 2 = 12

Group - E

8. (a) What is a blocking network? Prove that GoS = Blocking probability

   (b) During 20 minute, 40 subscribers initiate calls with a total duration of 4800 secs. Calculate load offered and average subscriber traffic.

(1 + 6) + 5 = 12

9. (a) What do you understand by distortion and echo and how does these affect conversation?

   (b) Explain the concept of diversity and hot standby.

6 + (3 + 3) = 12