

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 alternatives for the following: 10 x 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) Blockage of calls is represented by
- (a) busy hour performance (b) off peak hour performance
(c) lost calls during period of observation (d) all of these.
- (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) In frequency diversity systems, transmitters use frequency separation of
- (a) 2% to 5% (b) well above 10%
(c) 15% to 20% (d) well above 20%.
- (v) Last mile connectivity refers to the connectivity between
- (a) all the nodes (b) exchange and subscriber
(c) various repeaters (d) none of these.
- (vi) Regenerative repeaters are employed with
- (a) digital transmission line (b) all types of transmission lines
(c) satcom system (d) diversity network.
- (vii) E1 system has a framing sequence of
- (a) 1100110 (b) 0101001
(c) 0011011 (d) none of these.
- (viii) In a Local area Network, HSP represents
- (a) hierarchial signalling point (b) heavy speed ports
(c) high speed printer (d) none of these.

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- (ix) North American Standard for BRI in ISDN is
(a) 160 Kbps (b) 192 Kbps (c) 200 kbps (d) 220 Kbps.
- (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 essentials of one way and both ways circuits in connecting exchanges?
(b) With the assumptions of LCC model, prove that Grade of Service = Blocking probability.

5 + 7 = 12

Group - C

- 4.(a) What are the specific advantages of a radio link compared to a wired link? What is the exact definition of a link?
(b) Explain, in brief, the concept of signalling in an Analog telephone network.
(c) In the case of In-band signalling, what are the various categories in which this can be organized? Explain.

(5+1) + 3 + 3 = 12

- 5.(a) With the help of schematic diagrams, explain the various LAN topologies along with a tree network.
(b) Mention four IEEE 802 series standards which govern various access methods and network architecture.

8 + 4 = 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.

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(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) With a neat diagram, explain how a Time-Space-Time switch is organised and elaborate its operation.

(b) Calculate the number of trunks that can be supported on a time multiplexed space switch. Given that : 32 channels are multiplexed in each stream; control memory access time 100 nS; bus switch and transfer time = 100 nS/transfer.

(c) What do you understand by digital loss?

(3+4) + 3 + 2 = 12

Group - E

8.(a) What are the various channels and standard bit rates in an ISDN network? Draw and explain the ISDN reference model.

(b) Mention 5 conceptual principles on which ISDN is based.

(3+4) + 5 = 12

9.(a) What are the main differences between ISDN & BISDN? In a BISDN protocol reference model, explain the functions of user plane & control plane.

(b) Write short notes on i) ATM adaptation layer (AAL) ii) disadvantages of broadband network.

(3+3) + (3+3) = 12