

TELECOMMUNICATION SYSTEMS
(ECEN 3234)

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) DTMF stands for
(a) Dial Tone Multi Frequency (b) Dial Tone Maximum Frequency
(c) Dual Tone Multi Frequency (d) Dual Time Multy Frequency
- (ii) The inter digit time is
(a) 400 ms (b) 500 ms (c) 200 ms (d) 300 ms.
- (iii) A fully connected network has 6 nodes. So numbers of physical link required
(a) 24 (b) 15 (c) 16 (d) 36.
- (iv) STD stands for
(a) State Trunk Dialling (b) Subscriber Trunk Destination
(c) Subscriber Terminal Dialling (d) Subscriber Trunk Dialling.
- (v) 1 Erlang means the telecommunication circuit line is occupied for
(a) 1 hour (b) 1 second (c) 1 minute (d) 1/60 second.
- (vi) MTTR stands for
(a) Mean time to repair (b) Minimum time to repair
(c) Maximum time to repair (d) More time to repair.
- (vii) MUM stands for
(a) Maximum unit message (b) Maximum under message
(c) Multi unit message (d) Multi unit member.
- (viii) In a pulse dialing the ratio of making and breaking time is
(a) 1:3 (b) 1:2 (c) 1:4 (d) 2:3.
- (ix) What is the full form of POTS?
(a) Plain old telephone system (b) Public Old telephone system
(c) Public Ordinary telephone system (d) None of these.

- (x) In 100 line exchange subscriber number must be
(a) 100 digit (b) 2 digit (c) 10 digit (d) 3 digit.

Group- B

2. (a) Explain the inter digit time in pulse dialling system? What is side tone? Explain with the diagram of telephone receiver in connection of side tone. [[CO1](Understand/LOCQ)]
(b) Compare the major advantages for the subscriber in using Touch – tone keypad over dial pulsing telephone set? [[CO1](Understand/LOCQ)]
(c) Explain with the diagram of telephone receiver in connection of side tone. [[CO1](Understand/LOCQ)]
3 + 5 + 4 = 12
3. (a) An exchange uses 48 V battery, a resistance of 300 ohm is placed in series with the battery. If the telephone set resistance is 50 ohm, Evaluate the loop resistance limit for the minimum current requirement of 23 mA for carbon microphone. [[CO2](Evaluate/HOCQ)]
(b) Explain briefly the basic concepts of packet and circuit switching. [[CO3](Understand/LOCQ)]
6 + 6 = 12

Group – C

4. (a) A dual processor system configured with three modes – outline each mode briefly. [[CO2](analyze/IOCQ)]
(b) In a Telecommunication system it is observed that MTBF = 1000 hours and MTTR = 8 hours, calculate the unavailability for single and dual processor systems. [[CO2](Evaluate/HOCQ)]
(c) Outline with necessary diagram the time division space switch. [[CO2](analyze/IOCQ)]
5 + 3 + 4 = 12
5. (a) Explain the basic principle and operation of cross bar switching system with necessary diagrams. [[CO2](Understand/LOCQ)]
(b) Explain with necessary diagram the American and European PCM carrier channel. [[CO3](Understand/LOCQ)]
6 + 6 = 12

Group – D

6. (a) Outline the difference between normal Telephone exchange and Tandem exchange? [[CO2](analyze/IOCQ)]
(b) Explain with necessary diagram the Telecommunication Hierarchical structure for routing the signal. [[CO2](Understand/LOCQ)]
6 + 6 = 12

7. (a) Which type of signalling system is supported by Signalling System 7 (SS7)? Justify your answer with necessary diagram. [(CO3)(analyze/IOCQ)]
(b) Explain the differences between step index fibres and graded index fibres? Illustrate the fundamental difference between light source LEDs and ILDs? [(CO3)(Understand/LOCQ)]
6 + (2 + 4) = 12

Group – E

8. (a) Outline the features and Service of ADSL in a telecommunication system. [(CO5)(analyze/IOCQ)]
(b) A Traffic of 20 Erlang is offered to a group of trunks. It was observed that 5 calls were lost during busy hour and all the trunks remained busy for 20 sec. Evaluate the GOS, traffic carried and average holding time. [(CO6)(Evaluate/HOCQ)]
4 + 8 = 12
9. (a) Critically draw your views on Erlang-B congestion in a telecommunication system. [(CO6)(Create/HOCQ)]
(b) Write the three fundamental channels used in ISDN. Mention the functions of D Channel. [(CO4)(Remember/LOCQ)]
6 + (4 + 2) = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	29.16	31.25	39.58

Course Outcome (CO):

1. Apply the previous knowledge of analog communication to appreciate the contents of this paper.
2. Understand basics of Telecommunications and its entities along with the evolution of different types of exchanges.
3. Identify concepts of Telecommunication like signalling techniques, setting up links etc effectively.
4. Describe working principles and practical applications of FAX, EPABX, ISDN etc effectively.
5. List salient features of EWSD, NGN, ADSL etc.
6. Evaluate performance of a telecom network using the concepts of Traffic Engineering and case studies based on the observation.

*LOCQ: Lower Order Cognitive Question; IOCQ: Intermediate Order Cognitive Question; HOCQ: Higher Order Cognitive Question

