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) STD stands for
          (a) State Trunk Dialling   (b) Subscriber Trunk Destination
          (c) Subscriber Terminal Dialling   (d) Subscriber Trunk Dialling.

    (iii) Switching capacity of a 6 × 6 crossbar system is
           (a) 6   (b) 3   (c) 12   (d) 36.

    (iv) SPC stands for
          (a) Standard Protocol Control   (b) Signaling Protocol Control
          (c) Stored Program Control   (d) none of these.

    (v) When the control subsystem is outside the switching network, then it
         is called
         (a) direct control   (b) stored program control
         (c) common control   (d) distributed control.

    (vi) 1 Erlang means the telecommunication circuit line is occupied for
          (a) 1 hour   (b) 1 second
          (c) 1 minute   (d) 1/60 second.

    (vii) If PCM binary samples are switched, its known as
           (a) time division switching   (b) analog time division switching
           (c) digital time division switching   (d) none of these.

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

(ix) MTTR stands for
(a) Mean Time to Repair   (b) Minimum Time to Repair
(c) Maximum Time to Repair   (d) More Time to Repair.

(x) ISDN stands for
(a) Integrated Services Dual Network
(b) Integrated Services Digital Network
(c) International Services Dual Network
(d) International Services Digital Network.

Group – B

2. (a) What is the inter digit time in pulse dialling system? What are the major advantages for the subscriber in using Touch – tone keypad over dial pulsing telephone set? What is side tone? Explain with the diagram of telephone receiver in connection of side tone.

(b) 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, calculate the loop resistance limit for the minimum current requirement of 23 mA for carbon microphone.

(2 + 3 + 1 + 3) + 3 = 12

3. (a) Explain the salient features of circuit switching & packet switching systems.

(b) With a diagram, explain the principle of operation of a Time multiplexed time switch.

5 + 7 = 12

Group – C

4. (a) Compare merits and demerits of fibre optics cable and copper/coaxial cable.

(b) Explain, with a diagram, the operation of a 2M selector switch.

6 + 6 = 12

5. (a) Write the difference between Common Channel and In-Channel signalling.

(b) A dual processor system is configured with three modes – discuss each mode briefly.
Given that MTBF = 1000 hours and MTTR = 8 hours, calculate the unavailability for single and dual processor systems.

5 + (4 + 3) = 12

Group – D

6. (a) What is the difference between normal Telephone exchange and Tandem exchange? Explain with necessary diagram the Telecommunication Hierarchical structure for routing the signal.

(b) What is time slot interchange (TSI)? Describe about the 30 channel PCM system.

(2 + 3) + (2 + 5) = 12

7. (a) What are the drawbacks of ISDN? How does BISDN overcome these?

(b) What is EPABX? Explain its features and functions.

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

Group – E

8. (a) What is a blocking network? Prove that GoS = PB (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. Write short note on any three.

   (i) VoIP
   (ii) Cordless Telephone
   (iii) Digital PABX system
   (iv) Time division space switch
   (v) ADSL.

(4 × 3) = 12