MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL

Paper Code : EC-603

TELECOMMUNICATION SYSTEM

Time Allotted : 3 Hours | *Full Marks* : 70

The figures in the margin indicate full marks.

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

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : $10 \times 1 = 10$

   i) Attenuation can be reduced in subscriber loop using

      a) higher diameter in copper wire

      b) series of inductance in line

      c) lower diameter in copper wire

      d) series of a capacitance in line.

   ii) Switching capacity in table of a 6 cross × 6 cross-bar switching system is

      a) 6 b) 3

      c) 12 d) 36.

   iii) Blocking probability is

      a) time congestion b) call congestion

      c) both (a) and (b) d) none of these.

   iv) When the control subsystem is outside the switching network, then the system is called

      a) direct control

      b) common control

      c) stored program control

      d) none of these.

   v) Circuit switching takes place at the layer of

      a) data line b) physical

      c) network d) transport.

vi) In a pulse dialing, the inter-digit gap may be

a) 1 sec b) 10 sec

c) 200 m sec d) 100 m sec.

vii) If PCM binary samples are switched, switching is known as

a) analog time division switching

b) digital time division switching

c) time division switching

d) none of these.

viii) High bandwidth for short duration is needed for

a) data traffic b) voice traffic

c) both (a) and (b) d) neither (a) nor (b).

ix) Bandwidth of digital transmission media is expressed in

a) Hz b) bits per second

c) decibel d) erlang.

x) Which traffic is not at all fault tolerant ?

a) Data traffic b) Voice traffic

c) Both (a) and (b) d) none of these.

xi) Unit of traffic intensity is

a) ampere b) ohm

c) mho d) erlang.

xii) A telephone set requires bias current of

a) 1Ð 2 mA b) 4Ð 6 mA

c) 20Ð 30 mA d) 50Ð 100 mA.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. Explain the difference between circuit switching and packet switching technologies.

3. Derive Erlang *B* formula.

4. Describe merits and demerits of fibre optic cables *vs* copper and co-axial cables for telecommunication transmission media.

5. Describe strowger switching system.

6. Describe facsimile transmission and its technical details.

7. Discuss about different switching networks. What is transit exchange ? What are the advantages of automatic switching system over manual switching system. 2 + 1 + 2

GROUP – C
(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

8. a) Calculate the unavailability of single and dual processor systems in stored program control systems.

   b) In SPC system MTBF = 4000 Hr and MTTR = 4 Hr. Calculate the unavailability for single and dual processor systems for 30 years.

   c) Why does active processor upgrade the secondary memory after certain time period in standing mode of SPC system. 8 + 4 + 3

9. a) Explain subscriber loop systems with a neat diagram.

   b) Define the following :

      i) Cost capacity index

      ii) Equipment utilization factor

      iii) Traffic handling capacity

      iv) Switching capacity.

   c) What is stored program control ? 4 + (4 × 2) + 3

10. Define blocking probability (P_b) and grade of service (GOS). Show P_b = GOS in numeric values. Define

    a) Busy hour

    b) Peak busy hour

    c) Time consistent busy hour. 2 + 2 + 5 + 6

11. What is SS7 signaling system ? Draw its protocol stack and explain each layer. Distinguish between in-channel and common channel signaling with proper diagram. 4 + 8 + 3

12. a) Write down different channels in ISDN.

    b) Write in brief about user network interface in ISDN.

    c) What is B-ISDN ? 6 + 6 + 3

13. Make a comparative study between circuit, message and packet switching. State the working principle of DTMF. What is NOSFER ? 6 + 5 + 4

14. State the working principle of carbon microphone for simplex mode of communication. Design a 4 × 4 crossbar switching system with minimum number of cross points. 7 + 8

15. Write short notes on any *three* of the following : 3 × 5 = 15

a) Reed relay crosspoint switch

b) FAX

c) DSL

d) 5ESS

e) Modems

f) BORSCHT.