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 × 1 = 10

i) A fully connected network has five nodes. So physical link required is

a) 20   b) 10

c) 5   d) 15.

ii) A switching network with unequal number of inlets and outlets is called

a) Symmetric Network

b) Asymmetric Network

c) Folded Network

d) None of these.

iii) In pulse dialing, the interdigit gap may be

a) 1 s   b) 10 s

c) 100 ms   d) 200 ms.

iv) In DTMF tone, the frequency used is

a) 697 Hz/1209 Hz

b) 920 Hz/1478 H

c) 220 Hz/540 Hz

d) 50 Hz/120 Hz.

v) ISDN *B*-channel carries data and services at

a) 16 kbps   b) 32 kbps

c) 64 kbps   d) 1·544 kbps.

vi) The standard value of GOS in India is

a) 0·2   b) 0·002

c) 0·02   d) 0·0002.

vii) The ratio of the number of successful calls to the total number of calls attempt is known as

a) busy hour call attempt

b) call completion rate

c) busy hour calling rate

d) traffic load.

viii) Which of the following is correct ?

a) 1E = 60 CCS

b) 1E = 36 CCS

c) 1E = 3600 CCS

d) 1E = 360 CCS.

ix) Network termination interface between customer premises and ISDN network is called

a) NT1   b) NT2

c) TE1   d) TE2

x) In a Strowger system, a high value of CCI indicates

a) good design

b) poor design

c) EUF data need to be checked

d) no impact on design.

xi) MTTR means

a) Mean Time to Repair

b) Maximum Time to Repair

c) Minimum Time to Repair

d) Mean Time to Represent.

xii) Blocking probability is

a) call congestion   b) time congestion

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

GROUP – B
(Short Answer Type Questions)
Answer any *three* of the following.   3 × 5 = 15

2. a) What do you mean by point to point communication ? Mention the disadvantage of the scheme.

   b) What is BORSCHT function ?   (2 + 1) + 2

3. Classify switching system. What are the advantages of automatic switching system over manual switching system ? What is TASI ?   2 + 2 + 1

4. Write down the differences between in channel and common channel signalling.

5. a) Define Grade of Service and Blocking Probability.

   b) Over 20 min. interval, 40 subscribers initiate calls. Total duration of the calls is 4800 secs. Calculate the load offered to the network by the subscribers and average subscriber traffic.   2 + 3

6. a) Define the following terms :

   i) Cost Capacity Index

   ii) EUF

   iii) Traffic handling capacity.

   b) Why are MODEMs used in communication ?   3 + 2

GROUP – C
(Long Answer Type Questions)
Answer any *three* of the following. $3 \times 15 = 45$

7. a) Explain the design consideration of DTMF dialing.

    b) Explain subscriber loop systems.

    c) An exchange uses 40 V battery to drive subscriber lines. A resistance of 250 Ω is placed in series with the battery to protect it from short circuit. The subscribers use a standard phone which offers a DC resistance of 50 Ω, Microphone requires 23 mA for proper functioning. Determine the furthest distance at which the subscriber can be placed if 26AWG conductor is used.

    [Different characteristics of 26 AWG wire are given below :

    Diameter = 0·41 mm

    R_{dc} = 133·9 Ω/km

    Loss = 1·61 dB/km]   4 + 4 + 7

8. a) Explain the working principle of Rotary Dial System with proper diagram.

    b) In a national transmission system the characteristic impedances of the 4-wire circuit and the 2-wire circuit are 1000 ohm and 1200 ohm, respectively. The average phase velocity of the signal in the circuit is 3×10^7 m/s. If the largest distance of a connection is 300 km, determine the attenuation to be inserted in the circuit.   10 + 5

9. a) Mention the differences between time switch and space switch.

    b) Describe time division time switching and calculate the switching capacity of the system.   5 + 10

10. a) Explain centralized SPC and mention its different modes of operation.

    b) In the load sharing configuration of centralized SPC, MTBF = 2000 hrs. and MTTR = 4 hrs. Calculate the unavailability for single and dual processor systems.

    c) Mention functional blocks and reference points used in ISDN.   5 + 5 + 5

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

   a) 2-wire to 4-wire hybrid transformer

   b) Signaling Tones in Telecommunication System

   c) Data Terminal Equipment

   d) Hybrid Switching System

   e) Voice over IP.