WEST BENGAL UNIVERSITY OF TECHNOLOGY

EC-603

TELECOMMUNICATION SYSTEMS

Time Allotted: 3 Hours | Full Marks: 70

The questions are of equal value.
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. Answer any *ten* questions. 10×1 = 10

(i) Blocking probability is

(A) time congestion (B) call congestion
(C) both (A) and (B) (D) none of these

(ii) ISDN means

(A) Integrated Service Digital Network
(B) International System Digital Network
(C) Indian Supply Direct Network
(D) None of these

(iii) When the control sub-system is outside the switching network, then the system is called,

(A) direct control (B) common control
(C) stored program control (D) none of these

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

(A) 20 (B) 10
(C) 5 (D) 15

(v) Crossbar switching system is

(A) electromechanical (B) electronic
(C) analog (D) digital switching system

(vi) Transmission line may be considered as an electrical circuit with

(A) lumped parameters (B) distributed parameters
(C) hybrid parameters (D) none of these

(vii) Traditional telephone lines can carry frequencies between

(A) 400 and 3400 Hz (B) 300 and 3600 HZ
(C) 300 and 3400 Hz (D) 300 and 3800 Hz

(viii) ISDN B-channel carries data and services at

(A) 16 kbps (B) 32 kbps
(C) 64 kbps (D) 1.544 kbps

(ix) Switching capacity of a 6*6 cross-bar switching system is

(A) 6 (B) 3
(C) 12 (D) 36

(x) What do you mean by death in a B-D process?

(A) call termination (B) call blocked
(C) call initiation (D) none of these

(xi) The unit of traffic intensity is

(A) Ampere (B) Ohm
(C) Erlang (D) Meter

(xii) In 100 line exchange subscriber number must be

(A) 100 digit (B) 2 digit
(C) 10 digit (D) 3 digit

GROUP B
(Short Answer Type Questions)

Answer any *three* questions. 3×5 = 15

2. (a) Draw the configuration of Step by Step Switching System. 3+2
   (b) Define side-tone. How it is minimized?

3. (a) What are the disadvantages of signaling? 3+2
   (b) What is non-associate CCS Signaling?

4. (a) An exchange uses 48V battery, a resistance of 500Ω is placed in series with the battery. If the telephone set resistance is 100Ω, calculate the loop resistance limit for the minimum current requirement of 30mA for a carbon microphone and find out the dc loop resistance of that loop line of 20Km. 3
   (b) Over a 20-minute observation interval, 40 subscribers initiate calls. Total duration of the calls is 4800 seconds. Calculate the load offered to the network by the subscribers and the average subscriber traffic. 2

5. (a) Define (i) Busy Hour (ii) CCR (iii) BHCA 3+2
   (b) In a group of 10 servers each is occupied for 30 minutes in an observation interval of two hours. Calculate the traffic arrived by the group.

6. (a) Write in brief TSI. 3+2
   (b) Compare Time Division Space Switching and Space Division Switching.

GROUP C
(Long Answer Type Questions)

Answer any *three* questions. 3×15 = 45

7. (a) Show that GOS = PB where PB is blocking probability. 3+5+4+3
   (b) Define voice over IP. A telephone line has a bandwidth of 3000 Hz and SNR is 34 dB. Calculate the data rate of this line.
   (c) Describe how an uniselector rotary switch can be used as selector hunter.
   (d) An exchange serves 2000 subscribers. If the average BHCA is 10,000 and the CCR is 60%. Calculate the busy hour calling rate.

8. (a) Explain the operation of two motion selector. 4+6+5
   (b) Describe the operation of Time Division Time Switching.
   (c) What is SS7 signaling system? Explain its protocol.

9. (a) Explain the working principle of 6 by 6 crossbar switching system with neat diagram. 7+3+5
   (b) Explain the architecture of 5ESS system.
   (c) Explain the difference between circuit and packet switching.

10. (a) Describe the functional grouping and reference points of ISDN. 6+3+6
   (b) How many transmission channels are exists in ISDN? Explain these.
   (c) Design a 100 line exchange using 100 uniselectors and 24 two motion selectors. Calculate design parameters. (TC, CCI, EUF)

11. Write short notes on any *three* of the following: 3×5
   (a) Digital PABX
   (b) Wireless in local loop
   (c) Data Terminal Equipment(DTE)
   (d) RS232C
   (e) H323 Signaling.