(b) Write characteristics of microwave communication. In the path profile of a microwave link of 25 km, a hill of height 70 m with trees is encountered at a distance of 10 km from the transmitting end. Carrier frequency is 6 GHz. Determine the tower height required. Assume a correction factor of 0.9 for ray bending. (6)

(c) Write five important services that are supported by ISDN? Explain any two. (6)

6. (a) How are switching systems classified? In what way is stored program control superior to hard-wired control? (6)

(b) What is the significance of layered network architecture? Explain in detail with an example. (6)

(c) What are modems? Explain any two modulation techniques used by them. (6)

7. (a) Describe Datagrams and Virtual Circuits with suitable diagram and applications. (6)

(b) Write short note on ALOHA. (6)

(c) What is PSTN? Write its major components and explain the switching system used in PSTN. (6)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1203 **I**

Unique Paper Code : 2513010009

Name of the Paper : Telecommunication Switching System & Networks

Name of the Course : **B.Sc. (H) Electronics (DSE)**

Semester : V (Under NEP UGCF Mode)

Duration : 3 Hours Maximum Marks : 90

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. **All** questions carry equal marks.
3. There are **seven** questions in all, out of which you have to attempt any **five** questions.
4. Question No. **1** is compulsory.
5. Use of non-programmable scientific calculator is allowed.

1. (a) A fully connected network supports full duplex communication using unidirectional links. Show that the total number of links in such a network with n nodes is given by $2 \times {}^{n}C2$. (3)

   (b) What is Uniselector? (3)

   (c) Given that MTBF = 2000 hours and MTTR = 4 hours, calculate the unavailability for single and dual processor systems in hours for a 30-year period. (3)

   (d) Explain the Principle of operation of packet Switching with an example. (3)

   (e) What is difference between In-channel and common Channel signaling? (3)

   (f) What is the address format of ISDN? Explain with example. (3)

2. (a) What is need for step by step switching System? Explain with diagram. (6)

   (b) Draw block diagram of Simple telephone communication system and explain its working principle. (6)

   (c) What is a switch? Draw N x N three -stage switching system. Show that the optimum ratio of the number of modules to the number of inputs per module is 2 in case of three stage switching system. (6)

3. (a) Explain electronic space division switching with a neat sketch. (6)

   (b) Define Grade of Service (GOS). A group of 20 servers carry a traffic of 10 erlangs. If the average duration of a call is three minutes, calculate the number of calls put through by a single server and the group as a whole in a one-hour period. (6)

   (c) Distinguish between Lost call returned (LCR) and Lost call held (LCH) System. (6)

4. (a) What is EPABX? Explain its working principle. (6)

   (b) Compare LAN, MAN and WAN with suitable examples. (6)

   (c) What is CSMA? Differentiate between bus and ring topology with help of sketches. (6)

5. (a) Draw CCITT hierarchical structure and explain routing in it. (6)