IC-1633

M.Sc. (INFORMATICS) / III Semester 2016

Paper IT-33 – TELECOMMUNICATION NETWORKS AND TECHNOLOGY

TIME: 03 hours Max Marks: 75

(Write your Roll No. on the top immediately on receipt of this question paper)

Note: Attempt any five questions. Question No.1 is compulsory.

1. Each part carries 3 marks.

a. Describe the principle of Time Division Switching?

b. Differentiate between Integrated Digital Networks (IDN) and Integrated Services Digital Network (ISDN)?

c. What is meant by a fully-connected network? Derive the total number of links in a fully-connected network that supports full-duplex communication using unidirectional links?

d. Differentiate between 1G (First Generation) and 2G (Second generation) cellular networks?

e. Explain the principle of Crossbar switching?

2.

a. Discuss the ISDN Basic rate interface and Primary rate interface transmission frame structures? (5)

b. Compare 3G (Third generation) with 4G (Fourth Generation) cellular networks on lines of their network architecture, transmission technology, data rates and other important characteristics? (7)

c. What is the significance of side-tone in a telephonic conversation? (3)

3.

a. Define the following terms: (5)

i. MSISDN
ii. IMSI
iii. IMEI
iv. Cell (in Telecommunications)
v. SIM

b. Discuss in detail the Strowger switching components? (5)

c. Design and explain the working of an output controlled time division space switch? (5)

4.

a. Discuss in detail the proposed network architecture and characteristics for 5G (Fifth generation) cellular networks? (5)

b. Compare between: (3)
   i. Analog Data and Digital Data
   ii. Analog Signal and Digital Signal
   iii. Analog Transmission and Digital Transmission

c. List five events that may occur in a telephone system and the corresponding actions that may have to be taken by the common control system? (5)

d. Explain the terms: (2)
   i. Busy hour traffic
   ii. Erlang

5.

a. Design an optimized 21,000 line blocking switching exchange having a blocking probability of less than 0.7 and calculate the following parameters: (7)

   i. Total number of switching elements
   ii. Total cost of the switching system
   iii. Traffic handling capacity
   iv. Equipment utilization factor
   v. Cost capacity index

b. Design and explain the working for a three-stage switching network? (5)

c. Differentiate between electronic and electro-mechanical switching systems? (3)

6.

a. Discuss the ISDN protocol architecture. (6)

b. Explain in detail the principle of Time-Slot Interchange. Discuss the working of a TSI switch having N time-multiplexed input streams each carrying M subscribers for the following modes: (7)
   i. Serial-in/Parallel-out
   ii. Parallel-in/Parallel-out

c. Differentiate between folded and non-folded networks? (2)