IC1733

M.Sc. (INFORMATICS) / III Semester 2017

Paper IT-33 – TELECOMMUNICATION NETWORKS AND TECHNOLOGY

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

Time: 3 hrs. MM: 75

Attempt any 5 questions., Question No.1 is compulsory.

1. Each part carries **3 marks**.

a. Define the different types of Busy Hour?

b. Calculate the access time of the memory modules in parallel-in/serial-out time switch using 64 input and 64 output streams with each stream multiplexing 32 channels?

c. Explain talk-off phenomenon?

d. Explain the following terms:
   i. Full-Duplex Transmission
   ii. Half-Duplex Transmission
   iii. Simplex Transmission

e. Define the terms Grade of Service and Blocking Probability. Also explain them from the Network and Subscriber viewpoints?

2.

a. Compare the Centralized and Distributed mode of organizing Stored Program Control (SPC)? **(5)**

b. Differentiate between Electrical communication system and Optical communication system? **(3)**

c. Derive the Binomial formula for a Lost Calls Cleared system with finite subscribers? **(7)**

3.

a. What are the two main functions of a Telecommunication Network? Differentiate between Direct Control and Indirect Control Switching Systems and give an example for both. **(4)**

b. Design a 20,000 line blocking switching exchange and calculate the following parameters: **(8)**

a. Total number of switching elements
b. Total cost of the switching system
c. Traffic handling capacity
d. Equipment utilization factor
e. Cost capacity index
f. Number of stages

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c. A call processor in an exchange requires 120ms to service a complete call. What is the BHCA rating of the processor? If the exchange is capable of carrying 700 erlangs of traffic, what is the call completion rate? Assume an average call holding time of two minutes. **(3)**

4.

a. Define the following terms: **(5)**

i. Time statistical parameters
ii. Ensemble statistical parameters
iii. Markov process
iv. Stationary process
v. Ergodic process

b. Discuss the metering and ring-trip circuit applied for selector operations in Strowger exchanges. **(5)**

c. What are the basic elements of a Switching System? Also discuss upon the different types of signaling provided by a switching system? **(5)**

5.

d. What are basic approaches to the design of subscriber access in Strowger systems? Describe them? **(7)**

e. Explain giving an example the difference between Time Division Space Switching and Time Division Time Switching? **(5)**

f. With Poisson arrival of two calls per minute, what is the probability that more than three calls will arrive in two minutes? What is the time during which at least four calls will arrive with a probability of more than 95 percent? **(3)**

6.

a. List advantages of Multi-stage networks over Single-stage networks? **(3)**

b. Derive the dynamics of a system modeled as a Birth-Death process. Extend it for deducing the service time characterization model? **(8)**

c. Estimate the number of cross-points required to design an exchange that supports 1000 users on a non-blocking basis and 200 transit, outgoing or incoming calls simultaneously. **(4)**