

DipIETE – ET (Current Scheme)

Time: 3 Hours

JUNE 2015

Max. Marks: 100

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE: There are 9 Questions in all.

- Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.
- The answer sheet for the Q.1 will be collected by the invigilator after 45 minutes of the commencement of the examination.
- Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.
- Any required data not explicitly given, may be suitably assumed and stated.

Q.1 Choose the correct or the best alternative in the following: (2×10)

- a. The number of point to point links required in a fully connected network for 50 entities is _____
- (A) 50 (B) 100
(C) 2500 (D) 1225
- b. In step by step switching line finders are connected to the _____
- (A) Calling subscriber. (B) Called subscriber.
(C) Between exchanges. (D) All of these.
- c. In a DTMF phone, digits are represented by _____
- (A) Orthogonal frequencies. (B) Orthogonal Phases.
(C) Orthogonal codes. (D) Orthogonal pulses.
- d. On an average, during busy hour, a company makes 120 outgoing calls of average duration 2 minutes. The outgoing traffic is _____
- (A) 4E (B) 0.25 E
(C) 0.5 E (D) 2E
- e. A star connected intermediate exchange is known as a _____
- (A) Repeater exchange (B) Private branch exchange
(C) Hub exchange (D) Tandem exchange
- f. The situation when both transmitter and receiver have to work in tandem is referred to as _____
- (A) parallel (B) serial
(C) synchronous (D) asynchronous

Code: DE62 Subject: TELECOMMUNICATION SWITCHING SYSTEMS

- g. ISDN handles data pertaining to _____
- (A) All digital services (B) Computer data only
(C) Speech and Video (D) Speech only
- h. Busy hour traffic is the _____
- (A) maximum average simultaneous traffic
(B) traffic during peak hour.
(C) traffic when all subscribers are engaged.
(D) the duration of maximum calls.
- i. As per Nyquist criterion the sampling rate is (f_s is the sampling frequency and f_m is highest frequency component of signal)
- (A) $f_s = 2 f_m$ (B) $f_s = \frac{f_m}{2}$
(C) $f_s = \frac{1}{2} f_m$ (D) $f_s = \frac{2}{f_m}$
- j. Maximum channel utilization in a LAN is defined by frame time (t_f) and propagation time (t_p). It is defined by _____
- (A) t_p / t_f (B) t_f / t_p
(C) $1 + (t_f / t_p)$ (D) $t_f / (t_f + t_p)$

**Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.**

- Q.2** a. With neat diagrams explain the configuration of a step-by-step switching system. (8)
- b. List the basic functions of a switching system. (8)
- Q.3** a. What do you mean by modelling of the traffic? Explain in detail. (8)
- b. During a busy hour, 1400 calls were offered to a group of trunks and 14 calls were lost. The average call duration has 3 minutes. Find (a) Traffic offered (b) Traffic carried (c) GOS. (8)
- Q.4** a. A three stage switching structure is to accommodate $N = 128$ input and 128 output terminals. For 16 first stage and 16 last stage, determine the number of cross points for nonblocking. If the number of cross points in the example is to be reduced by the factor of 3 with non blocking what is the probability that a call will be blocked? Assume the utilization probability $p = 15\%$. (8)
- b. Discuss grade of service. During busy hour, 1500 calls were offered to a group of trunks and 8 calls were lost. The average call duration was 120 seconds. Calculate total duration of congestion. (8)

Code: DE62 Subject: TELECOMMUNICATION SWITCHING SYSTEMS

- Q.5** a. Enlist the important features of T-S-T (time space time) switching. **(6)**
- b. Determine the implementation complexity of 2048 channel TST switch with 16 TDM links and 128 channels. Let the time slot of space switch is 25. **(4)**
- c. Explain with diagram the Space switching system in detail. **(6)**
- Q.6** a. Explain the principles of operation of centralized SPC and distributed SPC. Discuss the various operating modes of centralized SPC. **(8)**
- b. Define State Transition Diagram and explain the various SDL symbols used in state transition diagram. **(8)**
- Q.7** a. Describe the architecture of SS7 common channel signalling network with the help of a neat diagram. **(8)**
- b. Enlist the advantages and disadvantages of in band and out band voice signalling. **(8)**
- Q.8** a. Explain in detail ring and bus topology used in LAN technology. **(8)**
- b. Draw the Frame format of typical packet switching and explain various fields. **(8)**
- Q.9** a. Explain the working of broad band ISDN. **(8)**
- b. Explain the concept of Network management and the various services associated with network management. **(8)**