

**DiplETE – ET**

Time: 3 Hours

**DECEMBER 2012**

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. In a folded network with N subscribers, the maximum number of simultaneous calls or information interchanges is
 

|                    |         |
|--------------------|---------|
| (A) N              | (B) N/2 |
| (C) N <sup>2</sup> | (D) 2N  |
- b. During the busy hour, 1200 calls were offered to a group of trunks and 6 calls were lost. The average call duration was 3 minutes. The grade of service is
 

|           |          |
|-----------|----------|
| (A) 66.67 | (B) 1.11 |
| (C) 0.005 | (D) 6.67 |
- c. Cost Capacity Index (CCI) for a NxN time division switch is
 

|         |         |
|---------|---------|
| (A) N   | (B) N/2 |
| (C) N/4 | (D) N/3 |
- d. Which of following signals is provided to the exchange when each customer replaces the handsets
 

|                    |                   |
|--------------------|-------------------|
| (A) Address Signal | (B) Clear Signal  |
| (C) Answer Signal  | (D) Status Signal |
- e. The beginning and end of each high level data link control (HDLC) message is indicated by a unique combination of digits known as
 

|          |           |
|----------|-----------|
| (A) Flag | (B) Start |
| (C) Stop | (D) Frame |
- f. PSPDN stands for
 

|  |
|--|
| (A) Public Switched Packet data Network  |
| (B) Private Switched Packet data Network |
| (C) Packet Switched Public data Network  |
| (D) Packet Switched Packet data Network  |

- g. The letter 'O' and 'H' in BOPSCHT stands for
- (A) Ordinary control and hybrid
  - (B) Overvoltage protection and hybrid
  - (C) Overvoltage control and hybrid
  - (D) Overvoltage system and high speed switching.
- h. For a given grade of service, if the offered traffic A increases, then the number of trunks N must
- (A) Increase
  - (B) Remain Constant
  - (C) Decrease
  - (D) Be independent of A
- i. Which of the following will become difficult in Bus Network
- (A) Additional Nodes
  - (B) Twisted Pair Cable
  - (C) Reliability
  - (D) Fault Isolation
- j. Circuit switching is an example of
- (A) Queuing System
  - (B) Blocking System
  - (C) Lost Call System
  - (D) Non Blocking System

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

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- Q.2** a. Explain the functions of a switching system. (8)
- b. In 1000 Line strowger exchange using 1000 uniselector. Show trunking diagram when 254 establishes connection to subscriber 822. (8)
- Q.3** a. Compare Progressive grading and Homogeneous grading. (8)
- b. Design a three stage network for 100 incoming trunks and 400 outgoing trunks. (8)
- Q.4** a. Explain the working of a basic time division time switching with the help of a block diagram. (10)
- b. Calculate the number of trunks that can be supported on a time multiplexed space switch, given that
- (i) 32 channels are multiplexed in each stream
  - (ii) Control memory access time is 100 ns
  - (iii) Bus switching and transfer time is 100 ns per transfer. (6)
- Q.5** a. Define the following terms:
- (i) Reliability
  - (ii) Availability
  - (iii) Security of switching system. (8)
- b. Draw the state transition diagram for a local call with explanation. (8)

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- Q.6** a. With the help of block diagram, explain the CCITT number 6 signalling scheme. **(8)**
- b. Explain and compare Inband (VF) signalling and Outband signalling. **(8)**
- Q.7** a. Explain the principle of ATM switches. **(10)**
- b. An ATM network uses transmission links that operate at 150 Mbits/second and have a propagation delay of 5  $\mu$ s per Km. It uses cells of length 53 octets, consisting of a 5-octet header and a 48 bit information field. The maximum delay introduced by a Switching centre is 300 cells. Find the maximum delay encountered by a telephone call over a connection of length 500 Km that passes through six switching centres. **(6)**
- Q.8** a. Explain the Integrated Digital Network (IDN) with suitable diagrams. **(10)**
- b. Explain Private Networks used by multinational companies. **(6)**
- Q.9** a. Derive an expression for the probability of queuing system. **(8)**
- b. Write short note on:-
- (i) Queues in tandem.
- (ii) Delay tables and its applications. **(8)**