

## AMIETE – ET

Time: 3 Hours

**JUNE 2013**

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. One erlang = .....CCS

- (A) 42 (B) 36  
(C) 24 (D) 12

b. 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) 2 E

c. For full connectivity, a switch with 100 inlets and outlets, the number of cross points is

- (A) 100 (B) 10000  
(C) 10 (D) 1000

d. Traffic Capacity is given by

- (A) Switching capacity × Theoretical maximum load  
(B) Switching capacity / Theoretical maximum load  
(C) Theoretical maximum load / switching capacity  
(D) Theoretical minimum load × Switching capacity

**Code: AE64 Subject: TELECOMMUNICATION SWITCHING SYSTEMS**

- e. Which of the following is not true about the difference of B-ISDN as compared to ISDN?
- (A) B-ISDN provides for communication services with very high bit rate requirements such as digital television  
 (B) B-ISDN uses optical fibre cable whereas ISDN makes use of the existing infrastructure  
 (C) B-ISDN uses only packet switching whereas ISDN does not perform packet switching  
 (D) The bit rate for ISDN is pre specified unlike B-ISDN
- f. Which topology requires a central controller or hub?
- (A) Mesh (B) Star  
 (C) Bus (D) Ring
- g. Common channel signalling \_\_\_\_\_
- (A) Uses the speech or data path for signalling  
 (B) Does not use the speech or data path for signalling  
 (C) Needs no additional transmission facilities  
 (D) Finds it difficult to handle signalling during speech
- h. The \_\_\_\_\_ is a circuit-switched network, while the \_\_\_\_\_ is a packet-switched network
- (A) Telephone, ATM (B) SONET and FDDI  
 (C) Satellite, Telephone (D) FDDI and SONET
- i. A Master group consists of
- (A) 12 voice channels (B) 24 voice channels  
 (C) 60 voice channels (D) 300 voice channels
- j. 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

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

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- Q.2** a. Write short notes on
- (i) Uniselector (ii) Two motion selector. (8)
- b. List the basic functions of a switching system. (8)

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- Q.3**
- What do you mean by modelling of the traffic? Explain in detail? (6)
  - 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
    - Traffic offered
    - Traffic carried
    - GOS(6)
  - Define calling rate and holding time. (4)
- Q.4**
- 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)
  - Define grading in telecommunication switching networks. (2)
  - Design a strictly non blocking network for 1000 incoming and 1000 outgoing trunks. Also calculate the total cross points. (6)
- Q.5**
- Draw and explain time division space switching in detail. (8)
  - 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)
  - Enlist any four important features of T-S-T (time space time) switching. (4)
- Q.6**
- Define State Transition Diagram and explain the various SDL symbols used in state transition diagram. (8)
  - Draw the signal exchange diagram for a local call used to represent the sequence of events between the subscriber and exchanges? (8)
- Q.7**
- Enlist the advantages and disadvantages of in band and out band voice signalling? (6)
  - Explain Channel Associated mode, Channel Non-Associated mode and Quasi-Associated mode of common channel signalling networks. (6)
  - What are the various features of CCITT signalling system 7(SS7). (4)
- Q.8**
- Draw the Frame format of typical packet switching and explain various fields? (6)
  - A pure ALOHA system uses a 56 Kbit/s channel. On an average, each terminal originates a 1024-bit packet every 30 seconds. How many terminals can the system accommodate? How many terminals could the system accommodate using the slotted ALOHA protocol? (6)
  - Draw Asynchronous Transfer Mode (ATM) header structure. (4)

- Q.9** a. Explain three types of ISDN channels with their specifications in detail.
- b. Write short note on following:
- (i) Routing
  - (ii) Intelligent Networks
  - (iii) International Numbering
  - (iv) Cellular Radio Networks
- (4×2.5 = 10)