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Total number of printed pages – 3

B. Tech  
PEEC 5417

## Seventh Semester (Special) Examination – 2013

### DIGITAL SWITCHING AND TELECOMMUNICATION NETWORKS

BRANCH : EC, ETC

QUESTION CODE : 414

Full Marks – 70

Time : 3 Hours

Answer Question No. 1 which is compulsory and any **five** from the rest.

The figures in the right-hand margin indicate marks.

1. Answer the following questions : 2×10
- Explain the terms dB, dBw and dBm.
  - Differentiate circuit switching and message switching.
  - What are the facilities provided to the customer in electronic exchanges which can be controlled by him ?
  - Explain in brief Regulations, Standards in a telecommunication network.
  - Explain frame synchronization.
  - What is GOS ? Explain in case of a lost call system.
  - What is the difference between Internet and ISDN ?
  - Enlist the performance requirements for deploying a satellite based data network.
  - What is the difference between a line and a trunk ?
  - Define Blocking.



P.T.O.

2. (a) What is stored program control (SPC) ? Give the organization of centralized SPC and highlight its advantages in telephone switching. 5
- (b) Calculate the maximum access time that can be permitted for the data and control memories in a TSI switch with a single input and single output trunk multiplexing 2500 channels. Also, estimate the cost of the switch and compare it with that of a single stage space division switch. 5
3. (a) What layers are covered under end-to-end layer connectivity ? Explain briefly about each one of them. 5
- (b) What are the major systems of a telecommunication network ? Discuss about the subscriber loop systems with neat diagrams. 5
4. (a) Classify data networks. Explain with the Nyquist theorem, the data rate limitations in PSTN. Explain the importance of modems used for data transfer. List some V-series recommendations. 5
- (b) Explain the CCITT hierarchical structure of switching and routing using block schematic. 5
5. (a) In a 100 line exchange, 24 two-motion selectors are used. Draw the schematics you propose for this exchange and explain its working. How many simultaneous calls can be made during peak hour in this exchange ? 5
- (b) With two block diagrams, explain the difference between time division and space division switching. 5
6. (a) A three stage switching structure supports 100 inlets and 400 outlets. Find the number of cross points, and the number of primary and secondary switches used in the design. 5
- (b) Explain the working of a broad band ISDN system with neat sketches. 5

7. (a) In a national transmission system, the characteristic impedances of the 4-wire circuit and the 2-wire circuit are  $1200\Omega$  and  $1000\Omega$  respectively. The average phase velocity of the signal in the circuit is  $3 \times 10^7$  m/s. If the largest distance of a connection is 300 km, determine the return loss and round trip delay for echo. 5
- (b) Explain basic software architecture of a typical digital switching system. 5
8. Answer any **two** of the following questions : 5×2
- (a) What is traffic engineering ? Define the term busy hour, peak busy hour, time consistent busy hour, traffic intensity, BHCA, CCR, BHCR and grade of service.
- (b) What are the advantages of CCS over in-channel signaling ?
- (c) How numbering plan is achieved in modern telephony ? Give the structure with example.
- (d) Discuss the classifications of switching systems. In what way is stored program control superior to hard wired control ?

