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Total Number of Pages: 2

M.TECH
ETPC103

1st Semester Regular/Back Examination – 2014
TELECOMMUNICATION SWITCHING NETWORKS
BRANCH(S): COMMUNICATION ENGINEERING, COMMUNICATION
SYSTEMS, ELECTRONICS & COMMUNICATIONS ENGINEERING, ELECTRONICS &
TELE COMMUNICATION ENGINEERING

Time: 3 Hours

Max Marks: 70

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

- Q1 Answer the following questions: (2×10)
- Define switching system. Calculate the no of link for a fully connected network.
 - Define erlang? What is significance of it in telecommunication network?
 - Define blocking probability for folded and non folded network with proper block diagram
 - How switching systems are classified? In what way is stored program control superior to hardwired control?
 - Define the following terms: program, procedure, processor, process, task and subroutine
 - Determine the switch advantage ratio of a three stage network with N inlets and N outlets when $N = 128$ and $N = 32768$.
 - Calculate the total no of trunks that can be supported on a time multiplexed space switch, if 32 channels are multiplexed in each stream.
 - If MTBR = 1000 hours and MTTR = 10 hours, calculate the unavailability for both single and dual processor system?
 - Define the relationship among different markov processes using venn diagram.
 - What do you mean by broadband LAN? Mention its advantages and disadvantages over baseband LAN.
- Q2 a) What is the switching element advantage ratio? Derive the expression for blocking probability for a three stage network using Lee's graph. (5)
- b) Differentiate between Single stage and Multistage Network. (5)
- Q3 a) A subscriber makes five phone calls of two minutes, two minutes, three minutes, five minutes and 10 minutes duration in a one hour period. Calculate the subscriber traffic in erlangs, CCS and CM. (5)
- b) Derive the expression of unavailability for both single and dual processor system? (5)
- Q4 a) Explain basic common channel signaling and also CCS signaling message format for single unit and three unit message. (5)
- b) During the busy hour, 1200 calls were offered to a group of trunks and six were lost. The average call duration is 3min. Find (5)
- The traffic offered
 - The traffic carried
 - The traffic lost
 - Grade of service
 - The total duration of period of service

- Q5 a) Design a STS switch for supporting 128 TDM trunks each carrying a primary CCITT channel. The blocking probability should be less than 0.002. The loading is 0.2 E per channel. What is the cost of the switch? (5)
- b) What do you mean by congestion with respect to telecommunication system and how it can be handled at exchange? (5)
- Q6 a) A telephone administration provides leased lines at the rate of Rs. 600 per km for a minimum rental period of 3 months. A heavy point-to-point traffic user has his offices located 600km apart and is confronted with the choice of using STD or leased lines. At what traffic volume per day should be moved over to leased line? Assume 20 working days per month and a rate of Rs.1 per unit recorded by the meter and also cost of STD calls per hour over a distance of more than 500km is Rs.20 per minute. (5)
- b) The introduction of stored program controlled exchanges has led to the channel associated signaling (CAS) to be replaced by common channel signaling. Explain why? (5)
- Q7 a) A public call office (PCO) is installed in a busy parts of a town. 200 people use the booth every day. The average blocking time for a call is 2 minutes. There is a suggestion from the public that another PCO is required in the same locality as the wait times are unduly long. Analyze the situation using M/M/1 queue and determine is new PCO required. Justify? (5)
- b) Consider a B-D processes in which the birth rate decreases and the death rate increases with the population k in the systems: (5)

$$\lambda_k(0) = \begin{cases} (1 - k) & \text{for } k = 0 \\ 0 & \text{for } k \neq 0 \end{cases}$$

$$\mu_k(0) = \begin{cases} k & \text{for } k \leq N \\ 0 & \text{for } k > N \end{cases}$$

Write down the differential-difference equation for $p_k(t)$.

- Q8 Write short notes on any Two of the following (5×2=10)
- Packet switching network
 - p- persistent CSMA protocol
 - Centralized SPC
 - ISDN services with associate attributes