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Digital Switching System VTU CBCS Question Paper Set 2018

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10EC82

Eighth Semester B.E. Degree Examination, June/July 2016
Digital Switching Systems

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

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PART – A

1 a. Draw a neat diagram of four-wire circuit and explain its working. **(10 Marks)**

b. A four wire circuit has an overall loss (two-wire to two-wire) of 1 dB and the balance return loss at each end is 6 dB. Find: i) The singing point; ii) The stability margin; iii) The attenuation of talker and listener echo. **(06 Marks)**

c. Write a short note on European pleisochronous digital hierarchy. **(04 Marks)**

2 a. Differentiate between message switching and circuit switching. **(04 Marks)**

b. Explain the functions of electronic switching. **(06 Marks)**

c. With the help of neat diagram, explain the basic types of calls that are usually processed through a DSS. **(10 Marks)**

3 a. Derive the expression for second Erlang's distribution starting from basic principles. **(10 Marks)**

b. Define the following terms:
i) Busy hour ii) Grade of service
iii) Pure chance traffic iv) Statistical equilibrium **(04 Marks)**

c. On an average, one call arrives every 5 seconds. During a period of 10 seconds, what is the probability that:
i) No call arrives? ii) One call arrives?
iii) Two calls arrive? iv) More than two calls arrive? **(06 Marks)**

4 a. What is grading? Explain different types of grading. **(06 Marks)**

b. Derive the expression for grade of service of three stage network. **(08 Marks)**

c. Design a three stage network for 100 incoming trunks and 400 outgoing trunks. **(06 Marks)**

PART – B

5 a. Explain S-T-S switching network with neat diagram. **(06 Marks)**

b. A T-S-T network has 20 incoming and 20 outgoing PCM highway, each conveys 30 channels. The required GOS is 0.01, 0.02, 0.001, 0.005. Find the traffic capacity of network in mode 1 and mode 2. **(08 Marks)**

c. Explain the need for frame alignment in time division switching network. **(06 Marks)**

6 a. Explain in brief basic software architecture of a typical DSS with neat diagram. **(10 Marks)**

b. With a neat diagram, explain digital switching system software classification. **(10 Marks)**

7 a. Explain the organizational interfaces of typical DSS central office. **(10 Marks)**

b. Explain with a neat diagram, a strategy for improving software quality. **(10 Marks)**

8 Write short notes on:
a. Generic switch software architecture b. Recovery strategy
c. Common characteristics of DSS d. Analysis report for DSS **(20 Marks)**

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PART – A

1 a. Write four-wire circuit used in two-way transmission network and explain its working principle. **(08 Marks)**

b. Explain network topologies in brief. **(06 Marks)**

c. Express the following power levels in dBm and dBW:
(i) 1 mW; (ii) 1 W; (iii) 2 mW **(06 Marks)**

2 a. Design a 10,000 line step-by-step telephone exchange with a suitable diagram. **(06 Marks)**

b. Enumerate the functions of switching system. **(08 Marks)**

c. Explain the operation of BORSCHT circuit with a suitable block diagram. **(06 Marks)**

3 a. Derive an expression for second Erlang's distribution formula. **(08 Marks)**

b. A group of 20 trunks provides a grade of service of 0.01 when offered 12 E of traffic:
(i) How much is the grade of service improved if one extra trunk is added to the group?
(ii) How much does the grade of service deteriorate if one trunk is out of service? **(06 Marks)**

c. A group of five trunks is offered 2E of traffic:
Find
(i) The grade of service.
(ii) The probability that only one trunk is busy.
(iii) The probability that only one trunk is free.
(iv) The probability that at least one trunk is free. **(06 Marks)**

4 a. Deduce the expression to determine the total number of cross points for two stage network with incoming trunks M greater than outgoing trunks N. **(06 Marks)**

b. Explain progressive, skipped and homogeneous gradings. **(06 Marks)**

c. Design a three stage network for 100 incoming trunks and 400 outgoing trunks. **(08 Marks)**

PART – B

5 a. Explain space-time-space switching network with a suitable block diagram. **(07 Marks)**

b. Describe the frame alignment and synchronization networks. **(07 Marks)**

c. Explain cross-bar or space switching with a suitable diagram. **(06 Marks)**

6 a. Explain the classification of digital switching system with a suitable block diagram. **(10 Marks)**

b. Describe the concept of software linkages during a call required in telephony system. **(10 Marks)**

7 a. Describe the organizational interfaces of a typical digital switching system control office. **(10 Marks)**

b. Use strategic analysis and highlight to improve the software quality with a neat block diagram. **(10 Marks)**

8 a. Write a call connection flow-chart and a basic steps necessary to complete a simple call through a digital switching system. **(12 Marks)**

b. Write short notes on:
(i) Common characteristics of digital switching system.
(ii) Analysis report for digital switching system. **(08 Marks)**

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10EC82

Eighth Semester B.E. Degree Examination, Dec.2016/Jan.2017
Digital Switching Systems

Time: 3 hrs. Max. Marks:100

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PART – A

1 a. Explain the network services with diagram showing the relationship of service and bearer networks. **(07 Marks)**

b. Explain the principle of operation of four-wire circuit with neat diagram. **(08 Marks)**

c. Explain the principles of time-division multiplexing transmission with elementary TDM system and channel pulse trains. **(05 Marks)**

2 a. What are the different functions of switching system? Explain briefly. **(05 Marks)**

b. Explain the cross bar system with matrix of cross points. **(05 Marks)**

c. With diagram, explain the basic central office linkages, (relevant to MDF, TDF, power plant give explanation). **(05 Marks)**

d. Explain the switching system hierarchy with relevant diagram. **(05 Marks)**

3 a. Explain the congestion in telecommunications traffic system. **(05 Marks)**

b. During the busy hour, 1200 calls were offered to a group of trunks and six calls were lost. The average call duration was 3 minutes. Find:

i) The traffic offered.
ii) The traffic carried.
iii) The traffic lost.
iv) The grade of service.
v) The total duration of the periods of congestion. **(05 Marks)**

c. Explain the lost call system with assumptions, diagram and mathematical expressions. **(10 Marks)**

4 a. Explain the principles of gradings diagrams showing sixteen trunks interconnected to two groups of switches of availability 10. Write the following: i) Full diagram; ii) Grading diagram. **(08 Marks)**

b. Design a three-stage network for connection 100 incoming trunks to 100 outgoing trunks. Assume suitable data. **(06 Marks)**

c. Explain briefly about grades of service of link systems. **(06 Marks)**

PART – B

5 a. With relevant diagram explain the principle of operation of the space switch showing the 'K' incoming PCM highways and the in outgoing PCM highways. **(08 Marks)**

b. Explain the structure of time-space-time (T-S-T) switching network with m is number of PCM highways and 'n' is number of time slots. **(07 Marks)**

c. With diagram, explain the following exchange synchronization systems:

i) Single ended unilateral system.
ii) Double-ended unilateral system. **(05 Marks)**

6 a. With relevant diagram, explain the digital switching system software classification briefly. **(08 Marks)**

b. With neat diagram, explain the operation of the software linkages during a call. **(08 Marks)**

c. Name the different categories of call features. **(04 Marks)**

7 a. With flowchart explain the operation of interfaces of a typical digital switching system central office. **(07 Marks)**

b. With relevant block diagram approach explain the strategy for improving software quality. **(08 Marks)**

c. Write a note on 'Defect Analysis'. **(05 Marks)**

8 a. Explain briefly about generic switch hardware architecture with relevant diagram. **(08 Marks)**

b. Explain about some of the common characteristics of digital switching systems. **(07 Marks)**

c. Write note on 'Analysis Report'. **(05 Marks)**

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PART – A

1 a. Explain the hierarchy of a national switched telecommunication network, with the help of a neat diagram. **(06 Marks)**

b. Explain the operation of four wire circuit used in the two way transmission system. **(08 Marks)**

c. With suitable diagram, explain the principle of frequency multiplexing. **(06 Marks)**

2 a. Differentiate circuit switching and message switching. **(06 Marks)**

b. Explain the functions of MDF, IDF, and TDF in strowger exchange. **(06 Marks)**

c. Explain neatly, with diagram, the evolution of digital switching system. **(08 Marks)**

3 a. Define the following :
i) Busy hour ii) Grade of service iii) Holding time iv) Statistical equilibrium. **(08 Marks)**

b. Derive an expression for grade of service of a lost call system having N trunks. **(06 Marks)**

c. A group of 20 trunks provides a GoS of 0.01 when offered 12E traffic.
i) How much is the GoS improved if one extra trunk is added to the group?
ii) How much does the GoS deteriorate if one trunk is out of service? **(06 Marks)**

4 a. With the aid of simple diagram, derive expression for a progressive grading system. **(08 Marks)**

b. Obtain an expression for minimum number of cross points for a two stage network with incoming trunks greater than outgoing trunks. **(08 Marks)**

c. Find the GoS when a total of 30E is affected to the two stage switching network and the traffic is evenly distributed over the 10 outgoing routes. **(04 Marks)**

PART – B

5 a. With neat sketch, explain T-S-T switching network. **(06 Marks)**

b. An S-T-S network has 16 incoming and 16 outgoing highways each of which conveys 24 PCM channels. Between the incoming and outgoing space switches, there are 20 links containing time switches. During the busy hour, the network is offered 300E. Estimate the grade of service if :
i) Connection is required to a particular free channel on a selected out going highway.
ii) Connection is required to a particular outgoing highway but any free channel on it may be used. **(08 Marks)**

c. Explain the frame alignment of PCM signals in digital exchange. **(06 Marks)**

6 a. Explain in brief basic software architecture used in digital switching system. **(12 Marks)**

b. With flow diagram, discuss call forwarding feature. **(08 Marks)**

7 a. Describe the various organizational interfaces of a typical DSS control office. **(10 Marks)**

b. Explain the problem reporting system with a suitable block diagram and briefly explain how the maintenance cost be reduced in DSS. **(10 Marks)**

8 a. Explain Generic hardware and software architecture with a neat diagram. **(10 Marks)**

b. Explain : i) Recovery strategy ii) Analysis reports for DSS. **(10 Marks)**

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10EC82

Eighth Semester B.E. Degree Examination, June / July 2014
Digital Switching Systems

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PART – A

1 a. Explain the principle operation of a four wire circuit with neat diagram. **(08 Marks)**

b. Express the following power levels in dBm and dBw. i) 1 mW ii) 1 W iii) 2 mW iv) 100 mW. **(04 Marks)**

c. Explain the PCM primary multiplex with neat diagram, (30 channel or 24 channel frame format any one). **(08 Marks)**

2 a. Write a short note on crossbar system. **(06 Marks)**

b. With a neat block diagram, explain the term BORSCHT. **(06 Marks)**

c. With the help of a neat diagram, explaint the Intra LM call and Inter LM call processing. **(08 Marks)**

3 a. Define the following terms (any thre):
i) Traffic intensity ii) Grade Of Service (GOS) iii) Busy hour
iv) Blocking probability v) Blocking network. **(06 Marks)**

b. In an average, during the busy hour, a company makes 180 outgoing calls of average duration of 3 minutes. It receives 400 incoming calls of average duration 6 minutes. Find :
i) The outgoing traffic ii) Incoming traffic iii) Total traffic. **(04 Marks)**

c. Derive an expression for iterative form of Erlang's LOST CALL FORMULA with explanation of assumptions made. **(10 Marks)**

4 a. What is grading? Explain types of grading. **(08 Marks)**

b. Compare the features of single stage and multi stage network. **(08 Marks)**

c. Design a grading for 16 outlets using switches with 10 outlets. Draw grading diagram. **(04 Marks)**

PART – B

5 a. Explain the principle operation of T-S-T network and S-T-S network. **(12 Marks)**

b. Network has 50 incoming and 50 outgoing PCM highway. Each conveying 40 channels. The required grade of service is 0.7. Find the traffic capacity of network mode (1) and mode (2). **(08 Marks)**

6 a. Explain the basic software architecture of a typical digital switching system. **(10 Marks)**

b. What is a feature flow diagram? Explain with flow charts. **(10 Marks)**

7 a. Explain the methodology used for reporting and correcting of field problems. **(10 Marks)**

b. Explain the strategy used for improvement of software quality. **(10 Marks)**

8 a. With a neat flow chart explaint the simple call establishment process. **(12 Marks)**

b. Write short notes on any two of the following:
i) Reliability analysis
ii) Recovery strategy.
iii) Network Control Processor (NCP). **(08 Marks)**

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Digital Switching System

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PART – A

1 a. With a neat diagram of a four wire circuit connected to two wire circuit through a hybrid transformer and equation for line attenuation, explain singing and two types of echo's. **(10 Marks)**

b. Calculate the total bit rate for a 30 channel PCM system and draw figure for the same with all the details included. Also show calculations for the frame length. **(10 Marks)**

2 a. Differentiate between circuit switching and message switching. **(06 Marks)**

b. With a neat block diagram, explain subscribers line interface circuit for a digital switch. **(07 Marks)**

c. With the help of a neat diagram, explain the intra LM call and inter LM call processing. **(07 Marks)**

3 a. Derive an expression for the second Erlang's distribution starting from basic principles. **(10 Marks)**

b. Calculate $E_{2,N}$ (A) from $E_{1,N}$ (A). **(06 Marks)**

c. A group of 20 trunks provide a GOS of 0.01 when offered 12E traffic.
   i) How much GOS is improved if one extra is added to the group?
   ii) How much does the GOS deteriorate if one trunk is out of service? **(04 Marks)**

4 a. Design a progressive grading system connecting 20 outgoing trunks and having switches with availability of 10. Draw the grading diagram. **(10 Marks)**

b. Design a three-stage network for 100 incoming trunks to 400 outgoing trunks. Draw the diagram. **(10 Marks)**

PART – B

5 a. With a neat diagram, explain the operation of a time switch and discuss its limitations. Also illustrate how a S-T or T-S switch overcome these limitations. **(12 Marks)**

b. Explain synchronization and frame alignment of PCM signals in digital exchange. **(08 Marks)**

6 a. With neat diagram explain level 1, level 2 and level 3 control of a digital switching system. **(10 Marks)**

b. What are feature flow diagram? Draw feature flow diagram for feature activation, feature operation and feature deactivation for a call forwarding feature. **(10 Marks)**

7 a. With a neat block diagram, explain organizational interfaces of a digital switching system central office. **(10 Marks)**

b. Explain system outage and its impact on digital switching system reliability. **(10 Marks)**

8 a. Explain the three level scheme of recovery strategy in a digital switch. **(06 Marks)**

b. Write the common characteristics of digital switching system. **(06 Marks)**

c. Explain with a neat diagram, a generic switch hardware and software architecture. **(08 Marks)**

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