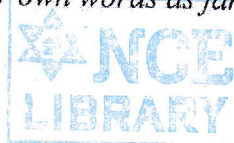


TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2082 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BEI	Pass Marks	32
Year / Part	IV/ II	Time	3 hrs.

Subject: - Telecommunication (EX 756)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.



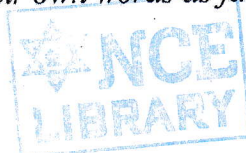
1. What is telecommunication? Explain the evolution of telecommunication with reference to the development of switching system. [2+6]
2. Differentiate guided and unguided transmission media. Explain briefly the operation of Hybrid transformer. [3+5]
3. Compare and contrast among FDM, TDM and WDM multiplexing techniques used in telecommunication. Describe T1 carrier system showing the frame structure and different multiplexing levels with data rates. [3+4]
4. Explain three different modes of dual-processor architecture used in an electronic switching system using centralized SPC. [8]
5. Explain the operation of TST and STS switch with necessary diagram. [4+4]
6. What is Common Channel Signaling (CCS)? Describe the SS7 protocol stack with a proper block diagram. [2+5]
7. During the busy hour, on an average, 30E is offered to a group of trunks and on average the total period during which all trunks are busy is 12 seconds and two calls are lost.
 - a) Find the average number of calls carried by the group. [3]
 - b) Find the average call duration. [3]
 - c) Show that the average number of calls offered to the group during a period equal to the average call duration is 30. [2]
8. Explain the operation of circuit switching and message switching with necessary diagram. [6]
9. What are the purposes of ITU? How is NTA helping in regulation and development of telecom in Nepal? Explain. [3+5]
10. Explain ISDN. Mention types of ISDN Channels. [6+2]
11. Explain about soft switching in brief. [4]

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INSTITUTE OF ENGINEERING
Examination Control Division
2082 Shrawan

Exam.	Back		
Level	BE	Full Marks	80
Programme	BEI	Pass Marks	32
Year / Part	IV / II	Time	3 hrs.

Subject: - Tele - Communication (EX 756)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.



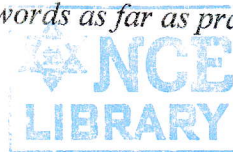
1. Explain the evolution of telecommunication. Explain functions of digital switching system. [4+4]
2. Compare among twisted pair, coaxial cable and optical fiber. List and explain different types of communication impairments. [6+4]
3. Differentiate between analog and digital multiplexing. Explain the mechanism involved in American 24 voice channel mux system. [8]
4. What do you mean by S (space) and T (time) switches? Show that 3-stage STS or TST network can minimize switching problem associated with 2-stage TS or ST network with their working models. [2+6]
5. Assume that a trunk group has enough channels to immediately carry all of the traffic offered to it by a Poisson process with an arrival rate of two call per minute. The average holding time is 2 min. [4+4]
 - a) What percentage of the total traffic is carried by the first five circuits?
 - b) How much traffic is carried by all the remaining circuits?
6. Describe the working principle of digital telephone exchange. Explain the CCS7 terminology. [4+4]
7. What are the objectives of traffic engineering in telecommunication? Explain the Engset formula used in the traffic source. [3+5]
8. What is a Queuing system in telecommunication? Explain the characteristics of a simple system in Kendall's notation. [2+6]
9. What are the functions and duties of NTA in the development of telecommunications industry in Nepal? What do the following acronyms stand for and write in brief their roles: IEEE, ITU-R, ITU-T, FCC. [4+2]
10. Write short notes on: (Any Two): [2×4]
 - a) Packet switching
 - b) Routing and Flow Control
 - c) Soft switching
 - d) National numbering planning according to E.164.

TRIBHUVAN UNIVERSITY
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2081 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BEI	Pass Marks	32
Year / Part	IV/ II	Time	3 hrs.

Subject: - Tele-Communication (EX 756)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.



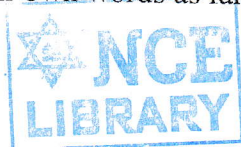
1. Draw the switching hierarchy used in the telecommunication switching system. Briefly explain the evolution of telecommunication until the telephone. [5+3]
2. List out different types of transmission media with their classes and basic characteristics. Describe the working principle of a Hybrid Transformer. [6+4]
3. Compare North American TDM and the European E1 TDM hierarchy by clearly indicating data rates and numbers of users with the help of proper diagrams. [8]
4. Define what the Clos network is. Derive the expression for blocking probability of both STS and TST switches, and compare them. [2+3+3]
5. Mention the important of signaling in telecommunication system. Explain the major building blocks and protocols of SS7 network. [4+4]
6. What is a Queuing System in Telecommunication? Explain the characteristics of a simple system in Kendall's notation. [4+4]
7. List the regulation of Nepal Telecommunications Authority. What are the basic charging plan needs for Telecommunication Company. [4+4]
8. Explain ISDN and the types of ISDN channels in detail. [8]
9. What is soft switching. Describe its architecture and management. [2+4]
10. Write short notes on: (Any Two) [2×4]
 - a) Datagram Network
 - b) Grade of Service
 - c) Extended Erlang B

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INSTITUTE OF ENGINEERING
Examination Control Division
2080 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BEI	Pass Marks	32
Year / Part	IV / II	Time	3 hrs.

Subject: - Telecommunication (EX 756)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt **All** questions.
- ✓ The figures in the margin indicate **Full Marks**.
- ✓ Assume suitable data if necessary.



1. What do you mean by an exchange telecommunication and its type. Describe essential features of an exchange showing major equipment. [3+5]
2. Compare guided transmission media in telecommunication system. Explain operation of hybrid transformer. [4+4]
3. What is TDM? How statistical TDM recover weakness of TDM? Explain STDM with its frame format. [4+2+2]
4. What are advantages of multi-stage switching system over switching system? Compare TST and STS switch in digital telephone exchange system with necessary diagram and its blocking probabilities. [2+6]
5. Compare and contrast between inchannel and common channel signaling. Explain different types of signalling links available in SS7 network. [4+4]
6. Define lost calls and grade of service in telephone traffic engineering. During a busy hour, 600 calls were offered to a group of trunks and 40 calls were lost. If the average call duration was 120 seconds, find the traffic offered, carried traffic, lost traffic, GoS and duration of congestion. [2+6]
7. What is infinite system and pure loss system? Describe the tele-traffic Engset model. [4+4]
8. Describe the role of NTA for the development of telecommunication sector in Nepal. Write a numbering plan as per ITU rules and regulation. [4+4]
9. Explain various types of switching strategies used in data communication. [8]
10. Write short notes on: [2×4]
 - a) Soft switching
 - b) Stored Program control (SPC) in digital exchange

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Examination Control Division
2079 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BEI	Pass Marks	32
Year / Part	IV / II	Time	3 hrs.

Subject: - Telecommunication (EX 756)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.



1. What is telecommunication? Explain the evolution of telecommunication with reference to the evolution of switching system. [2+6]
2. What is noise? Explain its types in brief. Describe the need and operating mechanism of the two-wire to four-wire converter with a neat diagram. [1+3+4]
3. What is Time Division Multiplexing? Explain digital carrier standards T_1 and E_1 with proper elaboration. [2+6]
4. What are the advantages of multi-stage switching over single-stage switching? Calculate and draw, How many cross points are found in three stages switching system, whereas 3 stages array of 4 input lines and 5 second stages array. [3+5]
5. What is common channel signaling? Explain the basic call set-up process using SS7 signaling system. [2+6]
6. Explain Kendall's notation? A PCO is installed in the busy part of the town. 150 persons use the booth every day. The average holding time for the call is 1.5 minutes. There is a suggestion from the public that the waiting period is very long and they need another PCO in the same locality. Analyze using M/M/1 queue. [3+5]
7. What are the formulas uses in telecommunication traffic engineering decision tree? A group of 20 servers carry a traffic of 10 erlangs. If the average duration of a call is three minutes, calculate the number of calls put through by a single server and the group as a whole in a one-hour period. [3+5]
8. What are the function and duties of NTA? Describe about IP switching with its switch structure. [4+4]
9. What is ISDN? Explain the architecture, services offered and different channels used in ISDN. [1+3+2+2]
10. Write short notes on: [2×4]
 - a) Digital Subscriber Line (DSL)
 - b) Voice over IP (VoIP)
