

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE- SEMESTER-VII EXAMINATION – WINTER 2025****Subject Code:3173212****Date:24-11-2025****Subject Name:Telecommunication Engineering****Time:10:30 AM TO 01:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

		<b>MARKS</b>
<b>Q.1</b>	(a) What is meant by delay and blocking criteria in telecommunication?	<b>03</b>
	(b) Given that MTBF = 2000 hrs and MTTR = 4 hrs. Calculate the unavailability for single and dual processor systems for 10 years and 30 years.	<b>04</b>
	(c) Explain level 1, level 2 and level 3 processing of distributed SPC in detail.	<b>07</b>
<b>Q.2</b>	(a) Compare single stage and multi stage switching networks.	<b>03</b>
	(b) An exchange serves 4000 subscribers. If the average BHCA is 24000 and the CCR is 50%, calculate the busy hour calling rate.	<b>04</b>
	(c) Tabulate the difference between circuit and message switching with diagram.	<b>07</b>
<b>OR</b>		
	(c) Explain the TST switch with neat diagram and its features.	<b>07</b>
<b>Q.3</b>	(a) Calculate the number of trunks that can be supported on a time multiplexed space switch, given that: (1) 64 channels are multiplexed in each stream; (2) Control memory access time is 50 ns; (3) Bus switching and transfer time is 50 ns per transfer.	<b>03</b>
	(b) Compare In-band and Out-band signaling in telecommunication.	<b>04</b>
	(c) Explain numbering and charging plans for telecommunication in detail.	<b>07</b>
<b>OR</b>		
<b>Q.3</b>	(a) With help of a bar graph, explain typical telephone traffic pattern of an urban area on a working day and define different busy hours.	<b>03</b>
	(b) Explain briefly with neat diagrams, the centralized switching and distributed switching.	<b>04</b>
	(c) Explain the N X N three stage switching network. Draw the Lee's graph to discuss its blocking probability.	<b>07</b>
<b>Q.4</b>	(a) Define: Erlang, Time Consistent Busy Hour, and Grade of service.	<b>03</b>
	(b) Discuss operations of load sharing and synchronous duplex mode of stored program control.	<b>04</b>
	(c) Discuss the network and protocol architecture of signaling system No.7.	<b>07</b>
<b>OR</b>		
<b>Q.4</b>	(a) Distinguish In-channel signalling and Common control signalling?	<b>03</b>
	(b) Explain subscriber loop system.	<b>04</b>
	(c) Explain DMS-100 switching system with necessary hardware and software architecture.	<b>07</b>

- Q.5** (a) List the advantages and disadvantages of CCS (common channel signalling). **03**  
(b) Describe fiber optic networks in detail. **04**  
(c) Derive an expression for the state probability  $P(k)$  using Birth-Death model. **07**

**OR**

- Q.5** (a) What is Erlang loss system? Name three models of the loss system. **03**  
(b) Describe satellite-based data networks in detail. **04**  
(c) Explain input, output and memory-controlled time division space switching with proper diagrams. **07**

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