

GUJARAT TECHNOLOGICAL UNIVERSITY
BACHELOR OF ENGINEERING – SEMESTER 7 – EXAMINATION – SUMMER 2026

Subject Code: 3173212

Date: 01/06/2026

Subject Name: Telecommunication Engineering

Time: 02:30 PM TO 05:00 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.**

- Q.1**
- (a) Compare single stage and multi stage switching networks used in telecommunication system. **03**
 - (b) Discuss operations of load sharing and synchronous duplex mode of stored program control. **04**
 - (c) State and derive an expression for the state probability $P(k)$ using Birth-Death model. **07**
- Q.2**
- (a) Explain subscriber loop system with proper diagram. **03**
 - (b) Explain sampling theory with example and diagram. **04**
 - (c) Briefly explain DMS-100 switching system with necessary hardware and software architecture. **07**
- OR**
- Q.2**
- (c) Draw and explain the network and protocol architecture of signaling system No.7 (SS7). **07**
- Q.3**
- (a) Define: Erlang, Time Consistent Busy Hour, and Grade of service. **03**
 - (b) List and compare In-band and Out-band signaling in telecommunication system. **04**
 - (c) Draw and explain the $N \times N$ three stage switching network. Also, draw the Lee's graph to discuss its blocking probability. **07**
- OR**
- Q.3**
- (a) What is meant by delay and blocking criteria in telecommunication system? **03**
 - (b) Explain the concept of centralized switching and distributed switching with example. **04**
 - (c) Explain the TST switch with neat diagram and its features. **07**
- Q.4**
- (a) List the advantages and disadvantages of common channel signalling. **03**
 - (b) With help of a bar graph, explain typical telephone traffic pattern of an urban area on a working day and define different busy hours. **04**
 - (c) Explain input, output and memory-controlled time division space switching with proper diagrams. **07**
- OR**
- Q.4**
- (a) Describe fiber optic networks in detail. **03**
 - (b) Explain AT & T 5ESS switching system with proper diagram. **04**
 - (c) Briefly explain different numbering and charging plans for telecommunication network. **07**

- Q.5** (a) Describe satellite-based data network in detail. **03**
(b) What is Erlang loss system? Also discuss three models of the loss system. **04**
(c) Explain level 1, level 2 and level 3 processing of distributed SPC in detail. **07**

OR

- Q.5** (a) In what way is stored program control superior to hard wired control. **03**
(b) Explain pulse code modulation system used for speech communication. **04**
(c) Explain Local Area Network, Metropolitan Area Network, and PSTN network in detail. **07**
