R20 Regulation *Subject code:3E6DD*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A' Grade)

B.Tech VI Semester Regular Examinations, June/July 2023

TELECOMMUNICATION SWITCHING SYSTEMS AND NETWORKS

(Electronics and Communication Engineering)

Maximum Marks: 70 Date:03.07.2023 Duration: 3 hours

Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit which carries 10M.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks **(10x2M=20 Marks)**

1 What are the elements of telecommunication systems?
2 What is crossbar switching?
3 Draw a two stage network.
4 What is the difference between space division multiplexing and time division multiplexing?
5 Define traffic intensity and congestion.
6 What are the assumptions of Erlang?
7 Write on numbering plan.
8 What are the switching techniques in data transmission?
9 List out the services of ISDN.
10 What is the function of a SONET?

Part-B

Answer All the following questions. **(10MX 5=50Marks)**

11 Explain about the step by step switching configuration. (10M)

OR

12 What is a three-stage network? Derive the expression to find number of cross point in three stage network when it has
a) N incoming and N outgoing trunks
b) M incoming trunks and N outgoing trunks(M>N)

13 What is the significance of SPC and explain about the levels of Centralized SPC? (10M) (10M)

OR

14 Explain basic Time division space switching and draw the input and output-controlled time division space switch. (10M)

15 A.What is the need of a mathematical model? What are the assumptions made for simple mathematical model? (5M)

B. A group of five trunks is offered 2 E 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 (5M)

OR

16 A. A common-control device in a telephone exchange is required to commence operation within an average period of 10 milliseconds after receiving a calling signal.

i. If the device is held, on average for 50 milliseconds per call, how many calls can it handle per hour?
ii. If the device is required to handle 18000 calls per hour. What is the maximum permissible average holding time? (5M)

B. Derive the queue capacity of a finite queue. (5M)

17 Discuss various types of switching hierarchy and routing used in Subscriber networks. (10M)

OR

18 Describe the ISO/OSI reference model in detail. (10M)

19 A. Describe frame format of ISDN. (5M)

B. Give a brief explanation about HFC Networks. (5M)

OR

20 Explain SONET devices and its frame format in details. (10M)