



Regulation R17

**TKR COLLEGE OF ENGINEERING AND TECHNOLOGY**

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

Subject code: 1P4DA

**B.Tech II Year II Semester Supplementary Examinations, December 2024**

**SWITCHING THEORY AND LOGIC DESIGN  
(Electronics and Communication Engineering)**

**Maximum Marks: 70**

Date: 03.12.2024

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.
  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 is Gray code?
- 2 What is min term?
- 3 What are don't cares?
- 4 Write about 2X1 MUX.
- 5 Compare latch and flip flop.
- 6 Write the characteristic table of SR Flip flop.
- 7 Compare combinational and sequential circuits.
- 8 Explain about Ring counter with a neat diagram.
- 9 List the capabilities of finite state machine.
- 10 Compare Mealy and Moore machines.

**Part-B**

Answer All the following questions.

(10M X 5=50Marks)

- 11 a) Convert the given Gray code number to equivalent binary 001001011110010. [4M]  
b) Convert  $(A0F9.0DC)_{16}$  to decimal, binary, octal. [6M]

OR

- 12 Simplify the following Boolean expressions using the Boolean theorems.

(i)  $(A+B+C)(B'+C) + (A+D)(A'+C)$  [5M]

(ii)  $(A+B)(A+B')(A'+B)$  [5M]

- 13 Minimize the following expressions using K-map and realize using NAND Gates.  
 $f = \sum m(1, 3, 5, 8, 9, 11, 15) + d(2, 13)$ . [10M]

OR

- 14 a) Design the 8:1 MUX for the given Boolean Expression  $f = \sum m(1, 3, 4, 11, 12, 13, 14, 15)$ . [5M]  
b) Design a combinational circuit to detect the decimal numbers 0, 2, 4, 6 and 8 in a 4-bit XS-3 code input. [5M]

- 15 a) Draw and explain the operation of the Master Slave SR flip-flops with block diagram. [7M]  
b) Explain the Race around condition in flip-flops in detail. [3M]  
OR
- 16 a) Convert T flip-flop into D and JK flip-flops [6M]  
b) What is Flip-Flop? Explain excitation table of S-R flip-flop. [4M]
- 17 a) What is a shift register? Explain about the following modes of operations in a four bit shift register (i) shift right (ii) shift left (iii) bidirectional. [6M]  
b) Explain the differences between ring and Johnson counters. [4M]  
OR
- 18 a) Design and explain a synchronous MOD-12 down-counter using T flip-flop. [7M]  
b) Explain about state table and state diagram with an example. [3M]
- 19 a) What are the Moore and Mealy machines? Compare them. [5M]  
b) Explain the procedure for state minimization using the partition technique. [5M]  
OR
- 20 Draw the diagram of Mealy type FSM and explain with an example. [10M]