

**BACHELOR OF ENGINEERING (ELECTRICAL ENGINEERING) FIRST YEAR SECOND
SEMESTER – 2024
ELECTRONICS-II**

Time: Three Hours

Full Marks: 100

Answer all the sub-parts of a question altogether

Module 1

Answer any 3

1. a) Implement $Y = (AB)' + A + (B+C)'$ using NAND Gate only.
 b) Realize $Y = (A+C) (A+D') (A+B+C')$ using NOR Gate only.
 c) Simplify the expression using Boolean algebra method $F = (A+B+C) (A+B'+C) (A+B+C')$
 d) Simplify the expression $Y = \sum m (3, 4, 5, 7, 9, 13, 14, 15)$ using the K-map method.

4+4+6+6 = 20

2. a) Simplify the expression using Boolean algebra method $G = (A+B).(B'+C).(A+C)$
 b) Simplify the expression $F(A, B, C) = \pi (0, 3, 6, 7)$ using the K-map method.
 c) Briefly describe full adder. Show the truth table.
 d) Draw the circuit diagram J-K flip flop and discuss its operation.

4+4+6+6 = 20

3. a) Draw the logic diagram of a 4 line to 1 line multiplexer with truth table.
 b) Draw the circuit diagram of D flip flop and discuss its operation.
 c) Explain full- subtractor. Implement a full-subtractor with two half- subtractors and an OR gate.
 d) List any three applications of flip-flops. Explain T flip-flop briefly.

5+5+5+5 = 20

4. a) Explain how a J-K flip-flop can be converted into a D flip-flop
 b) Draw the excitation table of S-R flip-flop and Edge-Triggered J-K Flip-Flop.

10+10 = 20

Module 2

Answer any 2

5. a) What do you understand by damped and undamped electrical oscillations?
 b) Explain the operation of a tank circuit with neat diagrams.
 c) With a neat diagram, explain the action of Hartley and Colpitt's oscillators.

5+5+10 = 20

6. a) Why do you use three RC sections in the RC oscillator?
 b) Why is negative feedback provided in Wien bridge oscillators?
 c) What is a multivibrator? Explain the principle on which it works. What is the basic difference among the three types of multivibrators?

5+5+10 = 20

7. a) What is Barkhausen Criterion? Explain briefly.
 b) Explain briefly Quadrature Oscillator.
 c) How a 555 Timer can be used as astable multivibrator.

6+7+7 = 20