Ex/EE/5/ET/T/123/2023

BACHELOR OF ENGINEERING (ELECTRICAL ENGINEERING) FIRST YEAR SECOND SEMESTER - 2023

ELECTRONICS - II

Time: Three Hours | Full Marks: 100

*Answer **any TEN** question*

1. What do you understand by damped and undamped electrical oscillations? Explain the operation of a tank circuit with neat diagrams. 5+5
2. With a neat diagram, explain the action of Hartley and Colpitt's oscillators. 5+5
3. Why do you use three RC sections in RC oscillator? Why is negative feedback provided in Wien bridge oscillators? 5+5
4. What is a multivibrator? Explain the principle on which it works. What is the basic difference among the three types of multivibrators? 2+5+3
5. With a neat sketch, explain the working of (i) astable multivibrator (ii) monostable multivibrator (iii) bistable multivibrator. 10
6. Briefly explain the working principal of Darlington Transistors with appropriate diagram. 10
7. Explain Schmitt Trigger Hysteresis with Op-amp. 10
8. Briefly explain the operation of Transistor Series Voltage Regulator and Transistor Shunt Voltage Regulator with their limitations. 5+5
9. Explain the action of 2-input TTL NAND gate. Realizing 2 input NOR gate using CMOS logic. 5+ 5
10. a) Convert the binary number $(1001.0010)_2$ to decimal.
    b) Convert $(8B3F)_{16}$ to binary.
    c) Convert the binary number $(111110101011.0011)_2$ to Octal.
    d) Divide 10000011_2 by 10_2. 2+2+2+4
11. a) Simplify the function F=(X+C)(A+B'+C)(X+C') using Boolean algebra.
    b) Find subtraction of $(25430)_8$ and $(4077)_8$
    c) Find subtraction of $(20C)_{16}$ and $(7E)_{16}$ 4+3+3
12. a) Simplify the expression $Y=\sum m\ (3,4,5,7,9,13,14,15)$ using the K-map method.
    b) Simplify the expression $F(A, B, C) = \pi(0,3,6,7)$ using the K-map method.
    c) Simplify the expression using Boolean algebra method G = (A+B).(B'+C).(A+C) 4+4+2
13. a) What is meant by a decoder? Explain it with a block diagram.
    b) How does an encoder differ from a decoder? 1+5+ 4
14. a) Show how an S-R flip-flop can be converted into a D flip-flop. What is meant by edge triggering.
    b) What advantage does a J-K flip-flop have over an S-R flip-flop? 5+2+3
15. a) Define shift register. Draw and explain 4 bit serial in parallel out shift register.
    b) Briefly describe a 3-bit asynchronous up counter with logic diagram, waveform and truth table. 1+4+5