Subject: - Basic Electronics Engineering *(EX451)*

✓ Candidates are required to give their answers in their own words as far as practicable.
✓ Attempt __All__ questions.
✓ The figures in the margin indicate __Full Marks__.
✓ Assume suitable data if necessary.

1. Describe different types of controlled source with figures. [4]

2. Calculate the current flowing in each branch using superposition theorem. [6]
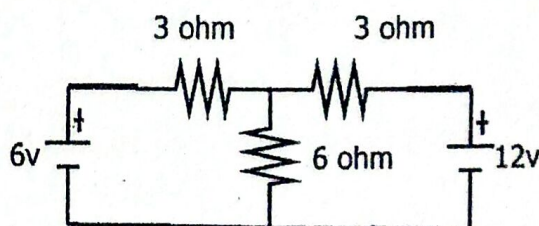
3. Describe the rectification process. Explain the operation of half wave rectifier with necessary diagrams. [1+4]

4. What is diode clamper? Describe the operation diode clamper circuit. [1+4]

5. Draw the DC load line and determine the Q point of the voltage divider biased transistor circuit having $V_{cc} = 15v$, $R_c = 1k\Omega$, $R_1 = 10 k\Omega$, $R_2 = 5k\Omega$, $R_c = 2k\Omega$ and $\beta = 75$. [6]

6. Why BJT is a bipolar and MOSFET is an unipolar device? And draw the circuit diagram of differential amplifier using BJT. [2+2]

7. Explain the operation of CMOS switch with necessary diagrams. [4]

8. Mention any four properties of an ideal OP amp. Derive the expression of voltage gain of an inverting amplifier using OP amp. [2+4]

9. Draw a circuit diagram of square wave generator using OP amp. Explain how it generates the square wave. Express the frequency of the square wave generated. [2+3+1]

10. What is Optical fiber? Explain the advantages of optical fiber communication over coaxial cable communication. [1+3]

11. Define communication system. And describe communication system in brief with the complete block diagram. [2+3]

12. Simplify the expression using K-Map, $F(x,y,z) = X'YZ+X'Y'Z+XYZ$ and realize it using logic gates. [5]

13. Mention the types of flip flops and explain the operation of J-K flip flop with necessary diagrams. [1+4]

14. Draw a block diagram of digital multimeter. Explain how it measures dc current flowing through it. [5]

15. Draw and explain the block diagram of data logger. [4]

16. Write short notes on: (any two) [2×3]
    a) Light emitting diode
    b) Output characteristics of common base configuration
    c) Regulated power supply

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