1ST SEM. /COMMON ./ 2024(W)NEW

TH4(a) Fundamentals of Electrical & Electronics Engineering

Full Marks: 70 **Time- 3 Hrs**

Answer any four Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1. Answer **All** questions 2 x 10
   a. Define Ohm's law.
   b. State the difference between periodic and aperiodic signal.
   c. Write down two characteristics of an ideal op-amp.
   d. State De-Morgan's theorem.
   e. Draw the symbols of different types of inductors.
   f. Define R.M.S value of Alternating Current.
   g. Write the truth table of a D flip-flop.
   h. Name the different types of power in A.C circuit & draw the power triangle.
   i. Write the e.m.f equation of a transformer.
   j. Draw the symbol of a P-channel FET.

2. Answer **Any Six** Questions 5 X 6
   a. Draw the circuit diagram for both Parallel and Series circuit connection. 2.5+2.5
      1) Find the total resistance of the three resistors connected in parallel having the value 12Ω, 4Ω and 6Ω.
      2) Find the total resistance of the three resistors connected in series having the value 12Ω, 4Ω and 6Ω.
   b. Explain the working of Light Emitting Diode.
   c. Describe the analogy between an electric and magnetic circuit.
   d. With neat diagram explain the working principle of D.C motor.
   e. A pure resistance of 50Ω is in series with a pure capacitance of 100 μF. The series combination is connected across 100V – 50 Hz supply. Find a) Impedance, b) Current, c) Power Factor, d) Phase angle, e) Voltage across resistor and capacitor and draw the vector diagram. 1 x 5
   f. Differentiate between Open Loop and Closed loop configuration of Op-Amp.
   g Convert
      i) $(10111001)_2$ to Hexadecimal. (1)
      ii) $(9BA)_{16}$ to Decimal (1.5)
      iii) $(432)_{10}$ to Octal (1.5)
      iv) $(10111001)_2$ to Octal. (1)

Answer any Two Questions.

3. Define counter. With neat diagram describe the working of Up-down counter. 10
4. Explain the working of Op-Amp as differentiator and integrator. 10
5. Derive the basic equation of different types of DC motor. 10
6. Describe the voltage and current relationship in star delta connection. 10