

Roll No. ....

Total No. of Questions : 09]

[Total No. of Pages : 03

B.Tech. (Sem. - 2<sup>nd</sup>)

## BASIC ELECTRICAL &amp; ELECTRONICS ENGINEERING

SUBJECT CODE : EE - 101Paper ID : [A0117]

[Note : Please fill subject code and paper ID on OMR]

Time : 03 Hours

Maximum Marks : 60

## Instruction to Candidates:

- 1) Section - A is **Compulsory**.
- 2) Attempt any **Five** questions from Section - B & C.
- 3) Select atleast **Two** questions from Section - B & C.

## Section - A

Q1)

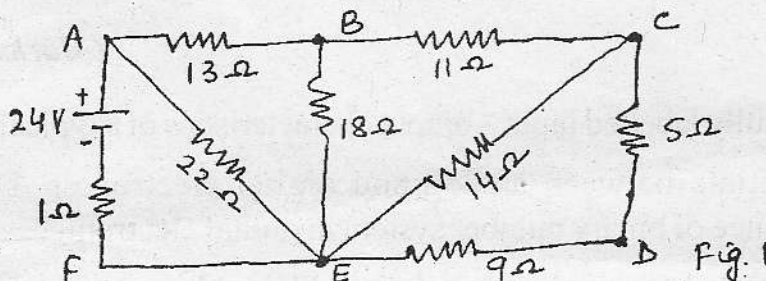
(Marks : 2 Each)

- a) Plot the fully labelled input - output characteristics of a typical thermistor.
- b) Differentiate between analog and digital electronics. Discuss the significance of binary number system in digital electronics.
- c) Differentiate between linear and digital ICs. Also give two examples of each.
- d) Draw a neat comparison between a JFET and MOSFET.
- e) In what respect an LED and a Zener diode are different from an ordinary PN junction diode?
- f) What is the role of deflecting and opposing torque in indicating instruments?
- g) What is the need of starter in dc motor?
- h) State and explain Kirchhoff's laws.
- i) In a circuit, the applied voltage of 150 V lags the current 8A by 40°. Determine
  - (i) Is the power factor lagging or leading?
  - (ii) What is value of power factor.
  - (iii) Is the circuit inductive or capacitive?
  - (iv) What is value of active and reactive power?
- j) Calculate the admittance  $G + jB$ , if the impedance is  $10 + j5$  ohms.

## Section - B

(Marks : 8 Each)

- Q2)** (a) An aluminium wire 10 m long and 2 mm in diameter is connected in parallel to a copper wire 6 m long. A total of 2 A is passed through the combination and it is seen that the current through aluminium wire is 1.25 A. Calculate the diameter of copper wire. Specific resistance of copper is  $1.6 \times 10^{-6} \Omega \text{cm}$  and that of aluminium is  $2.6 \times 10^{-6} \Omega \text{cm}$ .
- (b) An electrical network is arranged as shown in Fig 1.
- (i) Find the current in branch AF,
  - (ii) Power absorbed in branch BE and
  - (iii) Potential difference across branch CD.



- Q3)** (a) Derive the expression for resonant frequency and Q factor for a series resonant RLC circuit:
- (b) A coil of resistance 15 ohms and inductance 0.05H is connected in parallel with non - inductive resistor of 20 ohms. Find
- (i) The current in each branch and total current supplied, and
  - (ii) The phase angle of the combination when a voltage of 200 V at 50Hz is applied. Draw the phasor diagram.
- Q4)** (a) Why is damping torque necessary in indicating instruments? Explain with neat sketches different methods of producing the same.
- (b) Differentiate between moving coil and moving iron measuring instruments.

Q5) Describe the principle, construction and working of 3- phase induction motor with neat diagrams.

**Section - C**

*(Marks : 8 Each)*

- Q6) (a) Define a transducer. List the various application areas of transducer based systems.
- (b) Describe the construction, working principle and limitations of bonded type metallic strain gauges.
- Q7) (a) Describe the working of a NOR gate based R-S flip - flop. What is its limitation? How does JK flip - flop overcome it?
- (b) Convert  $4ABC_{16}$  into its equivalent octal and decimal number system.
- (c) Realize XOR gate using NAND gates.
- Q8) (a) Describe the pin configuration and internal block description of IC -555.
- (b) What is a voltage regulator? Describe the working and specifications of any regulator IC.
- Q9) (a) Describe the amplifying action of a transistor.
- (b) What is a Thyristor? Explain its working and V - I characteristics.

