Roll No. ....

Total No. of Questions : 09]   [Total No. of Pages : 03

B.Tech. (Sem. - 2nd)

BASIC ELECTRICAL & ELECTRONICS ENGINEERING

SUBJECT CODE : EE - 101

Paper 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.

R-1266   *P.T.O.*

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 1.6×10^{-6} Ω cm and that of aluminium is 2.6×10^{-6} Ω 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.

Fig. 1
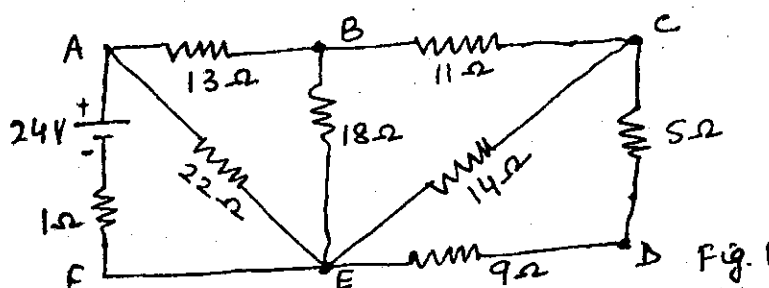
Q3) (a) Derive the expression for resonant frequency and Q factor for a series resonant RLC circuit.

(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.

R-1266   2

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 filp - 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.

◆◆◆◆