Roll No…….. **Total No. of Printed Pages: [01]**

Total No. of Questions: [09]

B. Tech (Mech. Engg.) (Semester – 2nd)

BASICS OF ELECTRICAL ENGINEERING

Subject Code: BELE0101

Paper ID: [110004]

Time: 03 Hours **Maximum Marks: 60**

Instruction for candidates:

1. Section A is compulsory. It consists of 10 parts of two marks each.
2. Section B consist of 5 questions of 5 marks each. The student has to attempt any 4 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

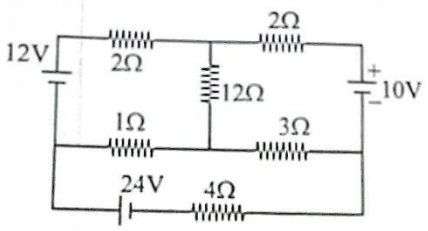
Section – A **(2 marks each)**

Q1. Attempt the following:

a) Define Kirchhoff's Laws.
b) What are the limitations of ohm's law?
c) What is meant by power factor?
d) What do you understand by cut-off frequency?
e) What is the power associated with pure resistance in an a.c. circuit?
f) What are the relationships between phase and line quantities in case of 3-Φ star connection?
g) Which material is used for making core of transformers and why?
h) Define the term voltage regulation.
i) What is the function of commutator in DC machines?
j) What is meant by the term slip?

Section – B **(5 marks each)**

Q2. Determine the current in 4Ω branch using loop current method of the circuit shown below:-



Q3. What is the use of star-delta and delta-star transformation in the circuits? Explain the method for transforming star network into a delta network.

Q4. Explain resonance phenomenon in a parallel circuit.

Q5. Derive the relationship between phase and line quantities in case of delta connections.

Q6. Explain the construction and working principle of induction motor.

Section – C **(10 marks each)**

Q7. A resistance of 10 ohms, an inductance of 0.24H and a capacitance of 100 μF are connected in series across 200V, 50Hz supply. Find out:-

(i) Impedance
(ii) Current
(iii) Voltage across R, L and C
(iv) Active and Passive powers
(v) Power factor of the circuit.

Q8. Explain the working of 1-phase practical transformer with equivalent circuit diagram. Also draw the phasor diagram of transformer on resistive, inductive and capacitive loads.

Q9. Explain the major parts of DC machines. Draw the sketch and discuss them in detail.