B.TECH 1st SEMESTER (Gr I/Gr II/Gr III/Gr IV) MID-SEMESTER EXAMINATION, FEBRUARY 2021

BASIC ELECTRICAL ENGINEERING (EE-1101)

FULL MARKS: 30   TIME: 45 minutes

(i) Use a single answer –script for all the questions
(ii) All parts of a question MUST be answered together

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Answer all the questions

Part – A

1. a)   Using principle of superposition find the current 'I' for the linear circuit shown in Fig.1. All resistances are in ohms.   (5)
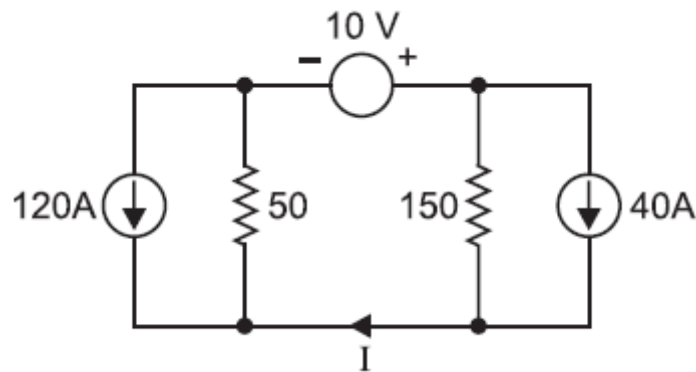

Fig. 1

b)   Distinguish between the following with suitable examples: $(1\frac{1}{2} \times 2 = 3)$

(i) Active and passive element
(ii) Linear and non-linear element

2. a)   Define the following terms with reference to a magnetic circuit: $(1 \times 3 = 3)$
(i) MMF   (ii) Reluctance   (iii) Permeability

2.b)   An iron ring has a cross-section of 3 cm^2 and a mean diameter of 25 cm. An air-gap of 0.4 mm has been cut across the section of the ring. The ring is wound with a coil of 200 turns through which a current of 2 A is passed. If the total magnetic flux is 0.24 mWb, find the relative permeability of iron, assuming no magnetic leakage and fringing.   (4)

Part – B

3.a)   An expression of an alternating current is given as i(t) = 150 sin 314t.
Find the i) frequency ii) time period iii) instantaneous value when t is 4 ms and
iv) time taken from t=0 for the current to reach +100A.   (4)

3.b) Find the i) average value ii) rms value and iii) form factor of the waveform shown in Fig. 2. (3)
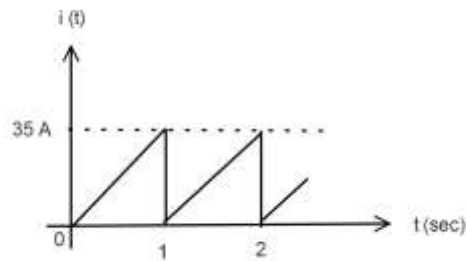

Fig. 2

4. A series circuit consists of a capacitor and a coil takes a maximum current of 0.5 A at 200 V, 50 Hz. If the voltage across the capacitor is 300 V at resonance, determine the i) capacitance ii) inductance and iii) half-power frequencies in Hz. Draw the circuit diagram and phasor diagram. (1+1+2+2+2)

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