Roll No. ....

Total Pages : 05

BT-2/M-19   32012

ELECTRICAL TECHNOLOGY

EE-101-E

Time : Three Hours]   [Maximum Marks : 100

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

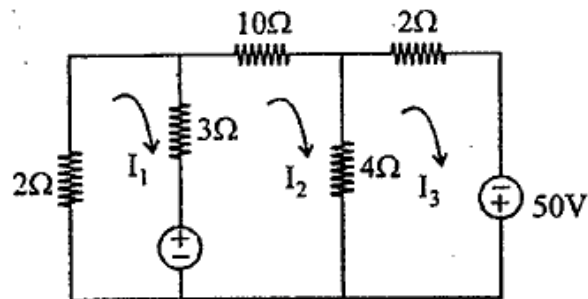1. (a) Use Nodal methods for finding the currents in the given Fig. 1.

Fig. 1

(b) Determine the rms and average valve of the waveform shown in Fig. 2.
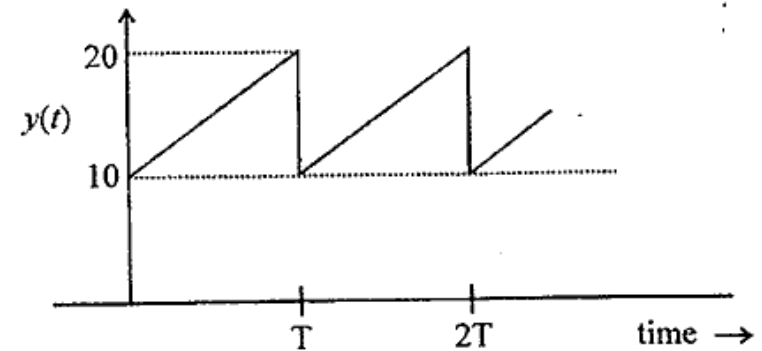
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Fig. 2

2. (a) Describe the properties of (i) Resistance (ii) Inductance (iii) Capacitance used in A.C. circuit.

(b) Two imedances Z_1 and Z_2 when connected separately across a 230 V, 50 Hz supply consumed 100W and 60W at power factors of 0.5 lagging and 0.6 leading respectively. If these impedances are new connected in series across the same supply, find (i) Total power absorbed and overall p.f. (ii) the valve of impedance to be added in series so as to raise the overall p.f. to unity.

Unit II

3. (a) In the given network in Fig. 3(a), K is changed from position *a* to *b* at *t* = 0. Solve for *i*, *di/dt*,

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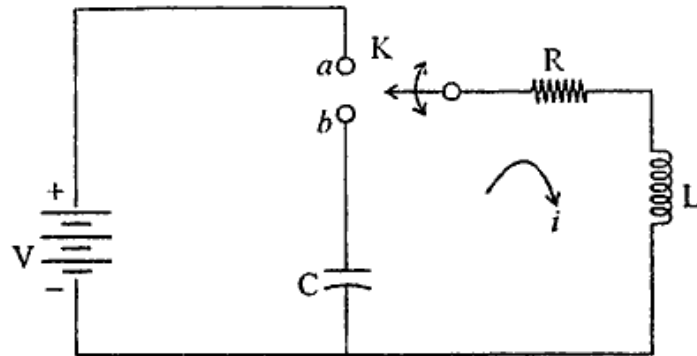d^2i/dt^2 at $t = 0^+$ if R = 1000 Ω, L = 1H, C = 0.1 μF and V = 100 V.

Fig. 3

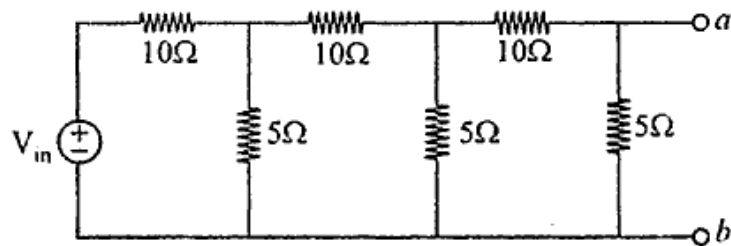(b) Obtain Thevenin equivalent for the given circuit in Fig. 4 to the left of terminals *ab*.

Fig. 4

4. (a) Calculate the resonant frequency, the impedance at resonance and the Q-factor at resonance for the given circuit in Fig. 5.
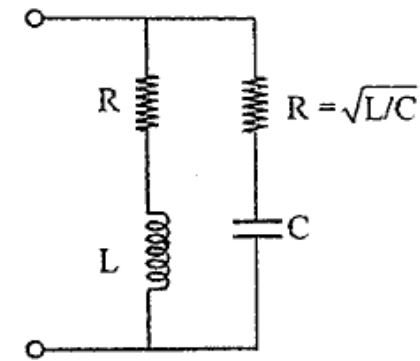

Fig. 5

(b) State maximum power transfer theorem and prove it by taking an example.

Unit III

5. (a) Establish relationship between live and phase voltages and currents in a balanced 3-phase star connection. Draw complete phasor diagram for voltage and currents.

(b) The input power to a three phase motor was measured by two wattmeter method. The readings were 10.4 kW and –3.4 kW and the voltage was 400 V. Calculate (a) the p.t. (b) the line current.

6. (a) Describe the construction of transformer with the help of neat diagram.

(b) Calculate the regulation of a transformer in which the ohmic loss is 1% of the output and the reactance drop is 5% of the voltage, when the power factor is (i) 0.80 lag (ii) unit (iii) 0.80 leading.

Unit IV

7. (a) Explain the working principle of Induction motor. Also give its types and relative merits and demerits.

(b) Sketch and explain the torque slip curve of Induction motor.

8. (a) Explain the methods to control the speed of d.c. series motor.

(b) Draw and explain the interval and external characteristic of D.C. shunt motor.