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Total Pages : 5

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October, 2020

B.Tech.-II SEMESTER

Basic Electrical Engineering (ESC-101)

Time : 3 Hours]

[Max. Marks : 75

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*
2. *Answer any four questions from Part-B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART - A

1. (a) Distinguish between loop and mesh in an electrical network with suitable circuit. CO1 (1.5)

(b) State Norton's theorem. CO1 (1.5)

(c) The equation of an alternating current is $i = 282.8 \sin 377t$. What is rms value of current and frequency? CO2 (1.5)

(d) What are the properties of parallel resonance circuit? CO2 (1.5)

(e) Give the relationship between magnetic field intensity and magnetic flux density. CO3 (1.5)

(f) What are the properties of an ideal transformer? CO3 (1.5)

(g) Define voltage regulation of a transformer. CO3 (1.5)

(h) What are the speed control methods of DC motor? CO3 (1.5)

(i) How ELCB work in the circuit? CO4 (1.5)

(j) What kind of protection is offered by a fuse? CO4 (1.5)

PART - B

2. (a) Calculate the current in each branch of the circuit shown in Fig. 1. CO1 (7)

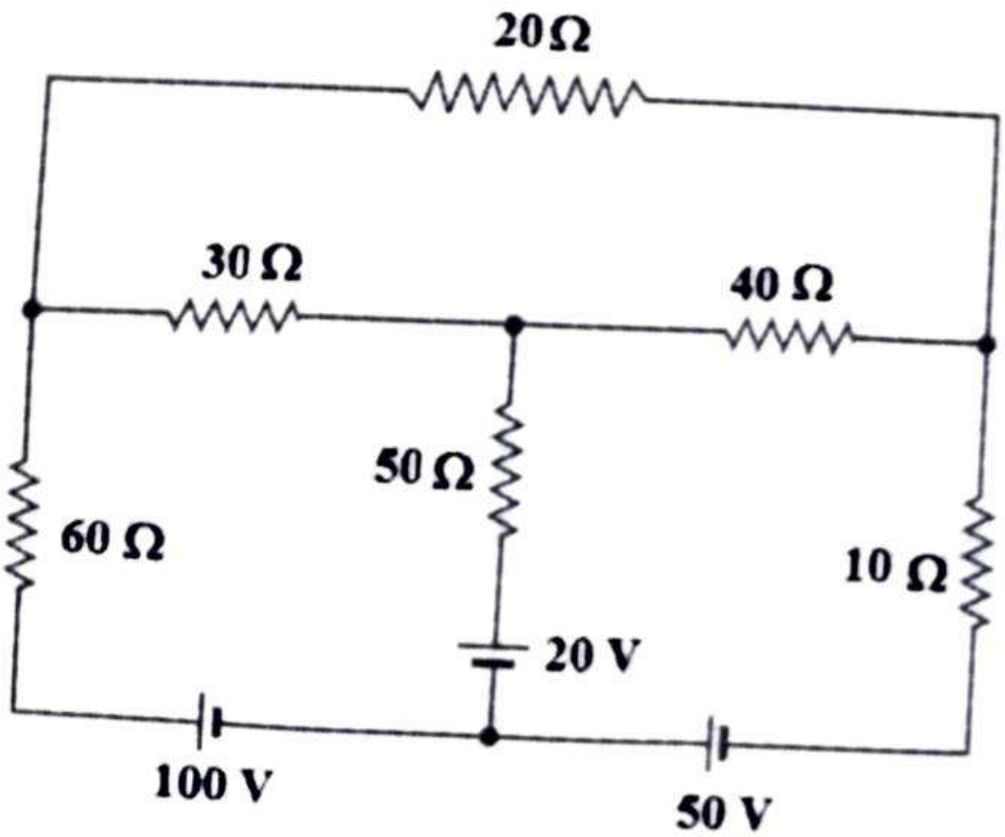

Fig. 1.

(b) By using Thevenin theorem, find current I in the circuit shown in Fig. 2. CO1 (8)

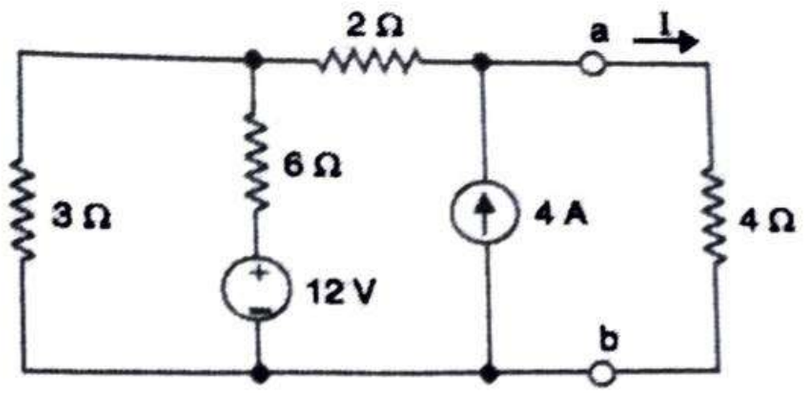

Fig. 2.

3. (a) Find the rms value, average value, form factor and peak factor of the voltage waveform shown in Fig. 3. CO2 (7)

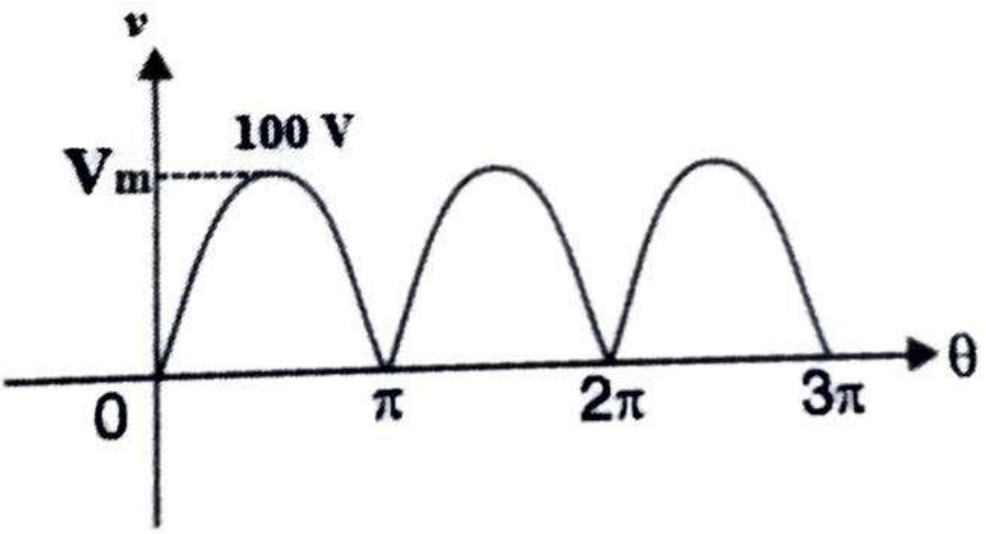

Fig. 3

(b) A 150 V dc is applied to a circuit consisting of a resistance of 50 Ω in series with an inductance of 10 H through the switch. If the switch is closed at $t = 0$, find out (i) the expression for current $i(t)$, voltage drop across resistor $v_R(t)$ and voltage drop across inductor $v_L(t)$ (ii) the value of $i(t)$ for $t = 0.25$ second and (iii) time at which $v_R(t) = v_L(t)$. CO1 (8)

[P.T.O.

4. (a) 230 V, 50 Hz a.c. supply is applied to a coil of 0.06 H inductance and 2.5 Ω resistance connected in series with a 6·8 μF capacitor. Calculate (i) impedance (ii) current (iii) power consumed (iv) power factor and (v) voltage drop across each element. CO2 (5)

(b) Obtain the relationship between phase voltage and line voltage, phase current and line current for delta connection in three phase system. CO2 (5)

(c) A 50 kVA loss less transformer has 500 turns on the primary and 40 turns on the secondary winding. The primary is connected to 3300 V, 50 Hz mains. Determine (i) primary and secondary current at full load; (ii) secondary emf and (iii) the maximum flux in the core, No load current can be neglected. CO3 (5)

5. (a) What are the losses occurring in a transformer? Write an expression for calculating the efficiency of a transformer and develop the condition for maximum efficiency. CO3 (7)

(b) Explain auto transformer with suitable diagram. Compare it with two winding transformer and what are its applications? CO3 (8)

6. (a) With the help of neat diagram discuss the various parts of a dc machine. CO3 (8)

(b) What do you understand by earthing? Why it is necessary in electrical installations? Explain pipe earthing with suitable sketch. CO4 (7)

7. (a) What is a dc chopper? Discuss with necessary circuit diagram the principle of operation of a step down and step up chopper. CO3 (8)

(b) What is MCCB? Explain its functions and working with neat diagram. CO4 (7)