

B.I.T. Sindri

First Mid Semester Examination 2018-19

Sub: Basic Electrical Engineering (Common to Sections A,C,D,E,F)

Time: 1.5 hrs

F.M.: 20

Answer any five questions

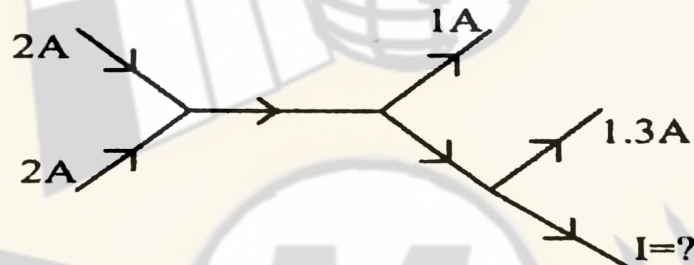
Q. No. 1 is Compulsory

Q1. Select the correct one (Answer any four):

[1+1+1+1=4]

i. The Current "I" in the electric circuit is ;

[CO 1]



- (a) 1.3 A (b) 3.7A (c) 1 A (d) 1.7 A

ii. Three 2Ω resistors are connected to form a triangle. The resistance between any two corners is

[CO 1]

- (a) 6Ω (b) 2Ω (c) 0.75Ω (d) 1.33Ω

iii. An alternating voltage is given by $v = 200 \sin(314t)$. Its r.m.s. value is

- (a) 100 V (b) 282.8 V (c) 141.4 V (d) 121.4 V

[CO 2]

iv. In a series RLC circuit, the voltage reads at resonance across R, L and C are 40 V, 60 V and 60 V respectively. Then the applied voltage is

[CO 2]

- (a) 60 V (b) 40 V (c) 160 V (d) $\sqrt{40^2 + 120^2}$ V

v. The KVA drawn by an a.c. circuit is given by $(3+j4)$ KVA. The active power drawn by the circuit is

[CO 2]

- (a) 3 KW (b) 4KW (c) 5KW (d) None of these

vi. A 3-phase load is balanced if all the three phases have same

[CO 2]

- (a) Impedance (b) power factor (c) Impedance and power factor (d) None

Q2 Using Norton's Theorem, Calculate the current in 5Ω resistor in the circuit given in Fig.1. [4 Marks] [CO 1]

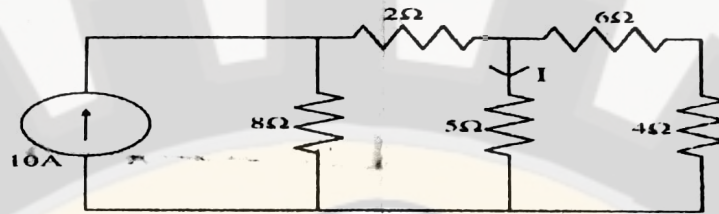


Fig. 1

Q3 State Superposition Theorem and determine the current "I" in the network shown in the Fig. 2 using superposition theorem. [4 Marks] [CO 1]

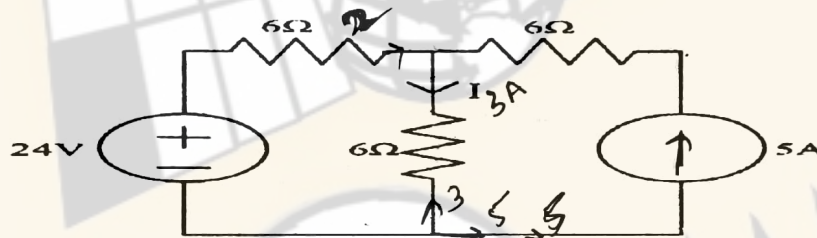
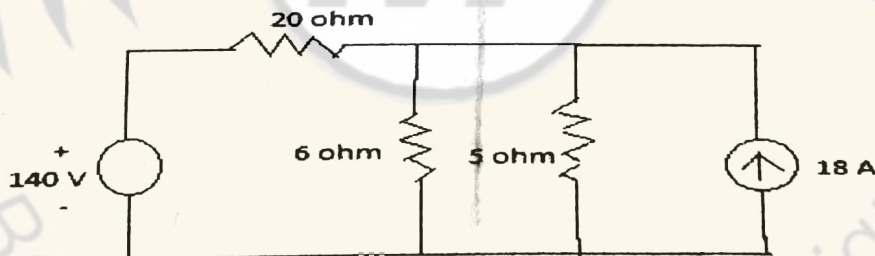


Fig. 2

Q4 Find the current flowing in 20Ω resistance and voltage across 6Ω resistance by using mesh analysis or Node analysis or Thevenin's theorem. [4 Marks] [CO 1]



Q5 A 230V, 50 Hz, a.c. supply is applied to a coil of $0.06H$ inductance and 2.5Ω resistance connected in series with a $6.8\mu F$ capacitor. Calculate (i) Impedance, (ii) Current, (iii) Phase angle between V and I, (iv) Power factor, (v) Power Consumed. [4 Marks] [CO 2]

Q6 An alternating voltage $(80 + j60)V$ is applied to a circuit and the current flowing is $(-4 + j10)A$. Find, (i) the impedance of the circuit, (ii) the power consumed, (iii) the phase angle. [4 Marks] [CO 2]

Q7 A balanced delta-connected load of $60\angle 30^\circ \Omega$ per phase is connected across a 3-phase, 400 V, 50 Hz supply. Calculate the line current, power factor and power consumed. [4 Marks] [CO 2]

$$X_c = \frac{1}{C \times \omega} \quad \omega = 2\pi f \quad \frac{1}{T} = \frac{2\pi \omega}{2\pi}$$