

**B.I.T. Sindri**  
**First Mid Semester Examination 2018**  
**Sub: Basic Electrical Engineering (Common to Sections B, G, H)**

**Time: 1.5 hrs**

**F.M.: 20**

**Answer any five questions**

**Q. No. 1 is Compulsory**

**Q1. Write the correct one (Answer any four):**

**[1+1+1+1=4]**

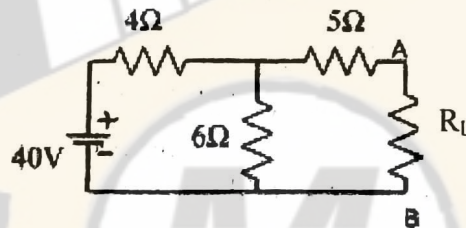
**i) KCL and KVL are applicable to:**

**a) DC circuit only   b) AC circuit only   c) Passive network   d) Both AC & DC circuit**

**ii) Superposition theorem is valid for calculating:**

**a) Voltage only   b) Current only   c) Voltage & Current only   d) Voltage, Current & Power.**

**iii) The value of  $R_{th}$  in Fig. 1 shown across terminal AB is :**



**Fig.1**

**a)  $15\Omega$    b)  $7.4\Omega$    c)  $6.4\Omega$    d)  $3.5\Omega$**

**iv) In an RL series circuit  $R=10\Omega$ ,  $X_L=10\Omega$ . The phase angle between applied voltage and current is**

**a)  $45^\circ$    b)  $30^\circ$    c)  $60^\circ$    d)  $36.8^\circ$**

**v) The current through  $400\Omega$  resistor is  $i=0.06 \sin(\omega t - 30^\circ)$  A. The voltages across the resistor is**

**a)  $24 \angle 0^\circ$    b)  $24 \angle -30^\circ$    c)  $24 \angle 30^\circ$    d) none of above.**

**vi) An ac series circuit has  $R=6\Omega$ ,  $X_L=20\Omega$  and  $X_C=12\Omega$ . The circuit power factor be**

**a) 0.8 lagging   b) 0.5 leading   c) 0.6 lagging   d) 0.6 leading**

Q2. Apply KCL and KVL to determine current  $I_L$  through  $1\Omega$  resistor in the network as shown in Fig. 2. [4]

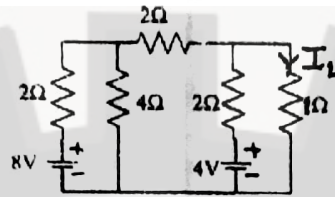


Fig. 2

Q3. Use superposition theorem to determine  $I$  in the network as shown in Fig 3. [4]

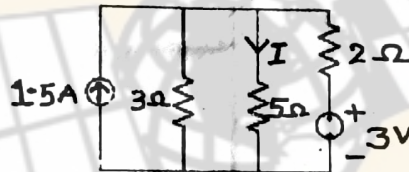


Fig. 3

Q4. Determine the current through the  $5\Omega$  resistor in the circuit as shown in Fig. 4 by using either Thevenin's theorem or Norton's Theorem. [4]

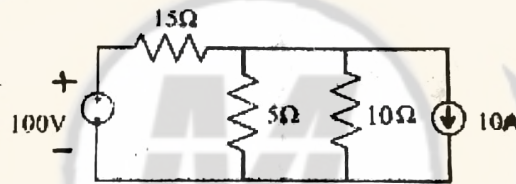
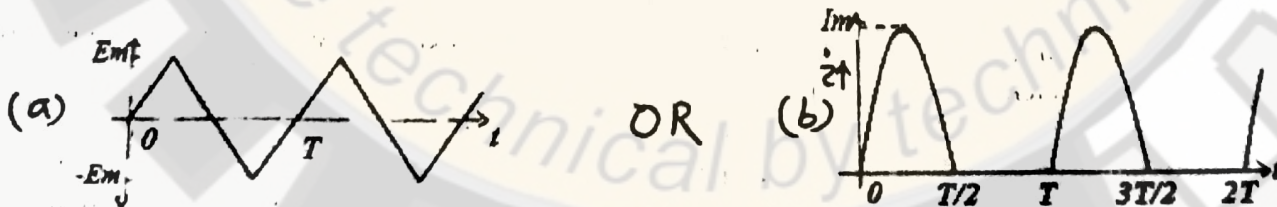


Fig. 4

Q5. A series circuit consists of a  $300\Omega$  non inductive resistor, a  $7.95\mu F$  capacitor and a  $2.06 H$  inductor of negligible resistance, if the supply voltage is  $250 V$  at  $50 Hz$ . Calculate (a) the circuit current (b) the phase angle (c) the voltage drop across each element. [4]

Q6. Find average value, rms value, form factor and peak factor of any one of the following waveform. [4]



Q7.a) State and explain superposition theorem. [2]

b) An impedance  $Z=3+j4\Omega$  is connected in series with a supply voltage of  $100 \angle 30^\circ$ . Determine the power triangle. [2]