

**6239**  
**BOARD DIPLOMA EXAMINATION**  
**MARCH/APRIL - 2019**  
**DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING**  
**ELECTRICAL CIRCUITS**  
**THIRD SEMESTER EXAMINATION**

**Time: 3 Hours**

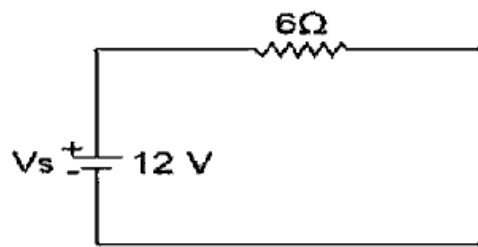
**Total Marks: 80**

**PART - A (3m x 10 = 30m)**

*Note 1: Answer all questions and each question carries 3 marks*

*2: Answers should be brief and straight to the point and shall not exceed 5 simple sentences*

1. State the principle of basic Potentiometer
2. Find the equivalent star connected resistance of a given delta connected load with  $R_{AB}=10 \Omega$ ,  $R_{BC}=20 \Omega$ ,  $R_{CA}=30 \Omega$
3. Define the following terms of an Electric network
  - a) Lumped parameters
  - b) Unilateral Circuit
4. Convert the voltage source in the below figure into current sources



5. Define the terms relating to an alternating quantity
  - i) leading
  - ii) lagging
6. A R-C series circuit has an impedance of  $30 \Omega$  and the current lead the voltage by  $60^\circ$ . Calculate the resistance and capacitance of the circuit
7. The current flowing through a pure inductor is 25A. Find the inductance and power consumption when the voltage applied across the inductor is  $V=150\sin 314t$  volts
8. Define Q factor for a parallel resonant circuit
9. A 3phase, 415V 50HZ supply is given to a balanced delta connected load. The current in each branch circuit is 30A and phase angle is  $30^\circ$  lag find
  - (i) The line current
  - (ii) Total power

10. The phase voltage of 3 Phase, 5MVA star connected Alternator is 6500 volts calculate.

- (i) The line voltage                      (ii) Full load line current of the alternator

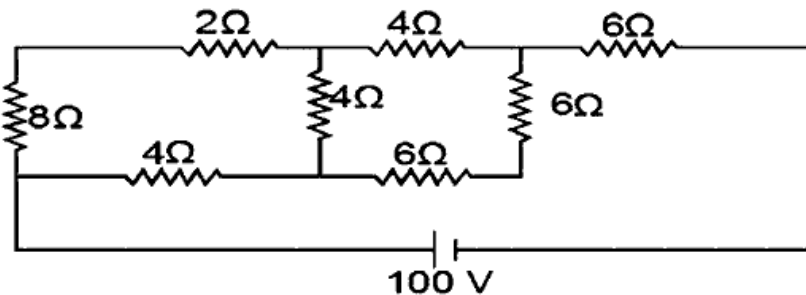
**PART - B      (10m x 5 = 50m)**

Note 1: Answer any five questions and each question carries 10 marks

2: The answers should be comprehensive and the criteria for valuation is the content but not the length of the answer

11. Explain the method of measurement of earth resistance using Earth Megger

12. Find the current supplied by the battery to the network shown in fig



13. An alternating voltage  $V=200\sin 314t$  is applied to a device which offers an ohmic resistance of  $20\Omega$  to the flow of current in one direction while entirely preventing the flow of current in the opposite direction. Calculate the R.M.S value, Average value and form factor <http://www.sbtetonline.com>

14. A coil having a resistance of  $6\Omega$  and an inductance of  $0.8\text{mH}$  is connected in series with a capacitor having a capacitance of  $50\mu\text{f}$ . A.C. supply of  $230\text{V}, 50\text{Hz}$  is applied across the circuit. Calculate

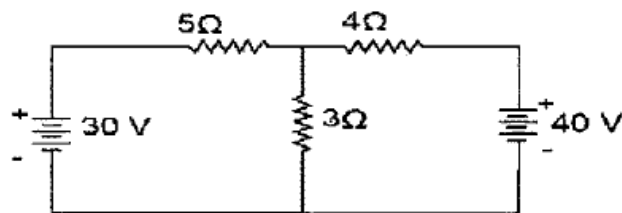
- i) Inductive reactance    ii) capacitance reactance    iii) total impedance  
iv) current    v) power consumed

15. a) A series R-L circuits whose resistance is  $10\Omega$ , inductance  $0.1\text{H}$  is connected across a  $230\text{V}, 50\text{Hz}$  supply. Find i) inductive reactance ii) impedance iii) current

b) A R-L series circuit has an inductance of  $0.04\text{H}$  and an impedance of  $40\Omega$  with sinusoidal applied voltage. The current lags behind the voltage by  $60^\circ$ . Calculate the frequency of the alternating voltage

16. a) Explain resonance in parallel circuits and derive an expression for resonance frequency.  
b) A coil has an inductive reactance of  $20\Omega$  at  $50\text{Hz}$  and its p.f is 0.8. Determine the value of the capacitor to be shunted with the coil to produce resonance at  $100\text{Hz}$ , also calculate the Q-factor of the circuit
17. a) When the three identical coils are supplied with  $440\text{ v}$ ,  $50\text{Hz}$ , 3 phase supply, the single phase wattmeter whose current coil is connected in line (R- Phase) and pressure coil across phase R & neutral reads  $6\text{Kw}$  and the ammeter connected in R phase reads  $30\text{A}$ . find  
i) Resistance & Reactance of the coil  
ii) Power factor of the load

- 18A. Find the currents in  $3\Omega$  resistor in the network shown below using super position theorem



- B. Derive the equation for Power factor of the three phase load using Two wattmeter method

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