Reg. No.									

INTERNATIONAL CENTRE FOR APPLIED SCIENCES

(Manipal University)

III SEMESTER B.S. DEGREE EXAMINATION – NOV. / DEC. 2016

SUBJECT: DC AND AC CIRCUIT ANALYSIS (EE 232)

(BRANCH: MECHANICAL, MECHATRONICS & IP)

Wednesday, 30 November 2016

Time: 3 Hours **Max. Marks: 100**

- ✓ **Answer ANY FIVE full Questions.**
- ✓ **Missing data, if any, may be suitably assumed**

1A. A 3 Phase star connected load draws a line current of 20 A. The three phase load kVA and kW are 20 and 11 respectively. Find the readings on the two wattmeters used to measure the three phase power.

1B. Find the equivalent resistance R_{ab} for the circuit shown in Fig 1B.

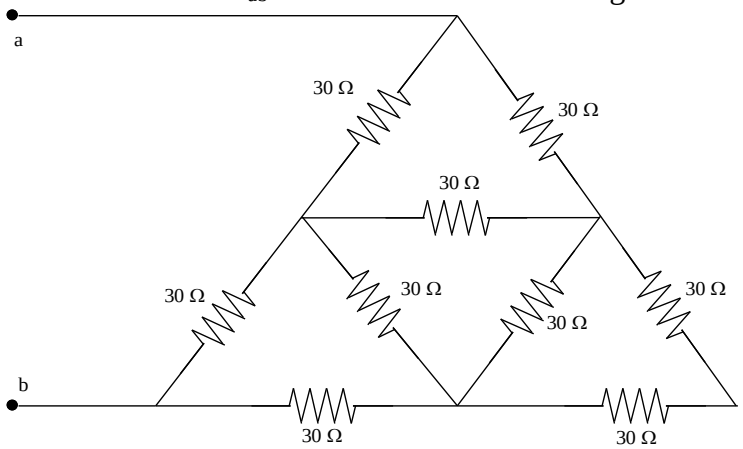

Fig 1B

(10+10)

2A. Find the current through the 40 Ω resistor using thevenin's theorem (Fig 2A).

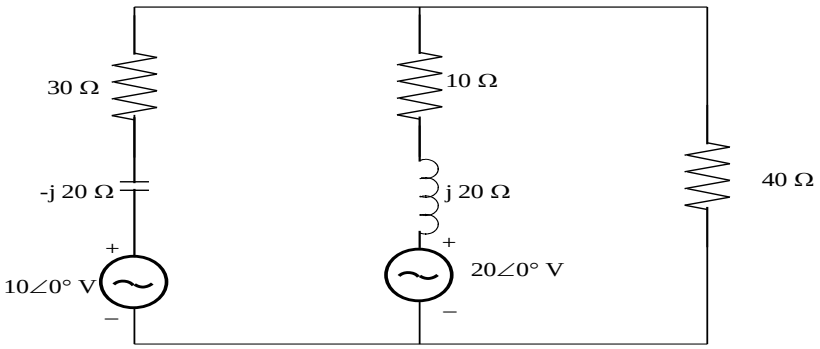

Fig 2A.

2B. Find the value of L at which the circuit resonates at a frequency of 1000 rads/s (Fig 2B)

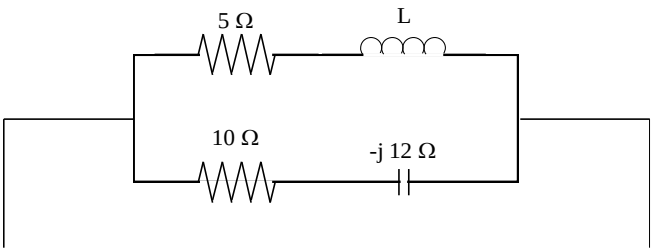

Fig 2B

(10+10)

3A. Determine the power delivered by the voltage source and the current in the 10Ω resistor (Fig 3A) using mesh analysis.

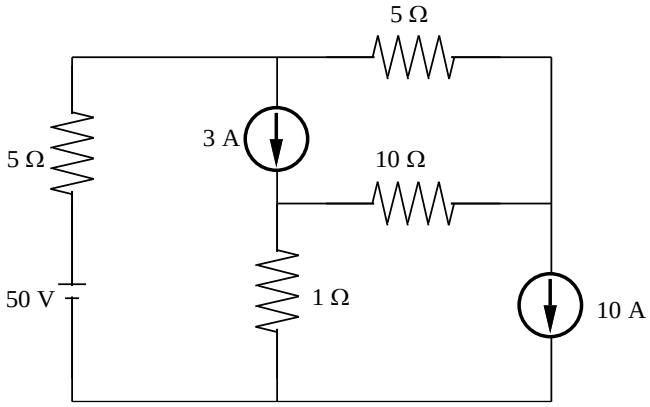

Fig 3A

3B. A voltage v(t) = 10 sinωt is applied to a series RLC circuit. At resonant frequency the voltage across capacitor is 500 V. The bandwidth of the circuit is 400 rads / sec. At resonance impedance of the circuit is 100 Ω. Determine inductance, capacitance, resonant frequency, upper and lower cutoff frequencies **(10+10)**

4A. Find the source voltage V_s, current I_s and the power input to the circuit shown in Fig 4A. The load is (10+j5) kVA at 500 V.

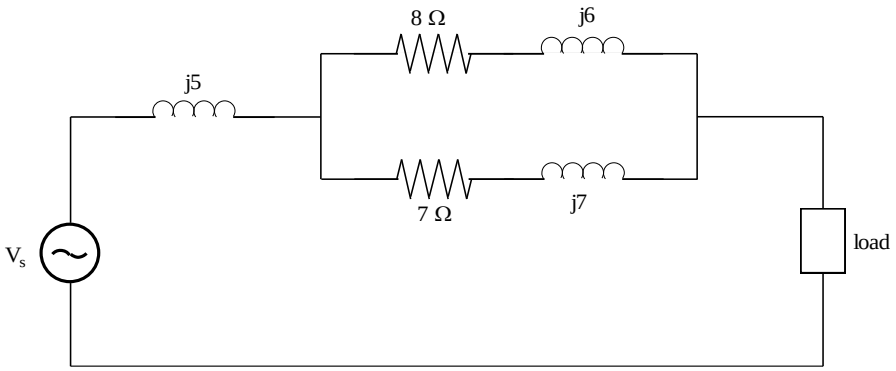

Fig 4A

4B. Find the voltage across the current source shown in Fig 4B

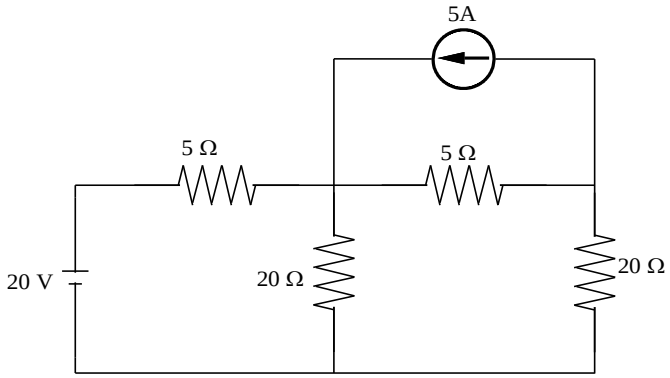

Fig 4B **(10+10)**

5A A Generator of voltage 400 V ∠0° is connected to a motor of voltage E_b ∠Φ V, through a line impedance (1 + j4) **Ω**.

Find the supply current, power factor, power input & motor output for the following cases.

a) E_b=360 ∠-20° V
b) E_b=440 ∠-20°

5B Find the value of Z_L so that maximum power can be transferred to it (Fig 5B). Find the maximum power.

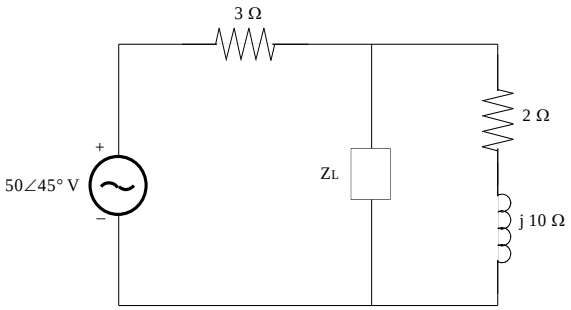

Fig 5B

(10+10)

6A A 3 phase load Y connected is supplied from 400 V supply. The load impedance per phase is (8+j6) Ω. Determine the readings on the two wattmeters to measure three phase power.

6B. Inductor loads of 0.8 kW and 1.2 kW at lagging power factors of 0.8 and 0.6 respectively are connected across a 200 V, 50 Hz supply. Find the total current, power factor and the value of the capacitor to be put in parallel to make the overall power factor 0.94 lag. **(10+10)**

7A. Find the equivalent impedance and the power factor of the circuit shown in Fig 7A.

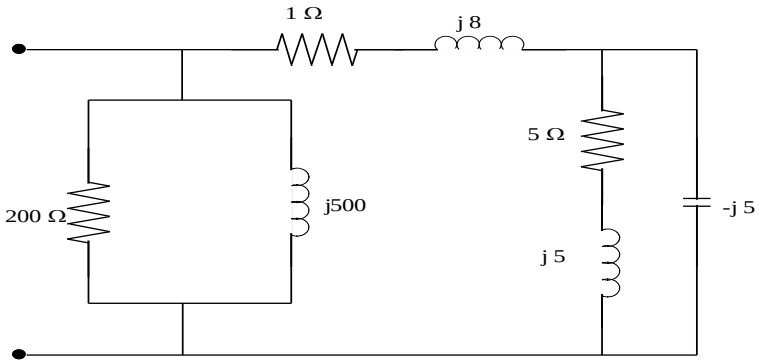

Fig 7A.

7B. With a neat connection diagram & phasor diagram prove that two wattmeters are sufficient to measure three phase power. Explain how the readings on the wattmeter depend on load power factor. **(10+10)**

8A. A generator of 500 ∠ 0° Vis connected to a load of constant magnitude but variable phase angle, the load draws a current of 15 A at unity, 0,8 pf lag & 0.8 pf lead. Find the load voltage for the above cases, given line impedance is (0.2 + j4)Ω.

8B. Find Norton's equivalent network across terminals A&B (Fig 8B).

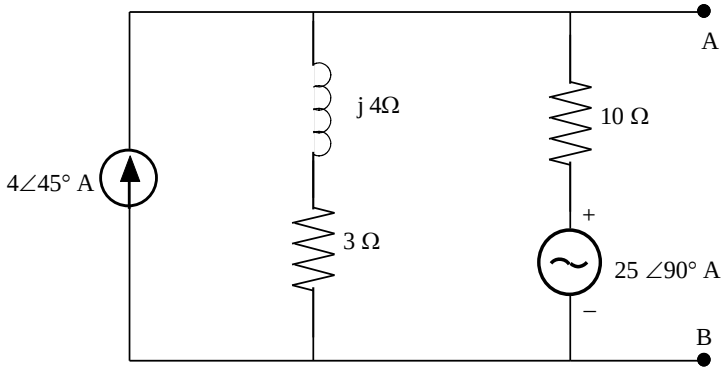

Fig 8B

(10+10)