II B.Tech II Semester Examinations,APRIL 2011
ELECTRICAL AND ELECTRONICS ENGINEERING
Aeronautical Engineering

Time: 3 hours   Max Marks: 80
Answer any FIVE Questions
All Questions carry equal marks
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1. Give the construction of a Cathode Ray tube using electrostatic focusing and deflection systems and describe the functions of various constituents with neat diagrams. [16]

2. (a) Derive the relations between I_B, I_E and I_c in CB configuration?

   (b) Explain the laboratory setup for obtaining the CC characteristics with neat diagram. [6+10]

3. (a) State the voltage current relationships for:
      i. Resistance
      ii. Inductance and
      iii. Capacitance.

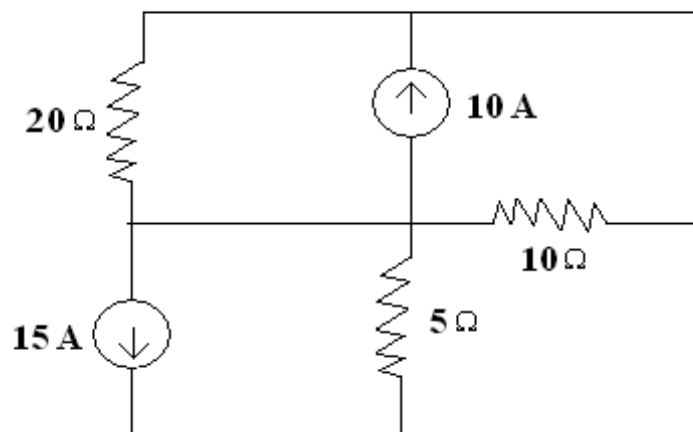   (b) Determine the voltage drop across the 10 ohms resistance for the following figure 3b. [6+10]

Figure 3b

4. (a) Derive the equation for the capacitance connected in shunt for the compensation of frequency errors in moving iron instruments.

   (b) A dynamometer wattmeter reading power correctly on DC is used to measure power in a circuit consisting of a resistance of 2 ohms and an inductance of 0.25H. The supply is from a 100V, 50Hz mains. The Voltage circuit of the wattmeter has a resistance of 1000 ohms and an inductance of 5.6mH. What will be the reading of the wattmeter on the 50Hz mains? Neglect the

impedance of the current coil. The pressure coil is connected on the load side of the instrument. [8+8]

5. A 100 KVA transformer has a 94% efficiency at no load and at 50% of full load. The power factor is unity in both cases:

   (a) Separate the losses

   (b) Determine the efficiency of the transformer for unity power factor and 75 percent of full load. [16]

6. Write short notes on the following:

   (a) Classification of DC generators with examples

   (b) Internal & External characteristics of DC generators

   (c) Self excitation mode of DC machine

   (d) Open circuit characteristics of a DC generator. [4+4+4+4]

7. (a) The data obtained on 100 KVA, 1100V, 3-phase alternator is:
      DC resistance test: E between lines = 6V dc, I in lines = 10 A dc
      O.C test: field current = 12.5 A, Voltage between lines =420V
      SC test: field current = 12.5 A, line current = rated value.
      Calculate the voltage regulation of alternator at 0.8 power factor lagging.

   (b) A 3-phase star connected synchronous motor has synchronous reactance of 4 ohms per phase and is working on 1100 V bus bar. Calculate the power factor of this machine when taking 90 KW from the mains, the excitation being adjusted to a value corresponding to an induced emf of 1200 V. Neglect armature resistance. [8+8]

8. (a) Define the term transition capacitance C_T of a PN diode and derive its equation.

   (b) Explain the term diffusion capacitance C_D of a forward biased diode and derive its equation. [8+8]

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(b) Determine the voltage drop across the 10 ohms resistance for the following figure 3b.   [6+10]
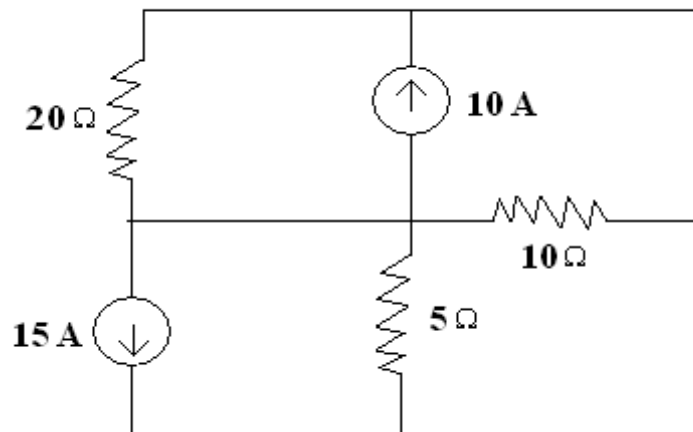

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(b) A 3-phase star connected synchronous motor has synchronous reactance of 4 ohms per phase and is working on 1100 V bus bar. Calculate the power factor of this machine when taking 90 KW from the mains, the excitation being adjusted to a value corresponding to an induced emf of 1200 V. Neglect armature resistance.   [8+8]

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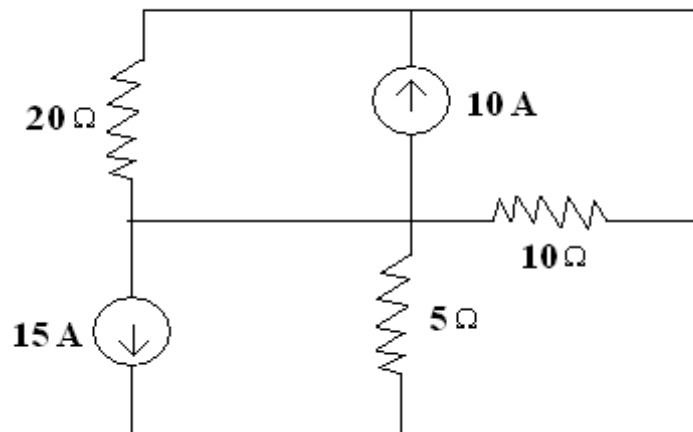(b) Determine the voltage drop across the 10 ohms resistance for the following figure 3b.   [6+10]

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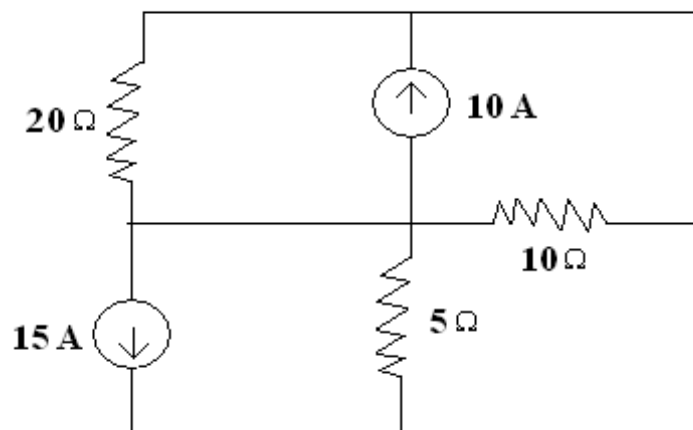
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