

Code No: NR210303

NR

Set No. 2

II B.Tech I Semester Examinations, November 2010

ELECTRICAL ENGINEERING

Common to ME, CHEM, MECT, MEP, AE, MMT

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions

All Questions carry equal marks

1. (a) Explain the construction of salient pole Alternator? [6]
(b) A 3-phase star connected alternator has an open circuit line voltage of 6599 volts. The armature resistance and synchronous reactance are 0.6 ohms and 6 ohms per phase, respectively. Find terminal voltage and voltage regulation if load current 180A at power factor of
i) 0.9 lagging
ii) 0.8 leading. [10]
2. (a) Derive an expression for the emf generated in a d.c. generator. [6]
(b) Calculate the value of emf generated in an 8 pole lap wound generator if it is rotated at 250rpm. The flux/pole is 0.05Wb and the number of armature conductors is 960. [5]
(c) A 6 pole wave connected armature has 250 conductors and runs at 1200rpm. The emf generated is 600V. Find the useful flux/pole. [5]
3. (a) With the aid of a circuit diagram, show that two wattmeters can be connected to read the total power in a three phase, three wire system. [8]
(b) Two wattmeters connected to read the total power in a three phase system supplying a balanced load read 10.5KW and -2.5KW respectively. Calculate the total active power. [8]
4. (a) Why is the speed of a shunt motor practically constant? [6]
(b) Draw the characteristics of shunt and series motors. [10]
5. Calculate the unknown resistance R and the current flowing through it when the current in the branch OC is zero. (figure 1) [16]

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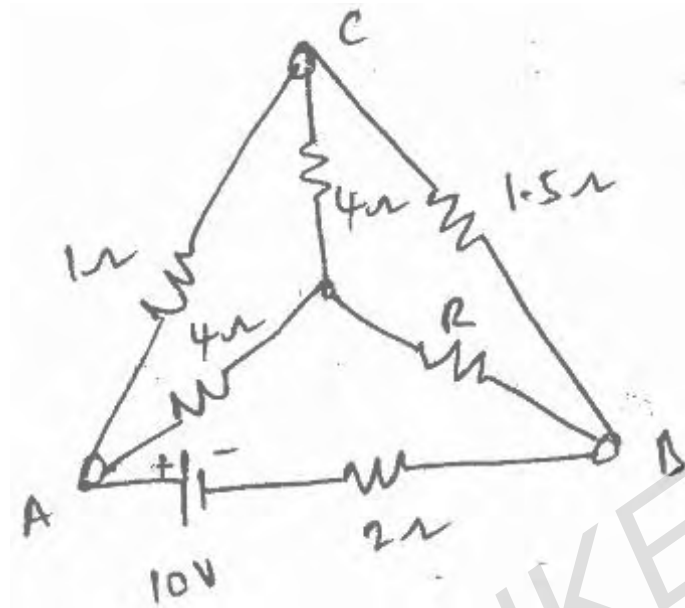


Figure 1

6. (a) Draw, and explain the phasor Diagram of a practical single phase transformer supplying lagging load. [6]
- (b) A 4 KV A, 200/400V, 50 HZ, single phase transformer gave the following test results,
- | | | | |
|---------------|--------|-------|------------------|
| No-load Test: | 200 V, | 0.7A, | 60W (L.V.side) |
| S.C.Test : | 9V, | 6A, | 21.6W (R.V Side) |
- Find the efficiency, and voltage regulation of the Transformer on full load at 0.9 P.F.Lagging [10]
7. (a) Discuss the phenomena of Electrical resonance in a circuit where a coil is in parallel with a capacitor. Why it is called as current magnifying circuit. [8]
- (b) A capacitor is connected in parallel with a coil having $L=5.52\text{mH}$ and $R=10\Omega$., to a 100V, 50Hz supply. Calculate the value of the capacitance for which the current taken from the supply is in phase with the voltage. [8]
8. (a) i. Derive the relationship between the frequency of rotor induced emf, and frequency of supply to the stator. [4]
- ii. Explain the speed -Torque characteristics of 3-phase Induction motor. [4]
- (b) A 18.65 KW, 4 pole, 50 HZ, 3 -phase Induction motor has friction, and windage losses of 25% of the output, and full-load slip is 4% calculate
- The rotor copper loss;
 - The rotor Input
 - The output Torque
 - The gross Torque.
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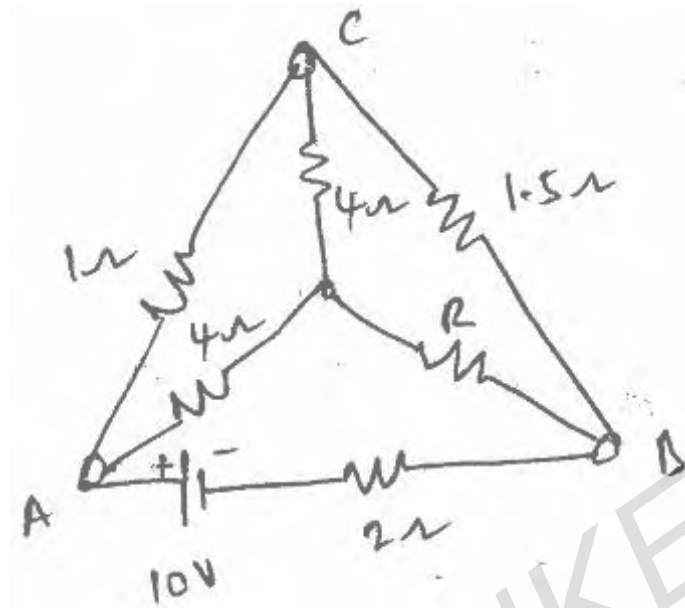


Figure 1

7. (a) Explain the construction of salient pole Alternator? [6]
- (b) A 3-phase star connected alternator has an open circuit line voltage of 6599 volts. The armature resistance and synchronous reactance are 0.6 ohms and 6 ohms per phase, respectively. Find terminal voltage and voltage regulation if load current 180A at power factor of
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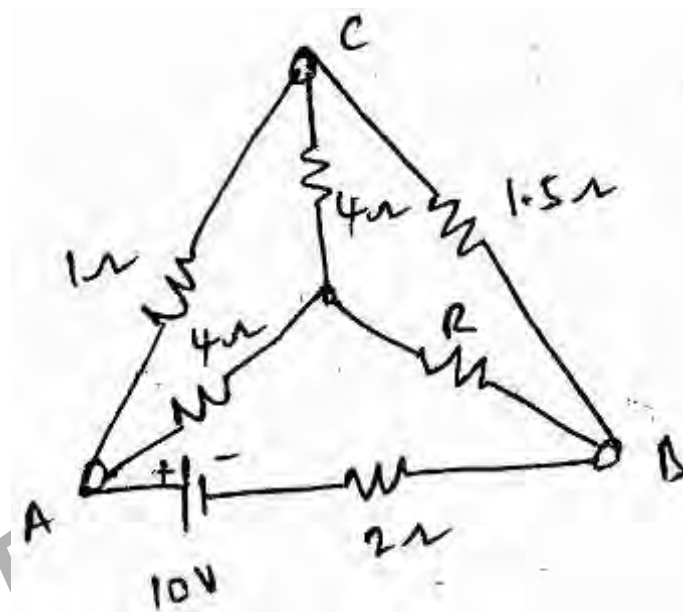


Figure 1

2. (a) Discuss the phenomena of Electrical resonance in a circuit where a coil is in parallel with a capacitor. Why it is called as current magnifying circuit. [8]
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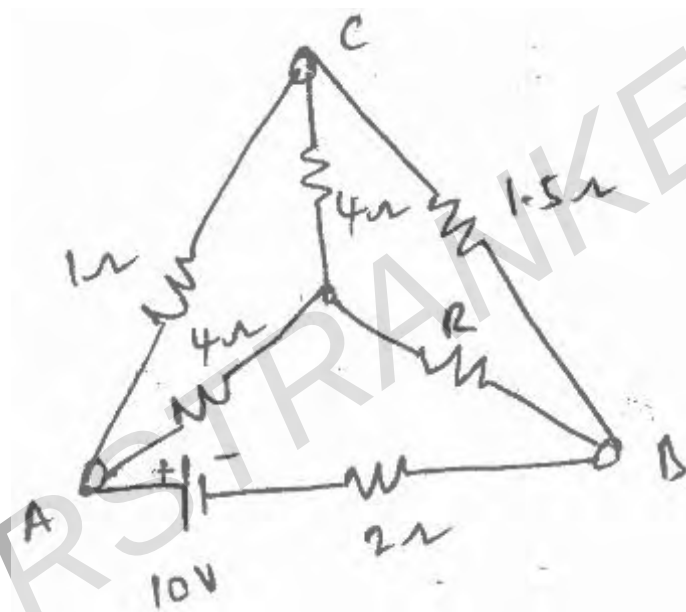


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Find the efficiency, and voltage regulation of the Transformer on full load at 0.9 P.F.Lagging [10]

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4. (a) With the aid of a circuit diagram, show that two wattmeters can be connected to read the total power in a three phase, three wire system. [8]
- (b) Two wattmeters connected to read the total power in a three phase system supplying a balanced load read 10.5KW and -2.5KW respectively. Calculate the total active power. [8]
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