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Code No: 09A30504

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD

B.Tech II Year I Semester Examinations, May/June-2013

Basic Electrical Engineering

(Common to CSE, IT)

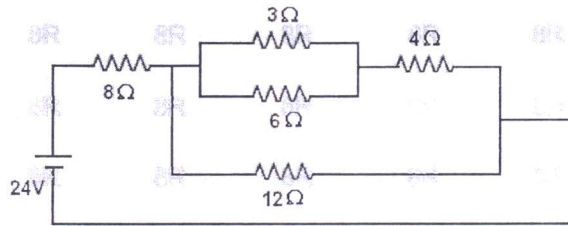
Time: 3 hours

Max. Marks: 75

Answer any five questions  
All questions carry equal marks

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- 1.a) State and explain Kirchoff's laws.  
b) Calculate the currents in individual resistors, the total power consumed and the total current by the compound circuit shown in Figure. [15]



Figure

- 2.a) Define Thevenin's theorem.  
b) An RL parallel circuit consists of a resistance of  $12\ \Omega$  and an inductance of  $0.05\ \text{H}$  connected across a  $115\ \text{V}, 50\ \text{Hz}$  source. Calculate  
i) The total current  
ii) The power factor  
iii) The true power at the circuit. [15]
- 3.a) What is meant by root mean square and average value of alternating currents and voltages?  
b) Two impedances  $Z_1 = (12 + j16)\ \Omega$  and  $Z_2 = (15 - j20)\ \Omega$  are connected in parallel across a  $230\angle 53.08^\circ$  volts power source. Calculate the power in volt amperes, in reactive volt amperes and in watts in each branch and the power factor of the complete circuit. [15]
- 4.a) Explain the working principle of a transformer.  
b) A  $50\ \text{kVA}$  single-phase transformer of  $2300\text{V}/230\text{V}$  rating has the primary and secondary winding resistance of  $2\ \Omega$  and  $0.02\ \Omega$  respectively. The iron losses equal to  $412\ \text{W}$ . Calculate the efficiency  
i) At half full load and  
ii) At full load,  
when the power factor of the load is  $0.8$ . [15]
- 5.a) Derive emf equation of DC generator.  
b) A 4-pole compound generator supplies a load of  $100\ \text{A}$  at a terminal voltage of  $400\ \text{V}$ . Calculate the generated emf of the machine if the resistance of the armature is  $0.02\ \Omega$ , the series field resistance is  $0.04\ \Omega$  and the shunt field resistance is  $160\ \Omega$ . Neglect the armature reaction. [15]

- 6.a) What are the losses present in a dc machine?  
b) A dc series motor having a resistance of  $1 \Omega$  between terminals, runs at a speed of 800 rpm at 200 V with a current of 15 A. Find the speed at which it will run when connected in series with a  $5 \Omega$  resistance taking the same current at the same supply voltage. [15]
- 7.a) Explain the working principle of three phase induction motor.  
b) If a 3-phase induction motor with 6-poles runs at 970 rpm when connected to a 50 Hz supply, calculate  
i) The percentage slip and  
ii) Frequency of the rotor currents. [15]
- 8.a) What are the essential features of measuring instruments?  
b) Explain the working principle of PMMC meter. [15]

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