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2007 JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY

**II B.TECH I SEMESTER REGULAR EXAMINATIONS
ELECTRICAL AND ELECTRONICS ENGINEERING
(AUTOMOBILEENGINEERING)**

SET NO -2
NOVEMBER 2007

Time: 3 hours
Marks: 80

**Answer any FIVE Questions
All Questions carry equal marks**

1. (a) Give the formulae to convert star connected resistances into equivalent delta resistances.
(b) Find R_{ab} across a-b terminals of the network [6+10]
2. (a) Give the applications of d.c. compound motor.
(b) A four pole, 220V d.c. shunt motor has 540 lap wound conductors. It takes 32A from the supply mains and develops power of 5.59 Kw. The field winding takes 1A. The armature resistance is 0.9 Ω and the flux per pole is 30mwb. Calculate
i. the speed and
ii. the torque developed in N-m. [6+10]
3. (a) Derive an approximate expression for voltage regulation in a transformer in terms of the parameters.
(b) A 5KVA, 220/110V single Phase transformer has the following parameters referred to secondary side Resistance =0.1 Ω Reactance =0.4 Ω . Calculate % voltage regulation
i. at full load unity P.F
ii. at full load 0.9pf lag
iii. at half load 0.8pf lead. [8+8]
4. (a) Explain the principle of operation of a 3-phase induction motor.
(b) Explain clearly with necessary circuit diagrams the tests to be conducted on a Three Phase alternator to determine the synchronous impedance of the machine
5. (a) Explain with a neat sketch the working of a repulsion type of moving iron Instrument?
(b) Derive the expression for deflecting torque in the above type of M.I. instrument. [8+8]

6. (a) Draw and explain the circuit diagram of bridge rectifier and also draw the output wave form

(b) A half wave rectifier uses a transformer of turns ratio 2:1. The load resistance is 500 ohms. If the primary voltage is 240V(rms), find dc output voltage and PIV ? Assume the diode to be ideal.
[8+8]

7. (a) Derive the relationship between the collector current and collector emitter leakage current, and also derive the relation between α and β

(b) The silicon transistor in the CE bias circuit has a β of 100. Find the bias point? $V_{BE}=0.7V$.

8. (a) A cathode ray tube has X-plates deflection sensitivity of 0.5mm/v. An alternating voltage of $40\sin 2\pi \times 50t$ volts is applied to X-plates. What trace will you observe on the screen? Give the dimensions of the trace.

(b) Derive an approximate expression giving the deflection produced by a long deflection coil in a CRO. Coil runs for the entire length from the final anode to the screen

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