

B. Tech Degree III Semester Examination, November 2009**IT/CS/EC/ME/EB/EI 302 ELECTRICAL TECHNOLOGY***(Common for 1999 & 2002 Schemes)*

Time : 3 Hours

Maximum Marks : 100

(All questions carry **EQUAL** marks)

- I. (a) Why the core loss in a transformer is load independent? Explain.
 (b) A single phase transformer has 1000 turns on the primary and 200 turns on the secondary. The no – load current is 3A at a power factor of 0.2 lagging. When the secondary current is 280A at a power factor of 0.8 lagging, calculate the primary current and power factor. Assume the voltage drop in windings to be negligible.

OR

- II. (a) Distinguish between CT & PT.
 (b) The following data were obtained on a 20 KVA, 50 Hz, 2000/200 V distribution transformer :

	Voltage	Current	Power
OC Test (HV side open circuited)	200	4	120
SC Test (LV side short circuited)	60	10	300

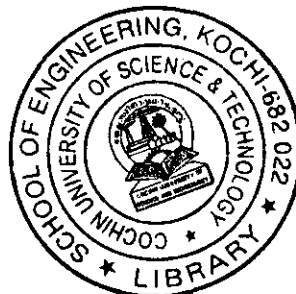
Obtain the parameters and draw the approximate equivalent circuit, referred to LV side.

- III. (a) Derive the emf equation of a DC machine.
 (b) A 220 V DC generator supplies 4 KW at a terminal voltage of 220 V, armature resistance being 0.4Ω . If the machine is now operated as a motor at the same terminal voltage with the same armature current, calculate the ratio of generator speed to motor speed. Assume that the flux/pole is made to increase by 10% as operation is changed over from generator to motor.

OR

- IV. (a) Explain the different methods for speed control of a DC shunt motor.
 (b) A shunt motor supplied at 250 V, runs at 900 rpm, when armature current is 30A. The resistance of the armature circuit is 0.4Ω . Calculate the resistance required in series with the armature to reduce the speed to 600 rpm, assuming the armature current is then 20A.

- V. (a) Explain the emf method for pre-determining the regulation of an alternator.
 (b) A 3 phase 12 pole, star connected alternator has 180 slots with 10 conductors per slot and the conductors of each phase are connected in series. The coil span is 144° (electrical). Determine the phase and line values of emf, if the machine runs at 600 rpm and the flux per pole is 0.06 Weber distributed sinusoidally over the pole.

OR*(Turn Over)*

- VI. (a) Explain the behaviour of synchronous motor with different excitations.
(b) Describe the methods employed for the starting of a synchronous motor.
(c) What are the different applications of a synchronous motor?
- VII. (a) Describe the principle of operation of a 3 – phase induction motor.
(b) A 4 – pole, 3 – phase induction motor operates from a supply whose frequency is 50 Hz. Calculate –
(i) Speed at which the magnetic field of the stator is rotating
(ii) Speed of the rotor when the slip is 0.04
(iii) The frequency of the rotor currents when the slip is 0.03
(iv) Frequency of rotor currents at standstill.
- OR**
- VIII. (a) Why a single phase induction motor is not self starting?
(b) Explain the working of a shaded pole IM.
- IX. (a) With necessary schematic diagram, explain the working of nuclear power plant.
(b) Explain the terms : (i) Corona (ii) Skin effect.
- OR**
- X. Write short notes on :
(i) Busbars
(ii) Methods of Transmission
(iii) Load dispatching
(iv) Substation equipments.
