YMCA UNIVERSITY OF SCIENCE & TECHNOLOGY, FARIDABAD
B.TECH EXAMINATION (Under CBS)
SUBJECT- EMEC (EIC-207), SCHEME-2010

Time: 3 Hrs **M.M. 60**

Note: Part A is compulsory. Attempt any four questions from Part B.

Part A

1.(i) what is the rotor frequecy at the time of starting & at the time of running for an induction machine?

(ii) A 6-pole,12 Kw, 240 V d.c. machine is wave connected. If this machine is now lap-connected,all other things remaining same, calculate its voltage,current and power ratings.

(iii) Write the condition for maximum efficiency of a DC generator.

(iv) Show that the emf generated in a short pitched coil is reduced by the factor cos ε/2, where ε is the chording angle.

(v) Why it is not possible to run an induction machine on synchronous speed.?

(vi) What is the function of no-volt release coil in a three pt. starter?

(vii What would happen if the field excitation is minimum at the time of starting a d.c. motor & why?

(viii) Why does the terminal voltage fall more rapidly in a self excited shunt generator than in a separately excited d.c. generator.?

(ix)Why Synchronous Machine is known as a doubly excited machine?

(x) What are the assumptions made in case of an ideal transformer? **2x10**

Part B

2.(a) Draw and explain the torque slip curve of an induction machine showing the braking, motoring and generating mode. 5

(b) Draw the phasor diagram for a polyphase Induction motor. How does it differ from the phasor diagram of a transformer? 5

3 (a) Derive the expression for the torque developed in a D.C. motor.Explain the armature resistance control method for the speed control of a D.C. motor. 5

(b) Draw & explain all the characterstics of a D.C. shunt generator. 5

4(a) Describe the principle of energy conversion. Draw and explain fully the general block diagram representation of an electromechanical energy conversion device. 5

(b) For a linear magnetic ckt. ,derive the following relations for magnetic stored energy Wfld and co-energy Wfld'

$Wfld = Wfld' = \frac{1}{2} F\varphi = 1/2\ \Psi i = \frac{1}{2} Li2$ 5

5.(a) Describe the operation & characterstics of split phase inuction motor & compare it with a capacitor start induction motor. 5

(b) Explain & draw the V-curves of a synchronous motor in detail. 5

6 (a) 8 KVA,500/250 V ,50 Hz , single –phase transformer gave the following Test results:

OC Test (lv side) : 250V,1.2 A, 80W SC Test (hv side) : 25V, 12.5A,90 W . 5

Determine (i) equivalent ckt. referred to lv side.(ii) secondary load voltage at 0.8 p.f. lagging with full-load current

(b) Derive the exact expression for computing the per unit voltage regulation of a transformer for lagging power factor. 5

7 (a) Explain the process of voltage build up in d.c. shunt generators. What are the possible causes for failure of build up . 5

(b)The armature & field resistances of a 250 V D.C .shunt motor are 0.4 Ω and 200 Ω resp.. when driving a load of constt. Torque at 500 rpm,the armature current is 20A.It is desired to raise the speed from 500 rpm to 700 rpm.What resistance should be added in series with the shunt field ckt.? .Assume the magnetic ckt. to be unsaturated. 5