## GANPAT UNIVERSITY
### B.TECH SEM.3rd MECHATRONICS ENGINEERING
### REGULAR EXAMINATION NOV-DEC 2012
### 2EE303 ELECTRICAL MACHINES & DRIVES

TIME:-3 HOURS                                                      TOTAL MARKS-70

INSTRUCTION:-     1.Attempt all questions.
                  2.Make suitable assumptions wherever necessary.
                  3.Figures to the right indicate full marks.

### Section-I

Que-1

(a) Define Voltage regulation of Alternator. Give methods of finding Voltage regulation. Explain Synchronous Impedance Method. (06)

(b) Explain why synchronous motor is not self starting? Draw vector diagram of motor and it's Equivalent circuit. (06)

**OR**

Que-1

(a) A 3-Φ, 16 pole alternator has a star connected winding with 144 slots and 10 conductors per slot. The flux per pole is 0.03 Wb. Sinusoidally distributed and the speed is 375 rpm. Find the efficiency and the phase and line emf. Assume full pitched coil. (06)

(b) Discuss the operation of synchronous motor with variable excitation on constant input. (06)

Que-2

(a) A Shunt generator delivers 450 A at 230 V. & the resistance of shunt field & armature are 50 Ω & 0.03 Ω respectively. Calculate the generated emf. (05)

(b) Sketch and explain the speed-current, speed-torque, and torque-current characteristics of a dc shunt motor. (06)

**OR**

Que-2

(a) A 250V, 4-pole, wave wounded d.c. series motor has 782 conductors. It has armature and series field resistance of 0.75Ω. It takes current of 40A. Calculate it's speed and gross torque developed, if flux per pole is 25mwb (05)

(b) Derive the emf equation of dc generator for lap and wave winding. (06)

Que-3     Attempt any three                                            (12)

(a) Synchronous condenser.

(b) Write short note on Three Point Starter

(c) Compare individual drives with group drives.

(e) Explain Armature Reaction in D.C Machine.

Que-4

(a) Explain methods of speed control of DC Series motor. (06)

(b) Draw and Explain internal & external characteristics of DC shunt Generator. (06)

**OR**

Que-4

(a) State and Explain condition of maximum efficiency of Transformer. Justify why Transformer efficiency changes with p.f . (06)

(b) Explain Rotating Magnetic Field using Vector diagram (06)

Que-5

(a) A 3-phase induction motor is wound for 4 poles and is supplied from 50 Hz system. Calculate (i) the synchronous speed (ii) the rotor speed, when slip is 4% and (iii) rotor frequency when rotor runs at 600 rpm. (06)

(b) Discuss principle of transformer and construction of transformer. (05)

**OR**

Que-5 (a) Obtain the equivalent circuit of a 200/400 V, 50 Hz, 1-phase transformer from the following test data: (06)

O.C. test   200V 0.7 A 70 W (On l.v. side)

S.C. test   15 V 10 A 85 W (On h.v. side)

Also calculate the % regulation when delivering 5 kW at 0.8 p.f. lagging.

(b) Derive the equation of torque under running condition for three phase induction motor. Also derive the condition for maximum torque under running condition. (05)

Que-6    Attempt any three (12)

(a) Auto transformer.

(b) Why 1Φ induction motor not self start?

(c) Discuss capacitor start induction run motor.

(d) Derive E.M.F. Equation of Transformer.

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