GANPAT UNIVERSITY
B.Tech SEM IIIrd (ELECTRONICS & COMMUNICATION ENGG.)
REGULAR EXAMINATION NOV.-DEC.-2011
2EE303: ELECTRICAL ENGINEERING

Time: 3 Hours   Total Marks: 70
Instructions:

(1) All Questions are compulsory.
(2) Figures to the right indicate full marks.
(3) Answer to two sections must be written in seperate answer books.
(4) Assume suitable data if necessary.

SECTION: 1

Que-1 **(a)** A short–shunt d.c. compound generator supplies 100 A to a load at 250 volt. The resistance of armature, series field and shunt field resistance of 0.1 ohm, 0.1 ohm and 130 ohm respectively. Find the voltage generated in armature. Assume 1 V drop per brush. **(04)**

(b) Discuss the significance of back e.m.f. in D.C. Motor. **(03)**

(c) Discuss the methods of speed control for DC Shunt motor. **(05)**

OR

Que-1 **(a)** Explain different characteristic of D.C. shunt generator. **(05)**

(b) A lap-wound ,4-pole, 220V shunt motor has 500 conductors. Which develops output power of 5.5kW and draws 30 A from the supply mains and. The field winding takes 1A. The armature resistance is 0.85 ohm and the flux per pole is 35m W b. Calculate (1) the speed (2) the torque developed in Newton meters **(04)**

(c) Derive the condition for maximum efficiency of DC generator. **(03)**

Que-2 **(a)** Explain Synchronous Impedance Method to obtain voltage regulation of Alternator. **(04)**

(b) A 3Φ,16 pole,50Hz synchronous generator has a resultant air gap flux of 0.06 wb per pole. The stator has 2 slots per phase and 4 conductors per slot .The coil span is 150° electrical. Calculate the phase and line induced voltage when the machine runs at 375 r.p.m. **(04)**

(c) Compare: Salient pole rotor with smooth cylindrical rotor. **(03)**

OR

Que-2 **(a)** Explain the V- curve of synchronous motor and also explain application of synchronous motor as synchronous condenser. **(04)**

(b) A 3Φ, 1500 KVA, star connected 50 Hz, 2300 V alternator has a resistance between each pair of terminals are measured by direct current is 0.16 Ω. Assume that effective resistance is 1.5 times the ohmic resistance. A field current of 70 A produces a short circuit current equal to full load current of 376 A in each line and t produces an e.m.f. of 700 V on open circuit, Determine its full load regulation at 0.8 lagging p.f. **(04)**

(c) Why armature is stationary in alternator? **(03)**

Que-3 **Attempt any three.** **(12)**
(a) Discuss Main parts of Hydro power plant.
(b) Discuss 3 point starter for DC shunt motor.
(c) Draw the schematic diagram of thermal power plant and explain working of Economizer and condenser.
(d) Explain Distribution factor and its effect on e.m.f. generated by alternator.

Que-4 (a) Derive an expression for approximate voltage drop and get the voltage regulation of 1-∅ Transformer. (05)

(b) For 50 KVA, 2400/120 V, 1-∅ transformer O.C. and S.C. test results are as follows: **O.C test : 120V, 9.65 A, 396W (L.V side)** (05)
S.C test : 92V, 20.8 A , 810W (H.V side)
Find out circuit constant. Also find efficiency and voltage regulation at 0.8 (leading) P.F. on full load condition.

(c) Draw the phasor diagram of 1-∅ transformer for Inductive power factor load. (02)

OR

Que-4 (a) Explain the basic conditions for parallel operation of 1-∅ transformers. (04)

(b) Discuss the equivalent circuit of 1-∅ transformer. (04)

(c) In a 25 KVA transformer the iron and copper losses are 350 W and 400 W respectively. Calculate the values of iron and copper losses which will give maximum efficiency and also calculate the value of maximum efficiency. Also get the load KVA at which efficiency be maximum. (04)

Que-5 (a) Discuss the methods of speed control for 3∅ Induction motor from stator side. (05)

(b) Justify" No load primary current drawn by Induction motor is more than Transformers no load current." (02)

(c) For 3∅ ,440V,60Hz, 4-pole star connected induction motor, calculate (1) speed of stator magnetic field (2) speed of rotor at 4% slip.(3)frequency of rotor current if slip is 3 % (4) Speed of rotor magnetic field with reference to stator (04)

OR

Que-5 (a) Explain Torque- Speed characteristic of Induction motor and also explain the effect of change in supply voltage and frequency in equal proportion on it. (04)

(b) Explain Capacitor start 1-∅ Induction motor. (03)

(c) A 746 KW, 3∅, 50 Hz, 16 pole Induction motor has rotor impedance of (0.02+j0.15) Ω at standstill. Full load torque is obtained at 360 r.p.m. Calculate (a) the speed at which maximum torque occurs; (b) the ratio of maximum to full load torque; (c) the external resistance per phase to be inserted in the rotor circuit to get maximum torque at starting. (04)

Que-6 **Attempt any three.** (12)

(a) Discuss : Auto transformer.

(b) Justify by using double field revolving theory-" 1-∅ Induction motor is not self starting".

(c) Discuss Star-Delta starter for Induction Motor.

(d) Explain the operation of circuit breaker with protective relay under the faulty condition.

END OF THE PAPER