

GANPAT UNIVERSITY
B.TECH SEM-IV (ELECTRICAL)
REGULAR EXAMINATION MAY-JUNE 2013
2EE402:-ELECTRICAL MACHINE-II

Time: 3 Hours

Total Marks:-70

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

SECTION-I

- Que-1 (A)** A 3- ϕ , 440V, induction motor gave the following test readings. [06]
 No load: 400V, 1250W, 9A.
 Short circuit: 150V, 4000W, 38A.
 Draw the circle diagram. If the normal rating is 14.9KW. Find from the circle diagram the full load value of current, p.f and slip.
- (B)** Explain the speed control of 3- ϕ induction motor from stator side. [06]
- OR**
- Que-1 (A)** A 400V, 40 hp, 50Hz star connected 3- ϕ induction motor gave the [06]
 following test data.
 No load: 400V, 20A, 1200W.
 Blocked rotor test: 100V, 45A, 2750W.
 The stator d.c resistance per phase is 0.01Ω . the ratio of a.c to d.c resistance is 1.5. The friction and windage loss is 300W. Calculate the circuit elements of the approximate equivalent circuit of the motor.
- (B)** Explain Star-Delta starter for 3- ϕ induction motor. [06]
- Que-2 (A)** Discuss the method to make 1- ϕ induction motor self starting. [06]
(B) Draw and discuss equivalent circuit of 1- ϕ induction motor. [05]
- OR**
- Que-2 (A)** Compare the performance of ordinary motor with energy efficient motor. [06]
(B) The full load slip of a 3- ϕ double cage induction motor is 6% and the two [05]
 cages have impedances of $(3.5+j1.5)\Omega$ and $(0.6+j7)\Omega$ respectively.
 Neglecting stator impedance and magnetizing current. Calculate the starting torque in terms of full load torque.
- Que-3 Attempt any two Questions [12]**
(A) Explain Cogging and crawling.
(B) Explain linear induction motor.
(C) Explain Shaded pole induction motor.

SECTION-II

Que-4 (A) Derive e.m.f equation of alternator. Show effect of harmonics on pitch factor and distribution factor. [06]

(B) A 3- ϕ star connected 1000KVA, 11000V alternator has rated current of 52.5 A. The ac resistance of the winding per phase is 0.45 Ω . The test results are given below: [06]

O.C. Test: field current = 12.5 A, voltage between lines = 422 V

S.C. Test : field current = 12.5A, line current = 52.5A

Determine the full load voltage regulation of the alternator for (i) 0.8 p.f lagging and (ii) 0.8 p.f leading loads with synchronous impedance method.

OR

Que-4 (A) List different methods for finding voltage regulation of an alternator and explain ZPF method. [06]

(B) A 2,000 KVA, 3- ϕ , 8-pole alternator runs at 750 rpm in parallel with other machines on 6,000 V bus-bars. Find synchronizing power on full load 0.8 p.f. lagging per mechanical degree of displacement and the corresponding synchronizing torque. The synchronous reactance is 6 ohm per phase. [06]

Que- 5 (A) State the condition and explain dark lamp method of synchronizing of an alternator with bus bar. [06]

(B) Explain the construction and working principle of hysteresis motor. [05]

OR

Que- 5 (A) A 1000KVA, 11000V, 3-phase, star connected synchronous motor has an armature resistance and reactance per phase of 3.5 Ω and 40 Ω respectively. Determine the induced e.m.f and angular retardation of the rotor when fully loaded at (a) 0.8 p.f lagging (b) 0.8 p.f leading [06]

(B) Explain the effect of varying excitation at constant load on synchronous motor with necessary diagram. [05]

Que-6 Attempt any three Questions [12]

(A) Explain V and inverted V curve of synchronous motor.

(B) Compare synchronous motor with induction motor.

(C) Explain Two reaction theory of synchronous machine.

(D) How does a 3-phase alternator differ from a d.c Generator?. Explain Advantage of stationary armature in a.c alternator.

END OF PAPER

Best of Luck