

GANPAT UNIVERSITY
B.TECH SEM III (Mechanical Engineering)
Regular Examination Nov-DEC.-2012
2EE303 - Electrical Technology

Time: 3 Hours

Marks: 70

Instruction:

- (1) All Questions are compulsory.
- (2) Figures to the right indicate full marks.
- (3) Answer to two sections must be written in separate answer books.

SECTION: 1

- Que-1** (a) For 440V, 3 Φ , 50Hz 4-pole star connected Induction motor calculate (1) (04)
Speed of stator magnetic field (2) speed of rotor at 4% slip. (3) frequency
of rotor current if slip is 3%(4) frequency of rotor current at stand still.
(5) speed of rotor field with reference to stator.
- (b) Explain power stages in a three phase induction motor.. (04)
- (c) Compare two basic types of induction motor. (04)

OR

- Que-1** (a) Explain speed- torque characteristic of Induction motor and also explain (05)
the effect of rotor resistance on torque-slip characteristic.
- (b) A 4-pole , 50 Hz, 3-phase induction motor develops a maximum torque (05)
of 162.8 N-m at 1365 RPM. The resistance of the star connected rotor is
0.2 Ω /phase. Calculate the value of the resistance that must be inserted in
series with each rotor phase to produce a starting torque Equal to half
the maximum torque
- (c) Explain the significance of "Slip" in performance of Induction Machine. (02)

- Que-2** (a) Explain the working of Ideal Transformer with Phasor Diagram and (04)
waveforms.
- (b) Obtain the condition for Maximum Efficiency of transformer. (03)
- (c) A For 4 KVA, 200/400 V, 1- Φ transformer O.C and S.C test results are (04)
as follows O.C. test : 200V, 0.8 A, 70W (L.V side)
S.C. test : 20V, 10 A, 60W (H.V side)
Find parameters from O.C and S.C test. Also find efficiency at 0.8
lagging P.F. on full load condition.

OR

- Que-2** (a) Explain Open circuit test on Transformer . (04)
- (b) Explain the Auto transformer with its advantages and application (04)
- (c) A 200 KVA transformer has an efficiency of 98% at full load. If the (03)
maximum efficiency occurs at three quarters of full load. Calculate the
efficiency at half load. Assume negligible magnetizing current and pf of
0.8 at all loads.

- Que-3** **Attempt any Three** (12)
- (a) List out speed control methods for Induction motor and explain any
method of speed control from rotor side.
- (b) Justify by using Double Field revolving theory "Single phase Induction
Motor is not self starting"
- (c) Discuss the parallel operation of single phase transformer.
- (d) Explain the important factors affecting the selection of electric drives.

SECTION: 2

- Que-4 (a) A 3 phase, 8 pole, 750 RPM star connected synchronous generator has 72 slots on armature. Each slot has 12 conductors and winding is short chorded by 2 slots. Find the induced emf between lines, given the flux per pole is 0.06 Wb (05)
- (b) Draw and Explain 'V - Curve' and "Inverted V curve characteristics" of synchronous motor. (04)
- (c) Explain the function of (1) Trip On coil in DC motor starter. (2) Economizer in Thermal Power plant. (03)

OR

- Que-4 (a) Derive E.M.F. equation of an alternator. (04)
- (b) Discuss constructional difference between AC generator and DC generator. And explain the advantage of stationary armature of synchronous machine over an armature located on rotor. (05)
- (c) Discuss the advantages of Electric heating over any other form of heating. (03)

- Que-5 (a) A 4-pole, 240 V, wave connected shunt motor gives 11.19 KW when running at 1000 RPM and drawing armature and field current of 50 A and 1.0 A respectively. It has 540 conductors. Its resistance is 0.1 ohm. Assuming a drop of 1 volt per brush, find (a) total torque (b) useful torque (c) useful flux / pole (d) rotational losses and (e) efficiency (04)
- (b) Explain the Types of D.C. Generator with equation. (04)
- (c) Discuss armature reaction in DC generator with figure. (03)

OR

- Que-5 (a) Explain the principle of D.C. Motor and significance of the back e.m.f. (04)
- (b) A shunt generator delivers 195 A at terminal voltage 250 volt. The armature resistance and shunt field resistance are 0.02 ohm and 50 ohm respectively. The iron and friction losses equal 950 W find (1) E.M.F. generated (2) copper losses (3) mechanical input power (4) commercial efficiency. (04)
- (c) Explain Speed-current & Torque - speed characteristics of D.C. shunt and DC series motor (03)

- Que-6 Attempt any three. (12)
- (a) Explain Dielectric Heating.
- (b) Explain synchronous Impedance Method for voltage regulation of alternator.
- (c) Draw the figure of 3 point starter and compare it with 4 point starter.
- (d) Compare AC welding and DC welding methods.

END OF PAPER