

GANPAT UNIVERSITY
B.TECH SEM III (Electronics and Communication Engineering.)
Regular Examination Nov-DEC.-2012
2EE303 - Electrical Engineering

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) What do you mean by Voltage regulation? Obtain an expression for approximate voltage drop and get voltage regulation of Transformer. (05)
 - (b) Discuss different losses in transformer and explain how can we minimize these losses? (03)
 - (c) The 500 KVA, 6000V/400V, 1- ϕ transformer have primary and secondary resistances of 0.4Ω and 0.0015Ω respectively. The constant loss of transformer is 3.2 KW. Calculate efficiency at full load and half load at 0.8 lagging power factor. (04)

OR

- Que-1**
- (a) Write the conditions for parallel operation of two single phase transformer. (03)
 - (b) A 1- ϕ , 50 Hz, 20 KVA, 2200/220 v transformer is tested for O.C and S.C test. Results obtained from the tests are as follows
 O.C test : 220v, 4.2 A, 148W (LV side)
 S.C test : 86v, 10.5 A, 360W (HV side)
 Find parameters of transformer, efficiency and voltage regulation at 0.8 lagging P.F. on full load condition. (05)
 - (c) Explain the working of single phase transformer on load with phasor diagram when supplying inductive load. (04)

- Que-2**
- (a) Derive the condition for maximum torque under running condition and Discuss the effect of rotor resistance on the value of maximum torque. (05)
 - (b) Discuss the significance of Slip in induction motor performance. (02)
 - (c) A, 3 ϕ induction motor runs at almost 1000 RPM at No-load and 950 RPM at full load when supplied from 3 ϕ , 50Hz source. Answer (1) How many poles has the motor? (2) What is the percentage slip at full load? (3) What is frequency of rotor voltage? (4) What is the corresponding speed of the rotor field with respect to rotor and also with respect to stator? (04)

OR

- Que-2**
- (a) Justify by using double field revolving theory: "Single phase Induction motor is not self starting". (04)
 - (b) Explain. Speed -Torque characteristic of 3- ϕ induction motor. (03)
 - (c) A 3- ϕ , 50 Hz, 500 V, 6 pole, star connected Induction gives an output of the 20 KW at 950 RPM with a power factor of 0.8. The mechanical losses are equal to 1KW. Calculate for this load (i) slip (ii) Copper loss (iii) Input if the stator losses are 1500 W (iv) Line current. (04)

Que-3 **Attempt any Three** (12)

- (a) List out the starters used for Induction motor and Discuss any of them.
- (b) Explain Open circuit test on Transformer
- (c) Discuss the power stages of 3- ϕ induction motor.
- (d) Explain capacitor start single phase Induction motor.

SECTION: 2

- Que-4 (a) Draw and explain torque-speed and speed-current characteristic for DC shunt and series motors. (05)
- (b) Explain the process of "Voltage Build Up" in a self excited shunt generator and define critical speed and critical resistance. (03)
- (c) A 4 pole DC shunt generator with lap connected armature supplies a load 100 A at a voltage of 200 volt. The resistance of shunt field and armature is 80Ω & 0.1Ω respectively. Total brush drop is 2 V. Find (1) Total Armature current (2) Current per armature path (3) the generated EMF. (04)

OR

- Que-4 (a) Explain different types of DC generator with their voltage equations. (05)
- (b) A 250 V dc shunt motor, on no load, runs at 1000 RPM and takes 5 A. The field and armature resistances are 250Ω and 0.25Ω respectively. Calculate the speed when the motor is loaded such that it takes 41 A if the armature reaction weakens the field by 3 %. (04)
- (c) Discuss the importance of "Hold On coil" and "Trip On coil" in DC motor starter with appropriate diagram. (03)

- Que-5 (a) What are the different types of AC generators in use? Explain the essential differences in their construction. (04)
- (b) A 3 phase, 50 Hz synchronous generator has star connected stator having 180 slots and 8 conductors per slot with 0.03 Wb per pole sinusoidally distributed resultant flux over the pole in air gap. The winding factor is 0.96. Calculate the phase and line induced voltage. (04)
- (c) What are the advantages of short pitching? Discuss the Pitch factor. (03)

OR

- Que-5 (a) Explain the effects of varying excitation upon the armature current and power factor of synchronous motor. (04)
- (b) A 3 phase, star connected 1000 KVA, 50 Hz, 11,000 V alternator has rated current of 52.5 A. The ac resistance of winding per phase is 0.45 ohm. The test results are given below, (04)
- OC Test; field current = 12.5 A, Voltage between line = 422 V.
 SC Test; field current = 12.5 A, line current = 52.5 A
 Determine synchronous reactance of the machine and its full load regulation at 0.8 lagging power factor.
- (c) Draw the schematic diagram of Thermal power plant. (03)

- Que-6 Attempt any three. (12)
- (a) Explain synchronous Impedance Method for voltage regulation of alternator.
- (b) Discuss all essential components of Hydro power plant.
- (c) Explain the construction and importance of High Rupturing Capacity fuses.
- (d) What are the factors that affect the speed of a DC Shunt motor? Also explain how speed can be controlled above and below the normal speed

END OF PAPER