

GANPAT UNIVERSITY
B. TECH SEM- III (MECHANICAL ENGINEERING)
REGULAR EXAMINATION NOV - DEC 2016
2EE306: ELECTRICAL TECHNOLOGY

TIME: 3 HRS

TOTAL MARKS: 60

Instructions:

- (1) This Question paper has two sections. Attempt each section in separate answer book.
- (2) Figures on right indicate marks.
- (3) Be precise and to the point in answering the descriptive questions.

SECTION: I

- Q.1 (A) Derive the equation of running torque of 3-phase induction motor. (04)
- (B) Why single phase induction motor is not self-starting.? What are the ways to make it self start? (04)
- (C) Define slip speed and slip. State the equations of both. (02)

OR

- Q.1 (A) With necessary diagrams explain how rotating magnetic flux generated in 3 phase induction motor. (03)
- (B) A 3 phase slip ring induction motor with star connected rotor has an induced emf of 120 V between slip rings at stand still with normal voltage applied to the stator. The rotor winding has a resistance per phase of 0.3 ohm and standstill leakage reactance per phase of 1.5 ohm. Calculate the i) rotor current per phase when slip is 4%, ii) slip and rotor current per phase when the rotor is developing maximum torque. (04)
- (C) Sketch and explain the torque slip characteristics of 3 phase induction motor. (03)
- Q.2 (A) Derive the e.m.f. equation of lap dc generator. (04)
- (B) A short shunt compound generators delivers a load current of 30 A at 220 V and has armature, series field and shunt field resistances of 0.05 ohm, 0.30 ohm and 200 ohm respectively. Calculate the induced emf and the armature current. Allow 1 V per brush for contact drop. (04)
- (C) Define following terms: (02)
- i) armature reaction
 - ii) critical resistance

OR

- Q.2 (A) Explain voltage build up process for dc shunt generator. (04)
- (B) A dc motor takes an armature current of 110 A at 480 V. The armature circuit resistance is 0.02 ohm. The machine has 6 poles and the armature is lap connected with 864 conductors. The flux per pole is 0.05 Wb. Calculate the speed and gross torque developed by the armature. (03)
- (C) Draw and explain the characteristics of dc series generator. (03)
- Q.3 (A) Explain different characteristics of dc shunt motor. (04)
- (B) Classify different types of dc generators with their connection diagram. (04)
- (C) What do you mean by back emf? Derive the condition for maximum efficiency in dc motor. (02)

SECTION: II

- Q.4 (A) Compare Individual, Group and Multi-Motor drives? (5)
(B) List & Explain the Advantages of Electrical Drive over another form of Drives? (5)

OR

- Q.4 (A) Discuss basic principle & construction of transformer. (5)
(B) What is Auto-Transformer? And Discuss about Saving of Copper in Auto Transformer? (5)

- Q.5 (A) An alternator has 25 slots/pole and the first coil lies in slots 1 and 16. Calculate the pitch factor for (i) fundamental (ii) 3rd harmonic (iii) 5th harmonic and (iv) 7th harmonic. (5)
(B) Explain in brief armature reaction & effect of armature reaction? (5)

OR

- Q.5 (A) Explain Two Dark Lamp & One Bright Lamp method For synchronizing of Alternator? (5)
(B) Calculate the R.M.S. value of the induced e.m.f. per phase of a 8-pole, 3-phase, 50-Hz alternator with 2 slots per pole per phase and 4 conductors per slot in two layers. The coil span is 160° . The flux per pole has a fundamental component of 0.12 Wb and a 20% third Component. (5)

- Q.6 Attempt any two. (10)
(A) Discuss the advantages of Electric Heating over other form of heating?
(B) Give the construction & working of Resistance Heating?
(C) Compare the protecting Devices FUSE, MCB, ELCB and Circuit Breaker?
(D) Compare the Thermal power plant & Nuclear power plant in brief?

-----END OF PAPER-----