

B. Tech. (EEEC) I

A

Paper (EEC - 105)
POWER APPARATUS

Time : 3 hours

Maximum Marks :70

(Write your Roll No. on the top immediately on receipt of this question paper.)

Answer any **FIVE** questions.
Assume suitable missing data, if any.

1. a) Draw the schematic diagram of a two winding core type transformer and derive expression of emf induced in primary and secondary windings. 07
b) The name plate of a transformer indicates 250kVA, 50Hz, 4160/480 volts.
(i) Determine the nominal primary and secondary currents.
(ii) If 2000V is applied to primary winding, How much power (in kVA) could be drawn safely from the transformer secondary winding. 07
2. a) Draw different types of three-phase connections used in three-phase transformers and discuss their applications. 07
b) Draw connection diagram of 3 phase to 2 phase conversion and state the voltage and current relationships in main and teaser windings. 07
3. a) Define the efficiency of a three-phase transformer and discuss how efficiency is determined for practical transformers. 07
b) What are the different types of alternator based on their rotar construction ? Draw the schematic diagram of a 4 - pole salient rotar alterantor. 07
4. a) Develop an expression for power developed by a three - phase cylindrical rotar alternator and sketch its power angle characteristics. 07
b) Differentiate between concentrated and distributed armature windings in alterantors and write an expression for winding factor. 07
5. a) Develop an expression for torque - developed by a three - phase induction motor and discuss its torque - slip characteristic. 07
b) Explain how a synchronous motor start up. When should be the d.c. excitation be applied ? 07
6. a) Calculate the synchronous speed of a 3 - phase 12 pole, induction motor that is supplied by a 50Hz source. What is the nominal speed if the slip at full load is 5%. 07

- b) Explain the operation of a single phase induction motor using double revolving field theory and draw its equivalent circuit diagram. 07
- 7 a) What is an universal motor? Explain its torque - speed characteristics for d.c. and A.C. operations. 07
- b) Explain the principle of operation of a shaded pole motor. 07
8. Write short notes on any two of the following: x 7
- (i) Pitch factor
 - (ii) Core type and Shell type transformers.
 - (iii) Speed control methods of 3 phase induction motor.
 - (iv) A.C. servo motor.