21819

3 Hours / 70 Marks Seat No. | | | | | | | | |

Instructions : (1) All Questions are *compulsory.*

(2) Illustrate your answers with neat sketches wherever necessary.

(3) Figures to the right indicate full marks.

(4) Assume suitable data, if necessary.

(5) Use of Non-programmable Electronic Pocket Calculator is permissible.

(6) Preferably write the answers in sequential order.

Marks

1. Attempt any FIVE of the following : **10**

(a) Identify the type of motor with the following characteristic shown in fig. (a) Also give any one application of this motor.

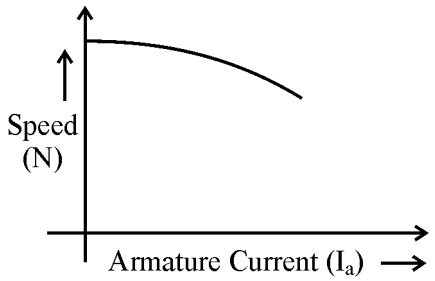

Fig. (a)

(b) State any two methods of speed control of three phase induction motor.

(c) Name any four special motors.

(d) Give any two applications of synchronous motors.

(e) Name any two methods of synchronization of alternators.

(f) Write the working principle of BLDC motor.

(g) State the temperature limit for class Y and class E insulators. Also give one example of each.

2. Attempt any THREE of the following : **12**

(a) Explain with circuit diagram the procedure to control the speed of dc series motor by variation of armature voltage.

(b) Explain the working principle of three phase squirrel cage induction motor.

(c) Write the conditions to be satisfied for the parallel operation of alternators.

(d) Describe with neat sketch the construction of variable reluctance stepper motor.

3. Attempt any THREE of the following : **12**

(a) Write the equation of torque of a three phase induction motor. Also draw the torque – slip characteristics.

(b) Draw typical 'V' and inverted 'V' curves of a synchronous motor. State the significance of these curves.

(c) Name the types of alternators. Also write the differences in constructional features between them.

(d) Explain with a neat sketch, working principle of AC servomotor.

(e) Describe with circuit diagram the procedure to conduct S.C. test of single phase transformer. Also write the significance of this test.

4. Attempt any THREE of the following : **12**

(a) Describe the trouble-shooting for any four troubles of DC series motor.

(b) Explain with neat sketch the procedure to control the speed of three phase induction motor by any one method.

(c) Explain the role of damper winding in synchronous motor.

(d) Describe with neat sketch, the construction of permanent magnet DC motor.

5. Attempt any TWO of the following : **12**

(a) Briefly explain any six troubles that can occur in three phase slip ring induction motor. Also suggest their remedies.

(b) Suggest a suitable special motor for ATM machine cash dispenser. Justify your answer. Also give typical name plate details of that motor.

(c) Briefly explain the effect of changing field excitation in synchronous motors with constant load.

6. Attempt any TWO of the following : **12**

(a) Suggest the suitable starter for the following motors with justification :

(i) 100 HP, 415 V, 50 Hz, 3 phase, slip ring induction motor.

(ii) 15 HP, 415 V, 50 Hz, 3 phase, squirrel cage induction motor.

(iii) 2.2 kW, 415 V, 50 Hz, 3 phase, squirrel cage induction motor.

(b) A 3 phase star connected alternator is rated at 1500 kVA, 13.5 kV. The armature resistance and synchronous reactance are 1.4 Ω and 25 ohms respectively per phase. Calculate percentage voltage regulation for a load of 1000 kW at 0.8 p.f. lagging.

(c) Suggest a suitable transformer for gate drive circuitary of S.C.R.s. Justify your answer. Also write the standard specifications of the same.
