22431

12425

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

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

(2) Answer each next main Question on a new page.

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

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

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

(a) State any two applications of DC shunt motor.

(b) State any two applications of 3 phase induction motor.

(c) Write any two advantages of parallel operation of alternator.

(d) List the different methods of synchronizing the alternator.

(e) Give any two applications of AC servomoter.

(f) State any two applications of stepper motor.

(g) Write any two electrical insulation classes along with their temperature limit.

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

(a) Draw neat sketch of DC machine. State function of armature & yoke.

(b) Compare 3ϕ squirrel cage and 3ϕ slip ring induction motor on any 4 pts.

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

(d) Draw and explain brushless DC motor (BLDC).

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

(a) Explain the working principle of 3ϕ induction motor with neat sketch.

(b) Explain the effect of increased load of synchronous motor at constant excitation.

(c) Draw and explain 'V' curve and inverted 'V' curve for synchronous motor.

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

(e) Explain with sketch the polarity test on transformer.

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

(a) Explain flux control method for speed control of DC shunt motor.

(b) A 4 pole, 50 Hz, 3ϕ IM runs at 1420 rpm. Calculate slip.

(c) Derive emf equation of alternator.

(d) State function and application of isolation transformer.

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

(a) Explain with neat sketch the speed control of 3ϕ induction motor by

(i) V/F control

(ii) Stator voltage control

(b) A 3ϕ star connected alternator is rated at 1600 kVA, 13.5 kV. The armature resistance and synchronous reactance are 1.5 Ω and 30 Ω respectively per phase. Calculate voltage regulation for a load of 1200 kW at 0.8 leading power factor.

(c) Explain in detail the construction and working of permanent magnet synchronous motor.

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

(a) State necessity of starter and explain in detail star delta starter.

(b) Explain with neat sketch the working principle of

(i) Switched reluctance motor

(ii) Permanent magnet DC motor

(c) Explain the procedure to find the voltage regulation of 3ϕ alternator by direct loading method.
