

22431

21222

3 Hours / 70 Marks

Seat No.

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15 minutes extra for each hour

- 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.

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| 1. Attempt any FIVE of the following : | 10 |
| (a) Write down any two applications of D.C. series motor. | |
| (b) List the types of starters used in three phase induction motor. | |
| (c) List the different speed control methods of three phase induction motor. | |
| (d) State the working principal of synchronous motor. | |
| (e) Write any two advantages of parallel operation of alternator. | |
| (f) State any two applications of D.C. servo motor. | |
| (g) Give any two applications of stepper motor. | |
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| 2. Attempt any THREE of the following : | 12 |
| (a) Explain the effect of flux on speed of D.C. Motor. | |
| (b) State the different losses taking place in D.C. Motor. Explain any one in detail. | |
| (c) Draw and explain torque – slip characteristics of 3-phase induction motor. | |
| (d) With neat diagram, explain the construction of core type & shell type transformer. | |

- 3. Attempt any THREE of the following : 12**
- (a) Give the comparison between squirrel cage induction motor and slip ring induction motor.
 - (b) Explain the working principle of three phase induction motor.
 - (c) Explain the procedure to find voltage regulation of a 3 – phase alternator for a leading p.f. load by direct loading method.
 - (d) Derive the emf equation of Alternator.
 - (e) Explain the effect of changing excitation in Synchronous Motor with constant load.
- 4. Attempt any THREE of the following : 12**
- (a) Draw and explain ‘V’ curve and inverted ‘V’ curve.
 - (b) State any four conditions for parallel operation of alternator.
 - (c) With neat diagram explain the working of variable reluctance stepper motor.
 - (d) State functions and applications of Isolation transformer.
- 5. Attempt any TWO of the following : 12**
- (a) Explain how rotating magnetic field is produced due to 3 phase supply in 3-phase 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 Ohms and 25 Ohms respectively per phase. Calculate percentage voltage regulation for a load of 1200 kW at 0.8 leading p.f.
 - (c) Compare A.C. servo motor and D.C. servo motor (Any 6 points).
- 6. Attempt any TWO of the following : 12**
- (a) Explain the following speed control method of 3-phase induction motor :
 - (i) Pole Changing Method
 - (ii) Frequency Control Method
 - (b) With neat diagram, explain the working of BLDC motor.
 - (c) A 10 kVA, single phase, 50 Hz, 500/250 V transformer has the following results :
 - O.C. Test (L.V. Side) :- 250 V, 3 A, 200 W.
 - S.C. Test (H.V. Side) :- 15 V, 20 A, 300 W.Calculate efficiency and regulation at full load 0.8 P.F. lagging.
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