22215

21222

3 Hours / 70 Marks

Seat No. | | | | | | | | |

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

(6) Preferably, write the answers in sequential order.

Marks

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

(a) Draw series and parallel magnetic circuit.

(b) Define form factor and peak factor for a Sinusoidal waveform.

(c) Define phase sequence in 3 phase a.c. supply system.

(d) State an emf equation of 1 phase transformer and write meaning of each term in an equation.

(e) Write two applications of D.C. Shunt Motor.

(f) Write any two applications of Stepper Motor.

(g) Write any four factors affecting an Earth Resistance.

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

(a) Draw and explain Hysteresis Loop.

(b) Define :

(i) Time period

(ii) Frequency

(iii) Power factor

(iv) Phase difference

(c) Draw star connected Load. State the relation between

(i) Line voltage and Phase voltage.

(ii) Line current and Phase current.

(d) Compare between 1 phase Auto-transformer and two winding transformer.

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

(a) Define each of the following terms :

(i) Magnetic flux

(ii) Magnetic flux Density

(iii) Reluctance

(iv) Permeability

(b) Draw and label constructional diagram of D.C. Motor.

(c) Draw schematic representation of single phase split phase type of Induction Motor and write its applications.

(d) Write any four IE rules relevant to Earthing.

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

(a) An iron ring of mean circumference of 90 cm is uniformly wound with 600 number of turns of wire. Calculate the value of flux density that a current of 1.5 A would produce in the ring. Assume relative permeability of 1400.

(b) 10 kVA, 2200/200 V, 50 Hz single phase transformer has 100 turns on secondary winding. Calculate :

(i) Primary number of turns

(ii) Full load primary current

(iii) Full load secondary current

(iv) Maximum value of flux in the core.

(c) Draw and label constructional diagram of Shaded Pole Induction motor. Write any two applications of it.

(d) Why single phase Induction Motor is not self starting ? How can it be made self starting ?

(e) State the necessity of fuse. List the types of fuses.

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

(a) A sinusoidal voltage with equation V = 200 sin [314t-60°] voltage is applied to a load. Calculate :

(i) Maximum voltage (ii) RMS voltage

(iii) Average voltage (iv) Phase angle

(v) Time period (vi) Frequency

(b) If a 3 phase, 400 V, 50 Hz supply is connected to a balanced 3 phase star connected load of impedance [3+j6] ohm per phase. Calculate

(i) Phase current (ii) Phase voltage

(iii) Power factor (iv) Total Active power

(v) Reactive power

(c) State and explain the different losses occurred in single phase transformer. Define efficiency of transformer.

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

(a) Draw and explain working principle of Universal Motor. How direction of rotation is reversed in it ?

(b) Which are the different types of earthing ? Draw and label any one type of Earthing.

(c) Draw and explain the working principle of ELCB. Write any two applications of it.

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