

314323

25226

3 Hours / 70 Marks

Seat No.

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- 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) Use of Non-programmable Electronic Pocket Calculator is permissible.
(7) 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) Define Luminous intensity and solid angle.
 - b) List any two advantages of CFL lamps over Incandescent lamp
 - c) State the modes of heat transfer.
 - d) State any two advantages of electrical heating.
 - e) State the principle of resistance welding.
 - f) Write classification of electric welding.
 - g) Define electrical drive.

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- 2. Attempt any THREE of the following : 12**
- a) Give the types of lighting schemes and explain any two.
 - b) Explain the inverse square law and Lambert's cosine law with neat diagram.
 - c) Describe the construction and working of the direct resistance heating.
 - d) A 40 kW, 3-phase, 400V resistance oven uses Nickel-Chromium strip of 0.4mm thickness. The heating elements are star connected. If wire temp. is to be 1127°C and that of charge is to be 727°C , estimate suitable width and length of wire required.
- 3. Attempt any THREE of the following : 12**
- a) A room of length 20m and width 10m is to be illuminated by 8 lamps. Average illumination is expected to be 50 lumen/m^2 i.e. 50 lux. Taking depreciation factor of 1.2 and utilization factor of 0.48, calculate MSCP of each lamp.
 - b) Describe the construction and working of high pressure mercury vapour lamp with neat sketch.
 - c) Explain dielectric heating. State its four applications.
 - d) Derive an expression for design of heating element when heating element is circular form.
- 4. Attempt any THREE of the following : 12**
- a) Explain the operation of Direct Arc furnace with neat diagram.
 - b) Write classification of electric welding and its advantages.
 - c) Compare DC and AC welding on any four points.
 - d) Compare individual and group drive on any four points.
 - e) Define average speed and schedule speed, also state four factors affecting the schedule speed.

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

- a) Describe the concept of load cycle with their graphical representation.
- b) Define load equalisation for electric motors. Explain its need.
- c) A train has schedule speed of 60kmph between stops which are 6km apart. Determine the crest speed over the run assuming
 - i) Duration of stops as 60 sec
 - ii) Acceleration as 2 kmph ps
 - iii) Retardation as 3 kmph ps, the speed time curve is trapezoidal.

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

- a) An electric motor has load variation as given below.
 - i) Torque 120 NM for 15 minutes
 - ii) Torque 60 NM for 10 minutes
 - iii) Torque 150 NM for 20 minutes
 - iv) Torque 80 NM for 10 minutesIf the speed of the motor is 720 rpm, calculate the power rating of the motor.
 - b) Define :
 - i) Average speed and
 - ii) Schedule speed in traction system.Explain the factors affecting the schedule speed. Also define crest speed.
 - c) Draw and explain the block diagram of an AC electric locomotive.
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