22626

22223

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) 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 the following terms related to illumination

i) Luminous intensity

ii) LUX

b) State Lambert's Cosine law of illumination

c) List modes of heat transfer.

d) State any four factors governing the selection of electric drives.

e) State different types of traction system used in India.

f) State any two desirable characteristics of tariff.

g) List two disadvantages of low power factor.

Marks

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

a) Distinguish between incandescent lamp and fluorescent lamp on the basis of following.

i) Initial cost

ii) Lumen output

iii) Energy saving

iv) Brightness

b) Explain direct arc furnace method with diagram.

c) An electric motor has load variation as given below.

i) Torque 140 Nm for 20 minutes

ii) Torque 40 Nm for 10 minutes

iii) Torque 200 Nm for 10 minutes

iv) Torque 100 Nm for 20 minutes

If the speed of the motor is 720 rpm, calculate the power rating of the motor.

d) Draw and label the various parts of A.C. electric locomotive.

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

a) State the various types of lighting schemes used in illumination and explain any two of them.

b) Explain working principle of dielectric heating. State its two application.

c) Explain the factors on which shape and size of car of elevator depends.

d) State any four advantages of high power factor for electric supply system.

Marks

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

a) Write classifications of electrical welding system.

b) With neat diagram, explain the plugging method applied to d.c. series motor.

c) A consumer has a maximum demand of 250 KW at 50% load factor. If the tariff is Rs. 100 per KW of maximum demand plus 20 paise per KWh. Find the overall cost per KWh.

d) Define average speed and schedule speed in traction system. List any two factors affecting the schedule speed.

e) Write any eight desirable characteristics of traction motors.

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

a) A 20 KW single phase 220 V resistance oven employs a circular nichrome wire for its heating element. If wire temperature is not exceed 1170°C and temperature of charge to be 500°C. Calculate the diameter and the length of the wire. Take $K = 0.57$, $e = 0.95$ and $\rho = 1.09 \times 10^{-6}$ ohm-meter.

b) Explain electrical braking. State any six requirements of ideal braking system.

c) A trapezoidal time curve of train consists of :

i) Uniform acceleration of 6 kmphps for 25 seconds.

ii) Free running for 10 minutes.

iii) Uniform deceleration of 6 kmphps to stop the train.

iv) A stop time of 5 minutes.

Find the distance between the stations, average and schedule speed.

Marks

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

a) Differentiate between DC welding and AC welding on the basis of

i) Equipment

ii) Cost

iii) Power factor

iv) Operating efficiency

v) Arc stability

vi) Heating

b) i) List various types of current collection system in electric traction.

ii) State main features of metro rail and monorail traction line services.

c) i) State Bombay Lift Act 1939. (Latest Amendment)

ii) List any four safety and protective devices used in elevator.