22626

12425

03 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.

(8) Use of Steam tables, logarithmic, Mollier's chart is permitted.

Marks

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

a) State the classification of electric heating.

b) Define :-

i) Average speed

ii) Schedule speed

c) List any four Advantages of improved power factor.

d) State Lambert's Cosine Law.

e) State any two Advantages and Disadvantages of Group Drives.

f) List various voltage levels used for Electrical Traction.

g) List any four types of Tariff.

P.T.O.

Marks

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

a) Explain with sketches construction of specified electric furnace.

b) Describe with a neat labelled diagram working of high pressure Mercury Lamp.

c) Write any two requirements of ideal traction system and list the factors affecting schedule speed.

d) Compare core type furnace and coreless type induction furnace.

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

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

b) Derive the equation for Most economical P.F.

c) Explain with sketches working principle of Arc Welding.

d) Explain the construction and working of pantograph collector ?

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

a) An industry has a Maximum demand of 200 KW at a power factor of 0.8 lagging and is charged at Rs. 720/KVA/Annum. If the phase advancing equipment costs Rs. 1200/KVAR. Determine the most economical P.F. at which the industry should operate. Interest and depreciation total 10% of capital investment on the phase advancing equipment.

b) Explain with neat sketch working principle of spot welding and state its application.

c) List the type of electrical drives and explain with its application.

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

e) State the need of load equalisation in motors. State the method to achieve it.

Marks

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

a) An electric train is to have acceleration and braking retardation of 1.2 Km/hr/sec and 4.8 Km/hr/sec respectively. If the ratio of maximum to average speed is 1.6 m and time for stops 35 seconds find schedule speed for a run of 3 Km Assume simplified trapezoidal speed-time curve.

b) Explain with neat sketch rheostatic braking system for D.C. series motor.

c) Describe with neat sketch Ajax Watt furnace.

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

a) A 27KW, 3ϕ, 400 V resistance oven is to employ nickel-chrome strip 0.25 mm thick for the three star connected heating element. If the temperature of the strip to be 1000°C and that of charge be 600°C estimate a suitable width for the strip. Assume emissivity = 0.9 and radiating efficiency to be 0.5 and resistivity of the strip material is $101.6 \times 10^{-8} \Omega m$.

b) Draw speed-time curve and label its various parts for the following services –

i) Main line services

ii) Urban line services.

c) Draw the block diagram of 25 KV. 1ϕ 50 Hz AC locomotive used for traction system. State the function of each part. Also draw speed-time curve for electric traction application.