22626

24225

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 answer 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 <u>FIVE</u> of the following: **10**

a) Define the following terms with reference to illumination –

i) Solid angle

ii) MSCP.

b) State the various types of reflectors used in industrial light fittings.

c) Draw a neat labelled diagram of direct arc furnace.

d) Suggest a suitable electric drive for each of the following application –

i) Lift or crane

ii) Paper mills.

Marks

e) State the function of bearings. Name any two types of bearings.

f) Compare urban, suburban and main line services on the followings points –

i) Distance between substation

ii) Value of acceleration.

g) Suggest the type of tariff for –

i) Commercial consumers

ii) Agriculture consumers.

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

a) Describe with a neat labelled diagram working of metal halide lamp.

b) Explain with neat sketch working of Ajax wyatt furnace.

c) Draw the curve and estimate suitable H.P. of motor having following duty cycle –

i) Rising load from 200 H.P. to 400 H.P. – 4 minute

ii) Uniform load of 300 H.P. – 2 minute

iii) Regenerative braking from 50 to zero H.P. – 1 minute.

iv) Idle for - 1 minute.

d) State the types of Track electrification used in India. Explain any one type.

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

a) Estimate the number and wattage of lamps which would be required to illuminate a workshop 80 m × 20 m, spaced 60 × 15 m by means of lamps 6 m above the working plane. The average illumination required is about 100 lux, coefficient of utilization is 0.4, luminous efficiency is 16 lumens per watt. Assume a space height ratio of unity and candle power depreciation of 20%.

b) Describe with neat sketch, the working principle of butt welding and state its application.

Marks

c) State the factors to be considered for selection of motor.

d) A 440 V, 50 Hz, 3 phase line delivers 250 kw at 0.707 p.f. lagging. It is desired to improve the p.f. to unity by using shunt capacitor. Calculate the value of capacitance of each unit if they are connected in star.

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

a) Describe any two methods of temperature control of resistance furnace.

b) Describe Rheostatic braking applied to A.C. 3ϕ Induction motor.

c) Recommend relevant motor for the following application –

i) Refrigeration and Air conditioners

ii) Electric clock

ii) Vaccum cleaner

iv) Washing machine.

d) A train has scheduled speed of 80 kmph between are 8 km apart. Determine the crest or maximum speed over the run. Assuming –

i) Duration of stop 50 second

ii) Acceleration 2 kmphps

iii) Retardation 3 kmphps. The speed time curve is trapezoidal.

e) Derive the equation for most economical power factor.

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

a) A resistance oven employing Nichrome wire is to be heated from 230V, 1ϕ a.c. supply and is rated at 20 kw. If the temperature of the heating element is to be heated to 1170°C and average temperature of the charge is 570°C. Find the diameter and length of wire. Given radiating efficiency = k = 0.6, emissivity = 0.9 specific resistance = 1.09×10^{-6} Ω m.

b) State the need of load equalization in drive. Describe the common method to achieve load equalization in industry.

c) Draw the block diagram of 25 kv, 1ϕ, 50 Hz, locomotive used for traction system. State the function of each part.

Marks

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

a) Compare A.C. welding with D.C. welding. (Any six points)

b) i) Explain the factors on which shape and size of the elevator car depend.

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

c) Define –

i) Average speed

ii) Schedule speed in traction system.
Write any three factors affecting the schedule speed.

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