

17507

16172

3 Hours / 100 Marks

Seat No.

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- 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) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (6) Preferably write the answers in sequential order.

Marks

1. (A) Attempt any THREE :

3 × 4 = 12

- (a) State the factors governing selection of electric motors.
- (b) State four advantages of electric heating.
- (c) Explain the factors to be considered while designing a lighting scheme.
- (d) Explain the principle of power factors improvement.

(B) Attempt any ONE :

1 × 6 = 6

- (a) (i) Define electrical braking. (1)
- (ii) State its types. (1)
- (iii) Explain regenerative braking for D.C. series motor. (4)
- (b) Explain with the diagram butt welding. State its applications.

2. Attempt any FOUR :**4 × 4 = 16**

- (a) State four advantages of electrical braking over mechanical braking.
- (b) State desirable properties of heating elements used in indirect resistance heating.
- (c) Compare A.C. and D.C. system of traction (any four points).
- (d) Explain the suitability of 3-phase induction motor for traction service.
- (e) Draw single line diagram of 132 kV/25 kV traction substation.

3. Attempt any TWO :**2 × 8 = 16**

- (a) Explain the requirements of elevator motor. State with reason best suitable motor for elevator.
- (b) Explain with neat diagram construction and working of Ajax Wyatt vertical core induction furnace.
- (c) An electric motor has load variation as given below :
 - (i) Torque 140 Nm for 20 minutes
 - (ii) 40 Nm for 10 minutes
 - (iii) 200 Nm for 10 minutes
 - (iv) 100 Nm for 20 minutes

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

4. (A) Attempt any THREE :**3 × 4 = 12**

- (a) State four advantages of seam welding over spot welding.
- (b) Define the following :
 - (i) Luminous intensity
 - (ii) Utilisation factor
 - (iii) Depreciation factor
 - (iv) Mean spherical candle power
- (c) State and explain four types of tariff applicable to H.T. and industrial consumers.
- (d) A 3-phase, 5 kW induction motor has a power factor of 0.75 lagging. Determine the size of capacitor in kVAR require to improve the power factor to 0.90.

(B) Attempt any ONE :**1 × 6 = 6**

- (a) Compare resistance welding and arc welding (any six points).
- (b) Explain the factors affecting framing of tariffs.

5. Attempt any FOUR :**4 × 4 = 16**

- (a) State the following :
 - (i) Law of inverse squares
 - (ii) Lambert's Cosine law
- (b) Justify the use of saturable reactor to control the magnitude of welding current.
- (c) Draw labelled speed-time curve for main line. Explain various parts of the curve.
- (d) Explain which system is preferred for traction work in India.
- (e) Explain with neat sketches series parallel control of traction motors.

P.T.O.

6. Attempt any TWO :

2 × 8 = 16

- (a) (i) Differentiate between core type and core less induction furnace. (4)
- (ii) Explain what is dielectric heating. State its four applications. (4)
- (b) An electric train has a schedule speed of 25 km/hr between stations 800 m apart. The duration of stop is 20 seconds, the maximum speed is 20% higher than average running speed and the braking retardation is 3 km/hr/sec. Determine rate of acceleration required to operate the train. (8)
- (c) (i) State any four advantages of high power factor. (4)
- (ii) A single phase 400 V, 50 Hz motor takes a supply current of 50 A at a P.F. of 0.6. The motor P.F. has to be improved to 0.9 by connecting a capacitor in parallel with it. Calculate the required capacity of capacitor in Farads. (4)
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