

17507

**11920**

**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) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

**1. (A) Attempt any THREE of the following :**

**3 × 4 = 12**

- (a) State the factors governing selection of electric motors.
- (b) State the causes of failure of heating element.
- (c) Draw single line diagram of 132 kV/25 kV traction substation.
- (d) State any four advantages of High power factor.

**(B) Attempt any ONE of the following :**

**1 × 6 = 6**

- (a) Explain with neat diagram seam welding. State any two of its applications.
- (b) Define the following :
  - (i) Luminous Intensity
  - (ii) Candle Power
  - (iii) MSCP
  - (iv) MHCP
  - (v) Utilisation factor
  - (vi) Depreciation factor

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**P.T.O.**

**2. Attempt any FOUR of the following :****4 × 4 = 16**

- (a) Define electric drive. State any two advantages & disadvantages of electric drive.
- (b) State desirable properties of Heating elements used in indirect resistance heating.
- (c) Compare resistance welding & arc welding (Any four points)
- (d) Explain with neat sketches series-parallel control of traction motors.
- (e) Describe the static capacitor method of power factor improvement.

**3. Attempt any TWO of the following :****2 × 8 = 16**

- (a) A train has schedule speed of 60 km/hr between stops which are 6 km apart. Determine the crest speed over the run assuming.
  - (i) Duration of stops as 60 sec.
  - (ii) Acceleration as 2 km/hr/sec
  - (iii) Retardation as 3 km/hr/secThe speed – time curve is trapezoidal.
- (b) State the different tariffs used by electricity supply authority ? Describe any two of them in brief.
- (c) Define load equalisation for electric motors. Explain how it is obtained for electric motors.

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

- (a) Suggest suitable electric drive for following application :
  - (i) Paper mills
  - (ii) Stone crusher
  - (iii) Textile mill
  - (iv) Electric traction

- (b) State the principle of Induction Heating. Write four applications of Induction Heating.
- (c) State the laws of Illumination.
- (d) Draw a neat labelled block diagram of AC electric locomotive. State the function of each part.

**(B) Attempt any ONE of the following :****1 × 6 = 6**

- (a) Explain how Rheostatic Braking is achieved in case of :
  - (i) DC series motor
  - (ii) 3-Ph Induction motor
- (b) Explain with neat diagram “Ajax Wyatt Furnace”. State any two of its advantages.

**5. Attempt any FOUR of the following :****4 × 4 = 16**

- (a) Compare A.C. and D.C. system of traction. (Any four points)
- (b) Explain the principle of Dielectric Heating.
- (c) Define welding. State the requirements of good weld.
- (d) “D.C. series motor is used for traction purpose.” Justify four answer with any four characteristics.
- (e) State any four desirable characteristics of traction motors.

**6. Attempt any TWO of the following :****2 × 8 = 16**

- (a) An electric motor has load variations as given below :
  - (i) Torque 250 Nm for 20 min.
  - (ii) Torque 150 Nm for 10 min.
  - (iii) Torque 300 Nm for 10 min.
  - (iv) Torque 200 Nm for 20 min.

If speed of motor is 720 rpm. Find the power rating of motor.

**P.T.O.**

- (b) A factory takes 200 kW at 110 volts from a 3-phase supply and p.f. of 0.71 lagging. A synchronous motor is installed which takes an additional 100 kW. What must be the kVA rating of this motor to raise the p.f. of the system to 0.87 lagging.
- (c) (i) Explain Topped Reactor Method with the help of neat diagram, for current control in welding transformer.
- (ii) Explain the following Tariffs :
- (1) Two port Tariff
  - (2) Time of Day Tariff
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