

17640

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. Attempt any FIVE of the following :

20

- (a) Explain in brief the various arrangements of power supply to various substations exist on Indian Railways for obtaining 25 kV High Voltage 1 ϕ supply.
- (b) Draw the layout of a typical 132 kV/25 kV traction substation.
- (c) Explain the effect of speed on overhead equipment.
- (d) State the different system of Train lighting and special requirements of Train lighting.
- (e) State the different machines used in three phase locomotives.
- (f) Explain in brief the broad strategy for protection of Electric locomotive.
- (g) Explain the practical possibilities of LIM propelled transportation.

2. Attempt any TWO of the following :**16**

- (a) Explain with circuit diagram :
 - (i) Feeding and sectioning arrangements
 - (ii) Sectioning and paralleling post of supply system
- (b) Explain with neat sketch :
 - (i) Transformer protection system for AC Traction
 - (ii) 25 kV catenary protection system for AC Traction
- (c) Explain in brief the following design aspects of OHE :
 - (i) Height of contact wire from Rails
 - (ii) Contact wire Gradient
 - (iii) Encumbrances
 - (iv) Span length

3. Attempt any TWO of the following :**16**

- (a) Explain with neat sketch and suitability of :
 - (i) Single catenary construction
 - (ii) Compound catenary construction
 - (iii) Stitched catenary construction
 - (iv) Modified Y compound catenary construction

- (b) What are the different types of pantographs collector ? And explain in brief each type with sketch.
- (c) What are the requirements of signaling system ? Explain in brief the following types of signals used in Indian Railways :
 - (i) three aspect colour light signaling
 - (ii) four aspect colour light signaling

4. Attempt any FOUR of the following :

16

- (a) State various Miscellaneous equipments at control post or switching stations with their specifications and purpose of providing.
- (b)
 - (i) Compare uninsulated overlap and Insulated overlap.
 - (ii) Draw the diagram of D.C. track circuit
- (c) Explain in brief the power circuit of 3-phase locomotive.
- (d) What are the characteristics of efficient maintenance of Electric locomotive ?
- (e) Explain protection of Electric locomotive from over voltage and under voltage.
- (f) State the weaknesses of LIM propelled Railway Traction System.

5. Attempt any TWO of the following :

16

- (a) Explain with neat sketch the following method of obtaining constant output in Train lighting :
 - (i) Three brush generator
 - (ii) Rosenberg Dynamo
- (b)
 - (i) State the advantages of Remote control system and state various system of Remote control.
 - (ii) Explain End-on Generation system with its advantages.
- (c) List the various equipments in Auxiliary circuit of AC locomotive and state their functions.

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6. Attempt any TWO of the following :**16**

- (a) Draw the power circuit Diagram of AC locomotive and state the various equipments in power circuit with their functions.
 - (b)
 - (i) Explain the need of maintenance and policy of obsolescence of Electric locomotive.
 - (ii) Explain the means to reduce the maintenance cost of Electric locomotive.
 - (c)
 - (i) Explain the principle of operation of Linear Induction motor.
 - (ii) State the various Linear Induction Based traction system and explain any one in brief.
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