17640

21415

3 Hours / 100 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.

Marks

1. (A) Attempt any THREE of the following : **12**

(a) Draw a neat labelled layout of traction substation.

(b) State the miscellaneous equipments at control post or switching substations and their use.

(c) Explain with neat sketch, the three aspect colour light signalling.

(d) Give the purpose and location of uninsulated overlap and insulated overlap.

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

(a) With neat sketches list the various types of construction of polygonal OHE and give their scope of application.

(b) Define mimic diagram and explain how it enables TPC to visualise the whole of the power supply system.

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

(a) Explain the purpose of sectioning arrangements.

(b) State any four advantages of automatic weight tensioning and temperature compensation.

(c) Explain the working of single battery system. What are its disadvantages ?

(d) State the function of relay in electric locomotive. List different types of relays for the same with its purpose.

(e) Draw a neat schematic diagram showing placement of main and traction overload relays.

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

(a) What are the strengths of LIM propelled railway traction system ?

(b) Give the different types of protection schemes used for traction transformers with a typical layout.

(c) For conductor rail system used for current collection system :

(i) State its merit (any one) and demerit (any one).

(ii) What is done to reduce the voltage drop at joints ?

(iii) Suitable system voltage.

(d) State any four factors by which traction transformer differs from ordinary transformer.

(e) What are various supply arrangements of feeding AC traction substation ?

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

(a) Describe the criteria for designing height of contact wire for OHE.

(b) Draw the diagram of A.C. track circuit. State the necessity of impedance band, where AC track are to be used.

(c) Compare pole collector with bow collector.

(d) List different types of OHE supporting structures and describe any one of them.

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

(a) Draw a neat labelled diagram of feeding post and state any four important features of it.

(b) Draw a neat sketch of moving primary fixed secondary double sided LIM and give two advantages and disadvantages for the same.

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

(a) What is 'end on generation' ? Explain how it is used in modern trains. Why it is required ?

(b) Draw the schematic arrangement of power circuit of AC locomotive. Explain briefly the functions and main features of equipment in power circuit.

(c) (i) Give any four important features of moving primary and fixed secondary single sided LIM.

(ii) Draw the labelled diagram of auxilliary circuit of a AC locomotive.

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

(a) Explain the purpose of following equipments in AC locomotive :

(i) Circuit breaker and earthing switch

(ii) Tap changer

(iii) Head light

(iv) Marker light

(b) (i) What is the need for maintenance and policy of obsolescence of locomotive ?

(ii) Explain the means to improve reliability of locomotive.

(c) (i) Explain with neat sketch protection of locos against lightening surges.

(ii) What are the advantages of VF signalling over DC signalling for remote control operation ?

———————