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. 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.
7. Use of Steam tables, logarithmic, Mollier’s chart is permitted.

Marks

1. Attempt any FIVE:

   (a) State any two miscellaneous equipments at control post with their functions.
   (b) List four special features of traction transformer.
   (c) Explain effect of speed on OHE (Any four points).
   (d) Draw a neat labelled diagram to show Automatic Weight Tension and Temperature Compensation of OHE.
   (e) With the help of neat diagram, explain the method to obtain unidirectional polarity in train lighting.
   (f) What is end on generation? State any two advantages.
   (g) List any eight equipments used in auxiliary circuit of electric locomotive.

2. Attempt any TWO of the following:

   (a) Draw a neat labelled diagram of feeding post and write any four points related to it.
   (b) Draw a neat labelled diagram to show protective system for AC traction and give the function of each relay used in it.
   (c) Draw and explain construction of Faireley type of pantograph collector. Also explain its working in brief.

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3. Attempt any TWO of the following:
   (a) List and draw any four polygonal OHE construction stating its speed suitability.
   (b) State the function of
       (i) Neutral section
       (ii) Section insulator
       (iii) Un-insulated overlap
       (iv) Insulated overlap
   (c) (i) List two major equipments at traction sub-station with their functions.
       (ii) Draw a neat layout diagram of traction sub-station.

4. Attempt any TWO of the following:
   (a) Draw the neat labelled diagram of AC track circuit and explain the function of impedance band present in it and also give the advantage of AC track circuit.
   (b) List any two types of relays and contactors with their function used in AC locomotive.
   (c) (i) State any four ideal requirements of signalling system.
       (ii) Give any four advantages of Voice frequency signals over DC signalling system.

5. Attempt any TWO of the following:
   (a) With the help of neat labelled diagram, explain the working of Double Battery Parallel Block System used in Train Lighting.
   (b) Draw neat labelled diagram of single-phase AC locomotive showing its various equipments of power circuit and give the function of each equipment used in power circuit.
   (c) (i) Explain the need of maintenance of electric-locomotive.
       (ii) State four important features of LEM that differ it from normal electric motor.
6. Attempt any TWO of the following:

(a) Explain with necessary diagram the earth fault protection of power and auxiliary circuit.

(b) List any four types of electrical faults that may occur on electric-locomotive with their causes.

(c) With respect to LIM propelled railway traction system, state four points of

   (i) Strengths of LIM

   (ii) Weaknesses of LIM