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

1. Attempt any 5 of the following:
   a) State where interrupter is located. What is its function? And which one is the important difference between it and CB?
   b) Distinguish between third rail system and overhead collection system- any 4 points.
   c) State the necessity of signalling system.
   d) Explain the meaning of the terms, WAM$_1$, WAV$_3$, YAV$_1$, WAG$_1$.
   e) Describe different causes of defects in Locomotive any (2) and the remedial actions will you suggest for the same.
   f) Differentiate between LIM and ordinary IM (any 4 points).
   g) List various miscellaneous equipments at control post. State use of each.

2. Attempt any 4 of the following:
   a) Draw a neat labelled sketch of traction substation.
   b) Draw a neat labelled diagram of Automatic weight tension and temp. compensation and give any 2 advantages of the same.
   c) Give purpose and location of
      i) Uninsulated overlap
      ii) Insulated overlap
      iii) Neutral section and
      iv) Section insulator.
   d) List any 4 advantages of multiaspect colour light signals.
   e) Differentiate DC and AC track circuits on the basis of
      i) Length of circuit ii) Application
      iii) Effect of stray currents iv) Maintenance
   f) Write any 4 points that state how a traction transformer is different from ordinary transformer.

P.T.O.
3. Attempt any 4 of the following:
   a) List any 4 characteristics of efficient maintenance of Locomotive.
   b) With the help of a neat figure explain differential current protection of traction circuit.
   c) List any 4 strengths of LIM propelled railway traction.
   d) Draw a neat sketch of power circuit of 3-phase locomotive.
   e) For a pantograph write any 2
      i) types  ii) advantages
      iii) methods of raising  iv) materials for collector strip
   f) Explain use of traction transformer and its speciality.

4. Attempt any 4 of the following:
   a) With a neat figure, explain End-on generation.
   b) Draw a neat sketch of earth fault protection of auxiliary circuit of electric loco. State the function of relay and isolating resistance.
   c) Explain moving primary fixed secondary single sided LIM with the help of figure.
   d) How to improve reliability of locomotive?
   e) Write any 4 equipments and their function in auxiliary circuits of electric locomotive.
   f) Draw a neat labelled sketch of feeding post.

5. Attempt any 4 of the following:
   a) State effect of speed on OHE.
   b) State what is meant by mimic diagram and what is the indication in mimic diagram of following coloured lamps.
      1) Green lamp  2) Milky white lamp
      3) Red lamp
   c) State any 4 limitations of Arno converter.
   d) Write 4 major equipments and their function at traction substation.
   e) Draw a neat and labelled figure of fairly type pantograph.
   f) Write a step-by-step procedure of obtaining constant output using 3-brush generator.

6. Attempt any 4 of the following:
   a) List any 4 contactors and their purpose.
   b) State any 8 causes for failure of under-frame equipments.
   c) Draw a neat and labelled sketch of compound catenary construction and state its speed limits.
   d) Draw a neat and labelled sketch of transformer protection.
   e) What is encumbrance? Write its value in normal situation.
   f) State the advantages of remote control system in traction (any 4).