

Highway Engineering (313323)

MSBTE Diploma · K-Scheme · Model Question Paper — Set B

Time: 3 Hours**Max. Marks: 70****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 the examination hall.

Q.1 Attempt any FIVE of the following:**10**

- a) State any four characteristics of road transport.
- b) Define: (i) Right of way (ii) Kerb.
- c) State any four purposes of providing camber.
- d) Define super-elevation and write the IRC formula used for its design.
- e) Define traffic volume study and state any two of its uses.
- f) Enlist any four components of a hill road.
- g) State any four desirable properties of subgrade soil.

Q.2 Attempt any THREE of the following:**12**

- a) Classify roads according to Nagpur Road Plan and explain each in brief.
- b) Define road alignment. State any four factors controlling the alignment of a road.
- c) Define gradient. State the IRC recommended ruling, limiting and exceptional gradients for plain and hilly terrain.
- d) A two-lane bituminous road 7.0 m wide is to be given a camber of 1 in 50. Calculate the height of the crown above the edges and the ordinates of a parabolic camber at 0.5 m intervals from the crown.

Q.3 Attempt any THREE of the following:**12**

- a) Draw a typical cross-section of a flexible pavement and state the function of each layer.
- b) Describe the California Bearing Ratio (CBR) test on soil with a neat labelled sketch.

- c) Describe the alternate bay method of laying cement concrete road slabs with a neat sketch.
- d) State any four requirements of a good highway drainage system.

Q.4 Attempt any THREE of the following:

12

- a) State the purposes of providing a transition curve and explain it with a neat sketch.
- b) Draw a neat sketch of a clover leaf intersection showing the direction of movement of traffic by arrows. State two advantages.
- c) State and explain any four failures of rigid pavement.
- d) State the sequential procedure for repairing potholes in bituminous pavement with a sketch.
- e) Draw a neat labelled cross-section of a National Highway in cutting.

Q.5 Attempt any TWO of the following:

12

- a) Calculate the overtaking sight distance on a two-lane two-way highway for a design speed of 80 km/h. The speed of the overtaken vehicle is 64 km/h, average acceleration during overtaking is 0.72 m/s^2 and reaction time of the driver is 2 s. Draw a neat sketch.
- b) Draw a neat labelled cross-section of a hill road showing breast wall, retaining wall, parapet wall, catch water drain, side drain and road pavement, and state the function of each.
- c) Define camber. Explain the types of camber with sketches, the factors affecting camber and the IRC recommended values.

Q.6 Attempt any TWO of the following:

12

- a) Explain the causes of landslides and the measures to prevent them, with a neat sketch.
- b) Draw the following road signs: (i) No parking (ii) Right turn prohibited (iii) Horn prohibited (iv) Cross road (v) One way (vi) Load limit 5 tonne.
- c) Explain with neat sketches the following joints in cement concrete pavement: (i) expansion joint (ii) contraction joint (iii) construction joint (iv) longitudinal joint (v) warping joint (vi) dowel bar.

Note: This is a **model question paper prepared by Ananda Technologies** only for practice and exam preparation, based on the pattern of previous MSBTE question papers and the K-scheme syllabus. It is **not an official MSBTE paper**, and it does **not** mean that these questions will come in the exam. Answers follow standard textbook points; marks shown are indicative. Free for students — anandatechnologies.in