

**Road Traffic Engineering (315318)**

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

**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 the scope of traffic engineering (any four areas).
- b) List any four vehicular characteristics which affect the design of roads.
- c) Define 85th percentile speed. State its use.
- d) Define desire line diagram in O-D study.
- e) Define: i) Parking index ii) Parking load.
- f) State any four sources of light used for street lighting.
- g) List the key elements involved in a road accident.

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

- a) Explain how gradient, curves, design speed and skid resistance of a road affect traffic operation.
- b) Explain the factors affecting the reaction time of a driver with reference to PIEV theory.
- c) State any four purposes of traffic volume study of a road section.
- d) Explain the home interview method and licence-plate method of O-D study.

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

- a) Describe the benefits of ITS (Intelligent Transportation System) in road traffic surveys.
- b) Suggest the measures to be taken for pedestrian safety on urban roads.
- c) Calculate the number of car parking spaces (ECS) required as per IRC standards for the following buildings in a city of 15 lakh population: (i) Shopping complex (mercantile), built-up area 4,200 m<sup>2</sup>; (ii) Private hospital of 120 beds; (iii) Cinema hall of 600 seats.

- d) Explain the ill effects of unregulated parking in urban areas.

**Q.4 Attempt any THREE of the following:**

12

- Explain the necessity of street lighting on urban roads. Define luminaire.
- Describe the factors affecting the visibility of road at night time.
- Explain the factors affecting the selection of type of trees for roadside plantation.
- Define arboriculture. State its objectives.
- Explain the causes of road accidents (any four).

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

12

- a) Explain the moving observer method. The following data were obtained on a 2.4 km road section AB by this method. Find the flow and the journey speed of the traffic stream in each direction.

| Run | Direction | Journey time (min) | Vehicles overtaking test car | Vehicles overtaken by test car | Opposing vehicles met |
|-----|-----------|--------------------|------------------------------|--------------------------------|-----------------------|
| 1   | A → B     | 4.20               | 3                            | 1                              | 92                    |
| 2   | A → B     | 4.45               | 5                            | 2                              | 88                    |
| 3   | A → B     | 4.10               | 2                            | 1                              | 95                    |
| 4   | A → B     | 4.35               | 4                            | 3                              | 90                    |
| 1   | B → A     | 4.60               | 4                            | 2                              | 110                   |
| 2   | B → A     | 4.80               | 2                            | 1                              | 104                   |
| 3   | B → A     | 4.50               | 3                            | 2                              | 108                   |
| 4   | B → A     | 4.70               | 5                            | 1                              | 112                   |

- b) (i) Compare the methods of representing traffic volume data and suggest a suitable method for a congested urban intersection. (ii) The classified hourly counts at a mid-block road section are given below. Convert them into PCU/h using the given factors (IRC:64-1990), draw the hourly variation chart and find the peak hour.

| Hour  | Motor cycle / scooter (PCU 0.5) | Passenger car / auto-rickshaw (PCU 1) | Light commercial vehicle (PCU 1.5) | Truck / bus (PCU 3) | Cycle (PCU 0.5) |
|-------|---------------------------------|---------------------------------------|------------------------------------|---------------------|-----------------|
| 7-8   | 420                             | 260                                   | 40                                 | 55                  | 90              |
| 8-9   | 610                             | 380                                   | 52                                 | 70                  | 120             |
| 9-10  | 780                             | 520                                   | 60                                 | 82                  | 95              |
| 10-11 | 690                             | 470                                   | 66                                 | 90                  | 70              |
| 11-12 | 540                             | 410                                   | 58                                 | 96                  | 60              |

|       |     |     |    |    |    |
|-------|-----|-----|----|----|----|
| 12–13 | 500 | 380 | 50 | 88 | 55 |
|-------|-----|-----|----|----|----|

- c) Compare on-street and off-street parking. Draw neat sketches of any one on-street and any one off-street parking layout.

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

**12**

- a) Spot speed study data on an urban arterial road are given below. Prepare the cumulative frequency distribution, plot the cumulative speed distribution curve and find the 15th, 85th and 98th percentile speeds and the mean speed. Suggest the speed limit.

| Speed range (km/h) | 25–35 | 35–45 | 45–55 | 55–65 | 65–75 | 75–85 | 85–95 |
|--------------------|-------|-------|-------|-------|-------|-------|-------|
| No. of vehicles    | 4     | 15    | 31    | 47    | 26    | 12    | 5     |

- b) What is a collision diagram? Draw the symbols used in it. Explain the condition diagram with a neat sketch.
- c) Explain the role of the '3 E's' — engineering, enforcement (legislation) and education — in road accident prevention.

**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](http://anandatechnologies.in)