

**'T' Scheme**  
**Sample Question Paper**

**Program Name** : Civil Engineering Program Group  
**Program Code** : CE/CR/CS  
**Semester** : Third  
**Course Title** : Highway Engineering  
**Max. Marks** : 70

**22302**

**Time: 3 Hours.**

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**Instructions:**

- (1) All questions are compulsory.
- (2) Illustrate your answers with neat sketches wherever necessary.
- (3) Figures to the right indicate full marks.
- (4) Assume suitable data if necessary.
- (5) Preferably, write the answers in sequential order.

**Q.1) Attempt any Five of the following.**

**10 Marks**

- a) State any four factors controlling road alignment.
- b) Classify the roads according to Nagpur Road Plan
- c) State the importance of road transportation in overall development of a country
- d) Define the terms- PCU and Traffic Density
- e) Name any four types of road marking.
- f) State any two types of hill road curves.
- g) State the types of drainage system.

**Q.2) Attempt any Three of the following.**

**12 Marks**

- a) Define : Kerb, Right of way, Camber, Super elevation
- b) Define design speed. Write four factors affecting it.
- c) Explain widening of road on horizontal curve with neat sketch.
- d) Explain softening point test on bitumen with neat sketch.

**Q.3) Attempt any Three of the following.**

**12 Marks**

- a) Describe the procedure of construction of water bound macadam road.
- b) Draw the cross section of typical pavement and label components.
- c) Draw the road signs for (i) One way (ii) No parking (iii) Narrow bridge (iv) Speed Limit
- d) Suggest the preventive measures that can be taken to avoid landslides in hilly area.

**Q.4) Attempt any Three of the following.**

**12 Marks**

- a) Explain the functions of components of hill road.
- b) Draw the labeled sketch of catch water drain.
- c) State the necessity of providing road drainage
- d) Justify the remedial measures for the following defects in flexible pavement
  - i. Pothole formation
  - ii. Rut formation
- e) Justify the causes of common type of distresses occurring in bitumen road.

**Q.5) Attempt any Two of the following.**

**12 Marks**

- a) Draw the neat labelled and dimensional sketch of cross section of National Highway in embankment.
- b) Calculate the stopping sight distance for two way traffic in a single lane road. The design speed is 68 kmph. Assume reaction time of driver as 2.5 seconds. Coefficient of friction is 0.6. Brake efficiency is 50%.
- c) Explain the alternate bay method of construction of concrete road with neat sketch.

**Q.6) Attempt any Two of the following.**

**12 Marks**

- a) The radius of horizontal circular curve is 100 m. The design speed is 50 kmph and the design coefficient of lateral friction is 0.15. (i) Calculate the super elevation required if full lateral friction is assumed to developed (ii) Calculate the coeff. friction needed if no super elevation is provided
- b) Explain the rotary island in brief with neat sketch.
- c) Draw the collision diagram for (i) Head on collision (ii) Rear end collision (iii) Side sweep

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**'I' Scheme**  
**Sample Test Paper - I**

**Program Name** : Civil Engineering Program Group  
**Program Code** : CE/CR/CS  
**Semester** : Third  
**Course Title** : Highway Engineering  
**Max. Marks** : 70

22302

**Time: 1 Hour**

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**Instructions:**

- (1) All questions are compulsory.
- (2) Illustrate your answers with neat sketches wherever necessary.
- (3) Figures to the right indicate full marks.
- (4) Assume suitable data if necessary.
- (5) Preferably, write the answers in sequential order.

**Q.1 Attempt any FOUR.**

**08 Marks**

- a) State any four requirements of a good alignment.
- b) Define roadway width and carriage way width.
- c) State the necessity of curves in road alignment.
- d) Define mechanical widening and psychological widening of road.
- e) Define angularity number of an aggregate. State its significance.
- f) Enlist various types of joints in construction of concrete road.

**Q.2 Attempt any THREE.**

**12 Marks**

- a) Explain the classification of road according to third road development plan.
- b) State the situation under which following gradients are provided.
  - i. Ruling gradient
  - ii. Limiting gradient
  - iii. Exceptional gradient
  - iv. Floating gradient
- c) Define design speed. Determine the permissible speed on a curve having radius of 150m with super elevation 15% and coefficient of friction 0.6.
- d) Explain the penetration test on bitumen sample.
- e) Explain the construction procedure of bituminous road.

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**'I' Scheme**  
**Sample Test Paper - II**

**Program Name** : Civil Engineering Program Group  
**Program Code** : CE/CR/CS  
**Semester** : Third  
**Course Title** : Highway Engineering  
**Max. Marks** : 70

22302

**Time: 1 Hour**

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**Instructions:**

- (1) All questions are compulsory.
- (2) Illustrate your answers with neat sketches wherever necessary.
- (3) Figures to the right indicate full marks.
- (4) Assume suitable data if necessary.
- (5) Preferably, write the answers in sequential order.

**Q.1 Attempt any FOUR.**

**08 Marks**

- a) State any four objectives of traffic volume study.
- b) Enlist different types of road signals.
- c) Compare grade intersection with grade separated intersection.
- d) Justify the necessity of drainage in case of hill roads.
- e) Give any four cases of landslides along hill roads.
- f) State the meaning of 'Road maintenance'.

**Q.2 Attempt any THREE.**

**12 Marks**

- a) Draw the cross section of a typical hill road and label the component parts.
- b) Draw the traffic signs for: i) Stop ii) Steep slope ahead iii) Pune 120 km iv) Overtaking prohibited.
- c) Define traffic island. Give its necessity.
- d) Distinguish between surface drainage and sub-surface drainage system.
- e) Explain the maintenance of water bound macadam roads in case of cracks and rut formation.