

Scheme - G

Sample Test Paper - I

Course Name : Civil Engineering Group

Course Code : CE/CS/CR

Semester : Sixth for CE/CS/CR And Seventh for CV

Subject Title : Highway Engineering

Marks : 25

17602

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.

**Q1. Attempt any THREE**

**3X3**

- a. Classify roads as per traffic and tonnage.
- b. Enlist six types of survey required for a highway project.
- c. Define camber, gradient and super elevation.
- d. Enlist six materials which are necessary for a road construction project.

**Q2. Attempt any TWO**

**4X2**

- a. Define C. D. works and why it is necessary in highway construction.
- b. Write four characteristics of a good pavement.
- c. Define sight distance, kerbs, road margin and right of way.

**Q3. Attempt any TWO**

**4X2**

- a. Draw a neat cross section of highway in embankment and in cutting. Label four components.
- b. Two cars were approaching from the opposite direction at 90 kmph and 60 kmph on a highway and reaction time of driver is 2.5 seconds. If coefficient of friction is 0.7 and break efficiency is 50 % for both the cars. Calculate the minimum sight distance required to avoid a head on collision
- c. Compare rigid and flexible pavements with respect to cost, durability, material of construction and time required for construction.

Scheme - G

## Sample Test Paper - II

Course Name : Civil Engineering Group

Course Code : CE/CS/CR

Semester : Sixth for CE/CS/CR And Seventh for CV

Subject Title : Highway Engineering

Marks : 25

**17602**

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.

**Q1. Attempt any THREE**

**3X3**

- a. Write function of sub grade, sub base and base course in a W.B.M. road.
- b. Enlist six types of road sign required for smooth flow of traffic on roads.
- c. Define traffic density, P.U.C. and traffic capacity.
- d. Write three points in favour of necessity of maintenance of road.

**Q2. Attempt any TWO**

**4X2**

- a. Define extra width provided at horizontal curve in highways and explain its necessity.
- b. Explain routine maintenance of roads and resurfacing and when it is done.
- c. What are the causes of landslides and what are the remedial measures taken during road construction to avoid landslides.

**Q3. Attempt any TWO**

**4X2**

- a. Why it is necessary to use compacting equipments for construction of highways? Enlist various types of compacting equipments.
- b. Draw layout of a hot mix bitumen plant and name various units required for it.
- c. Differentiate between surface and subsurface drainage with respect to aim and methods of providing in highway drainage.

Scheme - G

## Sample Question Paper

Course Name : Civil Engineering Group

Course Code : CE/CS/CR

Semester : Sixth for CE/CS/CR And Seventh for CV

Subject Title : Highway Engineering

Marks : 100

# 17602

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.

**Q1(A). Attempt any THREE**

**4X3**

- a) State the importance of roadways in India.
- b) Classify roads as per Nagpur Road Plan.
- c) Define alignment of roadway. Write four factors affecting it.
- d) Mention six details to be collected during reconnaissance survey of a new highway connecting Mumbai to Bhusaval?
- e) State four types of gradient and their locations as per IRC during geometric design of highways.

**Q1(B). Attempt any ONE**

**6X1**

- a) Compare bituminous concrete road and cement concrete roads for the following points.
  - i) Suitability
  - ii) cost of construction
  - iii) durability and maintenance.
- b) The design speed on a highway is 70 kmph. Assume reaction time of driver is 2.5 seconds and coefficient of friction is 0.6. Calculate the stopping sight distance for two way traffic in a single lane road.

**Q2. Attempt any FOUR****4X4**

- a) What is key map and index map? Mention their four utility for a highway project.
- b) Write eight stages of work required for construction of new highway between two major cities.
- c) Why overtaking zones are provided on highways? State the basis of deciding their length.
- d) State the values of the following for plain terrain and in area of heavy rainfall, as per Indian Road Congress for a national highway.
  - i) Ruling Gradient
  - ii) Normal Land Width
  - iii) Designed Speed
- e) List the materials required for construction of rigid and flexible pavements.
- f) Write function of sub grade, sub base, base course and wearing course in a WBM road.

**Q3. Attempt any FOUR****4X4**

- a) Define super elevation. On highway, a horizontal curve of radius 280 m is to be provided and friction resistance =0.13. Calculate the amount of super elevation required as per IRC recommendations.
- b) State the purpose of providing following in a road construction.
  - i) Camber
  - ii) Gradient
  - iii) Super elevation
  - iv) Road margin.
- c) Draw the cross section of a typical hill road s and label any four component parts.
- d) Enlist any four methods of soil stabilization for road construction and State its necessity.
- e) State the joints in cement concrete roads. Describe any one type of joint with neat labelled sketch.

**Q4 (A). Attempt any THREE****4X3**

- a) Define the following terms: i) borrow pits ii) lead and lifts.
- b) Define traffic volume. State the objects of traffic volume study.
- c) Define traffic sign. Draw six types of traffic signs which are provided on highways.
- d) Differentiate between surface and sub surface drainage on the basis of definition and methods adopted, for providing them in highways.

**Q4 (B). Attempt any ONE****6X1**

- a) What is WBM road? Draw a neat sketch of pavement structure of a WBM road.
- b) Describe the procedure of construction of bituminous road and draw a sketch of a bituminous road showing its components.

**Q5. Attempt any FOUR****4X4**

- a) It was suggested to provide a diamond type grade interchange to channelize the traffic at intersection of two highways. Draw its sketch and show directions of movements.
- b) Draw hair pin bend and re-entrant curve which are provided in hill roads and label the sketches.
- c) If formation level is below the ground level in an area, suggest the cross section of highway in cutting or embankment? Draw the suitable sketch.
- d) Prepare the schedule of maintenance operations required for bituminous concrete road in the period from October to March in Maharashtra.
- e) State the uses of following equipments during construction of a highway.
  - i) Bulldozer ii) JCB iii) Scrapper iv) Grader.
- f) Write the component parts of a hot mixed bitumen plant and their specific use for Construction of highway.

**Q6. Attempt any FOUR****4X4**

- a) Enlist eight types of equipments used for excavation in construction of roads.
- b) Draw a neat sketch of dragline and label four component parts.
- c) Write four causes of land slides and suggest four preventive measures.
- d) Write any four requirements of good drainage system in a road network.
- e) Draw a neat line sketch and label four components of JCB.