

22302

21819

3 Hours / 70 Marks

Seat No.

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- 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 Examination Hall.
  - (8) Use of steam tables, logarithmic, Mollier's chart is permitted.

**Marks**

1. Attempt any FIVE of the following :

10

- (a) Classify roads as per Nagpur Plan.
- (b) Define : (i) Camber  
(ii) Super-elevation
- (c) Enlist types of Gradients.
- (d) Define : (i) Road carriageway  
(ii) Road shoulder
- (e) Define : (i) Traffic density  
(ii) Traffic volume
- (f) State the necessity of Good drainage (2 points).
- (g) State classification of highway maintenance.

2. Attempt any THREE of the following :

12

- (a) Define alignment and state the requirement of an ideal road alignment.
- (b) State the necessity of providing extra widening on horizontal curves.
- (c) Explain the procedure for determining softening point of bitumen.
- (d) Define PCU and list four factors affecting passenger car unit.

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P.T.O.

- 3. Attempt any THREE of the following : 12**
- (a) Calculate the safe stopping sight distance for a design speed of 50 kmph for a two way traffic in a single lane road.  
Assume  $f = 0.37$  and reaction time = 2.5 seconds.
  - (b) Explain the procedure for flakiness and elongation test on aggregate.
  - (c) Discuss the merits and demerits of bitumen road.
  - (d) List any four causes of Accidents.
- 4. Attempt any THREE of the following : 12**
- (a) Draw following road signs :
    - (i) Speed limit
    - (ii) No parking
    - (iii) Narrow Bridge
    - (iv) Hair pin bend left
  - (b) Draw a neat labelled sketch of National Highway in Embankment.
  - (c) Explain the types of hill road curve with neat sketch.
  - (d) Draw neat sketch of hill road showing its components.
  - (e) Draw neat sketch of subsurface drainage.
- 5. Attempt any TWO of the following : 12**
- (a) Design the rate of super elevation for a Horizontal Highway curve of radius 500 metres and speed 100 kmph. Assume suitable data.
  - (b) Describe stepwise construction procedure of cement concrete road by continuous bay method.
  - (c) Enlist different types of traffic island and explain any one in brief with neat sketch.
- 6. Attempt any TWO of the following : 12**
- (a) Describe stepwise construction procedure for water bound macadam roads.
  - (b) Discuss the types and causes of landslides with neat sketch.
  - (c) Discuss the causes of failure in flexible and rigid pavement.
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