17602

Seat No.

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) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. a) **Attempt any <u>THREE</u> of the following:** 12

   (i) State importance of Road development plan.

   (ii) State the characteristics of road transport.

   (iii) Define 'Road alignment'. State factors affecting road alignment.

   (iv) Enlist six details to be collected during reconnaissance survey of new highway.

   (v) Define and state values of following terms with IRC standards for plain area.

   1) Camber

   2) Super-elevation.

Marks

b) **Attempt any <u>ONE</u> of the following:**   **6**

    (i) Draw a cross-section of N H in cutting and label all components and give approximate values of the same.

    (ii) Design a super-elevation for National Highway with design speed of 70 kmph and horizontal curve of radius 210m. Consider coefficient of friction f = 0.15

2. **Attempt any <u>FOUR</u> of following:**   **16**

a) Calculate the stopping sight distance for a car moving with design speed 90 kmph. Assume total reaction time of driver is 2.5 sec.

    Coefficient of friction = 0.7 and a brake efficiency = 50%

b) Calculate overtaking sight-distance for two way traffic highway with design speed 60 kmph. The rate of acceleration of fast moving vehicle is 3.6 kmph/sec. and speed of slow moving vehicle is 4.0 kmph. What will be the over taking sight distance if only one way traffic is allowed.

c) State the causes of landslides.

d) Explain the procedure of penetration Macadam for Bituminous Road construction.

e) Define :

    (i) Lead

    (ii) Lift

    (iii) Borrow pit

    (iv) Spoil bank

3. **Attempt any <u>FOUR</u> of the following:**   **16**

a) Enlist drawings required for road project.

b) Discuss the methods of providing super elevation.

c) Explain the term "Design Speed" and state IRC specification.

d) Define "gradient" - Explain types of gradients with RRC recommendation.

e) State methods of soil stabilization. Explain any one.

Marks

4. a) **Attempt any <u>THREE</u> of the following:**   **12**

    (i) Define pavement? State objectives of pavement.

    (ii) Define traffic volume. State objects of traffic volume study.

    (iii) Define traffic density and traffic capacity.

    (iv) State the necessity of drainage in highway.

  b) **Attempt any <u>ONE</u> of the following:**   **6**

    (i) Describe the procedure of construction of bituminous road and draw a sketch of bituminous road showing its components.

    (ii) Explain with neat sketch CBR Test on soil as sub grade material.

5.   **Attempt any <u>FOUR</u> of the following:**   **16**

  a) Draw following road sign.

    (i) No parking

    (ii) One way

    (iii) Give way

    (iv) Narrow bridge

  b) Discuss the special consideration has to be taken while fixing alignment in hill road.

  c) Draw process flow chart of hot mix bitumen plant

  d) State the necessity of maintenance of road.

  e) Name and draw sketch of suitable equipment for following-road construction activity.

    (i) Excavation upto 1m depth in soft murum.

    (ii) Compaction in soft clay soil.

  f) Describe in brief joints in concrete road.

Marks

6. **Attempt any <u>FOUR</u> of the following:** **16**

    a) State the use of compacting equipment.

    b) Enlist eight equipment used for excavation work.

    c) Describe in brief drainage structure in hill road.

    d) State and explain any four defects observed in cement concrete road.

    e) Explain working of Dragline with neat sketch.

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