17602

16117

3 Hours / 100 Marks 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 THREE of the following:** **12**

(i) State the importance of Road Development plan.

(ii) State the characteristics of road transport.

(iii) State the purpose of different types of engineering survey for road project.

(iv) State the contents of drawings required for road project.

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

1) Camber

2) Super-elevation

b) **Attempt any ONE of the following:** **6**

(i) Draw a cross-section of state highway in embankment and label all its components and give approximate values of the same.

Marks

(ii) Design a super-elevation for a National Highway with design speed 80 kmph and horizontal curve of radius 150 m. Consider co-efficient of friction f = 0.15.

2. Attempt any FOUR of the following: **16**

a) State four factors affecting road alignment.

b) Describe procedure to fix alignment of road.

c) Explain term "Design speed".

d) Explain the significance of gradient in road alignment.

e) State methods of soil stabilization and explain any one.

f) Describe procedure of cement concrete pavement construction.

3. Attempt any FOUR of the following: **16**

a) Calculate the stopping sight distance for oneway road having design speed 60 kmph and breaking efficiency of a vehicle 75%.

b) Calculate the overtaking sight distance for two lane one way traffic road with design speed 80 kmph. The rate of acceleration of fast moving vehicle is 0.75 m/s^2. The speed of slow moving vehicle is 40 kmph.

c) Explain the difference between hill roads and roads in plain.

d) Explain the procedure of Penetration Macadam for Bituminous Road Construction.

e) Explain the procedure of WBM road construction.

4. a) Attempt any THREE of the following: **12**

(i) State objectives of Pavement.

(ii) Define following terms-

1) PCU

2) Traffic capacity

(iii) State traffic characteristics.

(iv) State necessity of maintenance of roads.

Marks

b) **Attempt any ONE of the following:** **6**

(i) Differentiate between Rigid Pavement and Flexible Pavement with neat sketch.

(ii) Describe with a neat sketch CBR Test on soil as subgrade material.

5. Attempt any FOUR of the following: **16**

a) Draw signs for the following:

(i) Compulsory turn right

(ii) Right hair pin bend

(iii) One way

(iv) Height limit (3.5 m)

b) Describe prevention techniques of Landslide.

c) Draw a cross-section of highway in cutting and label its components.

d) State types of maintenance of roads and explain one in detail.

e) Draw layout of Hot mix Bitumen Plant.

f) 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.

6. Attempt any FOUR of the following: **16**

a) State four compacting equipments and its suitability.

b) State use of following equipments:

(i) Bulldozer

(ii) Scraper

(iii) Grader

(iv) JCB

c) Describe alignment survey for hill roads.

d) Explain maintenance of bituminous roads.

e) Explain working of JCB with suitable line sketch.