17602

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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) 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.

Marks

1. (A) Attempt any THREE of the following : **12**

(a) State the classification of roads according to Nagpur Road Plan.

(b) State the importance of transportation.

(c) Write four objectives of preliminary survey.

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

(e) Explain term 'Design speed'.

(B) Attempt any ONE of the following : **6**

(a) Draw the cross-section of a NH in embankment showing clearly the component parts.

(b) Calculate the length of stopping sight distance for two way traffic in a single lane road having descending gradient of 2%. The design speed is 70 kmph. Assume reaction time of driver as 2.5 seconds and coefficient of friction as 0.6.

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

(a) Write the use of any four drawings to be prepared for road project.

(b) Give the details to be shown on 'L' section of proposed road.

(c) Define format width. State it's IRC value for various types of roads in plain terrain.

(d) State the IRC specifications of gradients for different types of terrain.

(e) Differentiate between Ashalt and Tar.

(f) Define soil stabilized road. State the necessity of soil stabilization.

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

(a) Explain significance of gradient in road alignment.

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

(c) Draw a cross-section of a hill road showing it's component parts.

(d) What is meant by

(i) Balancing of earthwork ?

(ii) Prime coat in bituminous surfacing ?

(e) Write the construction procedure of bituminous carpet road.

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

(a) What is the necessity of joint filler in construction of concrete roads ? State the joint filler materials.

(b) Define following terms :

(i) PCU

(ii) Traffic Island

(c) Give the four situations where traffic volume study is used in road planning.

(d) State the functions of surface drainage and sub-surface drainage.

(B) Attempt any ONE of the following : **6**

(a) Why following tests are conducted on road materials :

(i) C.B.R. test

(ii) Penetration test

(iii) Softening point test

(b) Explain construction procedure for WBM road as per IRC.

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

(a) Draw road signs for following :

(i) Narrow bridge

(ii) Speed limit

(iii) No parking

(iv) Railway crossing

(b) State the types of curves in hill roads. Explain any one with neat sketch.

(c) Calculate the superelevation required for a road of 7.2 m wide, on a curve of 240 m radius for a permissible speed of 70 kmph. The coefficient of friction is 0.15.

(d) State the classification of maintenance operation for a road.

(e) State the use of any four excavating equipments during construction of road.

(f) Enlist four types of road rollers giving suitablility of each.

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

(a) Draw neat line sketch of power shovel and show its component parts.

(b) Explain the working of bitumen road paver.

(c) Write any four preventive measures for land slides.

(d) Explain how pot-hole repairs work is carried out for bituminous pavement.

(e) State the component parts of hot mix bitumen plant.
