Bihar Engineering University, Patna

B.Tech. 5th Semester Examination, 2023

Course: B.Tech. *Time: 03 Hours*

Code: 101507 *Subject: Transportation Engineering-I* *Full Marks: 70*

Instructions:-

(i) The marks are indicated in the right-hand margin.

*(ii) There are **NINE** questions in this paper.*

*(iii) Attempt **FIVE** questions in all.*

(iv) Question No. 1 is compulsory.

Q.1 ***Choose the correct option / answer the following (any seven questions only):*** **[2 x 7 = 14]**

(a) What is the maximum value of CBR and minimum value of G.I of any material, respectively?
(i) 100,0 (ii) 100,20 (iii) 50,5 (iv) 10,0

(b) Which one of the following methods is used in the design of rigid pavement?
(i) CBR Method (ii) Group Index Method
(iii) Westergaard's Method (iv) McLeod's Method

(c) As per latest IRC guidelines for designing flexible pavement of CBR method, the load parameter required is
(i) Number of commercial vehicles per day.
(ii) Cumulative standard axles in MSA
(iii) Equivalent single axle load
(iv) Number of vehicles (all types) during design life

(d) Bituminous material is used in highway construction primarily because of them
(i) Cementing and water proof properties (ii) Load bearing capacity
(iii) High specific gravity (iv) Black colour which facilitates

(e) The maximum number of cities and towns are connected by which type of highway?
(i) State highway (ii) Village Road
(iii) National highway (iv) Major district road

(f) The surveys of highway alignment are completed in how many stages?
(i) Four (ii) Three (iii) Two (iv) One

(g) The motor vehicle act was revised in _____
(i) 1939 (ii) 1988 (iii) 1989 (iv) 1987

(h) The total conflict points at a junction on both two-way roads are?
(i) One (ii) Four (iii) five (iv) six

(i) Which type of board should be installed if the speed limit is 100kmph?
(i) Small (ii) Medium (iii) Large (iv) Not required 5

(j) Choose correct order (ascending) according to width is
(i) right of way, formation width, carriageway
(ii) formation width, carriageway, right of way
(iii) right of way, carriageway, formation width
(iv) carriageway, formation width, right of way

Q.2 (a) What are the salient features of the Bombay Road development Plan? How it differs from Nagpur Plan? **[7]**

(b) Discuss the Various failure of Rigid and Flexible Pavement **[7]**

Q.3 (a) List and explain the desirable properties of road aggregate. State the test conducted for each property? **[7]**

(b) With a neat sketch, explain impact test? **[7]**

Q.4 Find out OSD required for a design speed of 80 kmph for a 2-lane and 2-way traffic road. Assume a = 1.6 kmph/sec. calculate and draw sketch showing overtaking zone. Explain with a neat sketch sight distance criteria at an uncontrolled intersection. **[14]**

Q.5 (a) What are the various gradients used in Highway? What do you understand by Grade compensation? **[7]**

(b) Explain factors affecting sight distance on a road and also explain PIEV theory briefly. **[7]**

Q.6 Write short notes on the following:- **[3½ x 4 = 14]**

(a) Jayakar committee

(b) Webster method

(c) Aggregate Crushing test

(d) Testing of Bitumen

Q.7 (a) With the help of neat sketches, explain mud-Pumping in cement concrete pavement. **[7]**

(b) What are the factors affecting the design of rigid pavement? **[7]**

Q.8 Design the thickness of pavement layer, base course, Sub-Base coarse are to be provided having 'E' value 400 kg/cm^2 and 200 kg/cm^2. Assuming the pavement consists of a single layer **[14]**

Q.9 (a) What is a power shovel? With a neat sketch, Explain its operation and application. **[7]**

(b) Explain the preparation and specification of stability test by Marshall method. **[7]**