Roll No. .....

OLE-24288

B. Tech. 5th Semester (Civil Engg.) Examination – April, 2021

TRANSPORTATION ENGINEERING - I

Paper : CE-303-F

Time : Three Hours] ***[Maximum Marks : 100***

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt ***five*** questions in all, selecting ***one*** question from each Unit. Question No. **1** is ***compulsory***. All questions carry equal marks.

1. (a) Define the ruling gradient and exceptional gradient.

(b) What is "Unevenness Index" ?

(c) What are flaky aggregates ?

(d) What are the types of sight distance ?

(e) What are the fundamental principles of alignments ?

(f) What are the effects of temperature on rigid curve ?

(g) What is Alligator Crack ?

(h) What is FWD and state its use ?

(i) How Geotextiles improves safety and stability of highway embankments ?

(j) How adding up the waste plastics help in the improvements of bituminous pavements ?

$2 \times 10 = 20$

UNIT – I

2. (a) What is the signification of Jayakar Committee report ? Explain how it is implemented in the road development of a country ? 10

(b) Determine the length of different categories of roads in a state in India by the year 2021 as per 3rd year road plan formulae. The area of the state is 308000 km^2, Number of towns as per 1981 census was 276 and Overall density aimed at 82 km per 100 km^2. 10

3. (a) Calculate the super elevation to be provided for a horizontal curve with a radius of 400 for a design speed 100 kmph in plain terrain. If super-elevation is restricted to 0.07, calculate the coefficient of lateral friction mobilized. 8

(b) Calculate the safe stopping distance while travelling at a speed of 100 kmph on a level road. Assume all other data as required. 6

(c) Draw the various components of overtaking sight distance on a straight stretch of a highway and explain each zone. 6

UNIT – II

4. (a) A road has a total width of 7.5 m including the extra widening on curve and design speed of 60 kmph. Calculate the length of transition curve and its shift on this curve of 200 m radius. Allowable super-elevation is 1 in 150 and pavement is rotated about center line. 12

(b) Briefly explain the role of pavement surface characteristics in highway geometric design. 8

5. (a) Explain inter-relationship between flow, speed and density with the help of graphs. 12

(b) Explain Road User Characteristics and vehicular Characteristics. 8

UNIT – III

6. (a) Explain the California bearing ratio test.

(b) What are the modern construction materials used for the construction of pavements ? Explain their characteristics and usage in detail.

7. (i) Explain Sleepers, types of sleepers, function and basic requirement of providing sleepers in railway transport.

(ii) Describe in details :

(a) Spikes and types of spikes

(b) Creeps wearing

UNIT – IV

8. Describe in details :

(a) Plating and its methods

(b) Method of interlocking

(c) Classification of yards

(d) Type of switches

9. Explain the following in details :

(a) Type of lining and its method.

(b) Purpose of providing the shaft in tunnels

(c) Maintenance and drainage of tunnels.