Paper Id: 100262 **Roll No.** | | | | | | | | | | |

B.TECH
(SEM VI) THEORY EXAMINATION 2018-19
TRANSPORTATION ENGINEERING

Time: 3 Hours ***Total Marks: 70***

Note: 1. Attempt all Sections.
2. Any data if missing may be suitably assumed.

SECTION A

1. Attempt *all* questions in brief. **2 x 7 = 14**

a. Define bump integrator.
b. Differentiate between skid and slip in highway engineering.
c. Enlist various road patterns.
d. List the conditions under which summit curve is used.
e. Define possible capacity and Basic capacity.
f. What do you understand by wrapping stresses & temperature stresses?
g. Differentiate between tack coat and prime coat.

SECTION B

2. Attempt any *three* of the following: **7 x 3 = 21**

a. Write salient features of first twenty year road development plant.
b. A vehicle moving at 40 km/h speed was stopped by applying brake and the length of the skid mark was 12.2 m. If the average skid resistance of the pavement is 0.70, the brake efficiency of the test vehicle will be nearly?
c. What is the extra widening required (as nearest magnitude) for a pavement of 7 m width on a horizontal curve of radius 200 m, if the longest wheel of vehicle expected on the road is 6.5 m and the design speed is 65 km/h?
d. Consider the following data with respect to the design of flexible pavement:
Design wheel load = 4200 kg
Tyre pressure = 6.0 kg/cm2
Elastic modulus = 150 kg/cm2
Permissible deflection = 0.25 cm
(take $\pi^{1/2} = 1.77$, $\pi^{-1/2} = 0.564$, $1/\pi = 0.318$, and $\pi^2 = 9.87$)
The total thickness of flexible pavement for a single layer elastic theory will be nearly?
e. Write short notes on i) sheet asphalt ii) mastic asphalt. iii)Bituminous carpeting

SECTION C

3. Attempt any *one* part of the following: **7 x 1 = 7**

(a) Discuss the cross sectional elements of the roads considered for design. Draw a neat sketch of cross section of 2 lane road with dual carriageway and median in rural area.
(b) Determine the length of transition & circular curves for the following data:
2 lane pavement of width 7 m on NH on a rolling terrain having radius 65 m. Design

speed is 45km/hr.

4. Attempt any *one* part of the following: 7 x 1 = 7

(a) What are the objectives of highway research board? Briefly explain the role of MORTH and IRC in highway development.

(b) Write brief notes on:

i) Central road fund

ii) Indian road congress

iii) Central road research institute

5. Attempt any *one* part of the following: 7 x 1 = 7

(a) What is mean by minimum gradient in highway? Why it is provided?

A valley curve is formed due to two gradients +3.5% and -2.75%.if the design speed of this highway is 80kmph, determine the stopping sight distance and design the valley curve to fulfill both comfort and head light distance conditions.

(b) State the limitations of CBR method of pavement design & also enlist the different tests on road aggregates.

6. Attempt any *one* part of the following: 7 x 1 = 7

(a) Calculate the stresses at interior & edge of a cc pavement by westergaard's equation:

μ of concrete

=0.15 h =18 cm

k=6.0 kg/cm

radius of contact area =15 cm

wheel load P = 5500 kg

Modulus of elasticity of concrete = 3×10^5 kg/cm^2. Where dowels bars are used?

(b) Write short notes on: Bituminous Macadam (BM), Semi dense bituminous concrete (SDBC) and Bituminous concrete, Dry lean concrete (DLC) Cement Concrete (CC) road construction, Roller Compacted Concrete Roads.

7. Attempt any *one* part of the following: 7 x 1 = 7

(a) Explain i) 30^{th} highest hourly traffic volume with neat graph.

The width of a carriage way approaching an intersection is given as 15 m. The entry and exit width at the rotary is 10 m. The traffic approaching the intersection from the four sides is shown in the figure below. Find the capacity of the rotary using the given data:

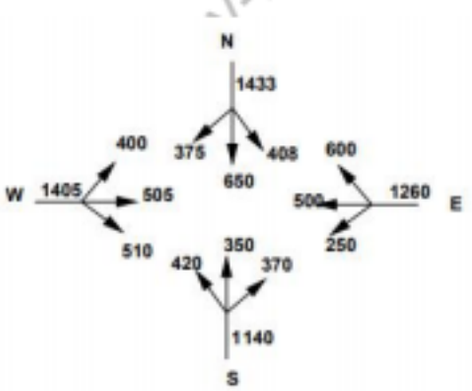

Figure : Traffic approaching the rotary

(b) A national highway passing through a rolling terrain has two horizontal curves of radius 450 m and 150 m. Design the required super-elevation for the curves as per IRC guidelines.