

**B. Tech. 6<sup>th</sup> Semester Mid-Term Examination, 2018**

**TRANSPORTATION ENGINEERING-I**

**Subject Code: 01 1X19**

**Time: 2 hours**

**Full Marks: 20**

**Instructions:**

- (i) Question No. 1 is compulsory.**
- (ii) Attempt any three questions from question no. 2 onwards.**
- (iii) Each question carries 5 marks.**

1. Chose the correct option of the following (any five)

(a) Raising of outer edge of a road with respect to inner edge, is known:

- (i) super elevation
- (ii) cant
- (iii) banking
- (iv) all the above.

(b) Enoscope is used to determine

- (i) spot speed
- (ii) average speed
- (iii) travel time
- (iv) none of these

(d) Speed regulations on roads is decided based on

- (i) 60 percentile cumulative frequency
- (ii) 50 percentile cumulative frequency
- (iii) 98 percentile cumulative frequency
- (iv) 85 percentile cumulative frequency

(e) The pavement width of a road depends upon

- (i) Terrain
- (ii) type of traffic
- (iii) number of lanes
- (iv) all the above

(f) For a vehicle moving with a speed of 80 km per hour, the brake reaction time, in ordinary cases, is

- (i) 1 sec
- (ii) 1.5 sec
- (iii) 2.0 sec
- (iv) 2.5 sec

- (v) 3.0 sec
- (g) The desirable camber for straight roads with thin bituminous surfacing, is
- (i) 1 in 33 to 1 in 25
  - (ii) 1 in 40 to 1 in 33
  - (iii) 1 in 150 to 1 in 140
  - (iv) 1 in 160 to 1 in 140
  - (v) none of these.
- (h) If cross slope of a country is greater than 60%, the terrain is classified as
- (i) rolling
  - (ii) mountainous
  - (iii) steep
  - (iv) plain.

2. Spot speed studies were carried out at a certain stretch of a highway with mixed traffic flow and consolidated data collected are given below.

Speed range, kmph	No. of vehicles observed
0 to 10	16
10 to 20	22
20 to 30	76
30 to 40	98
40 to 50	240
50 to 60	270
60 to 70	130
70 to 80	56
80 to 90	42
90 to 100	12

Determine: (i) the upper and lower values or speed limits for installing speed regulation signs at this road stretch and (ii) the design speed for checking the geometric design elements of the highway.

3. Write short notes on: (a) Traffic separators (b) Kerbs (c) Road margins (d) Pavement unevenness (e) Camber (f) Right of way (g) Width of formation.

4. (a) Find the stopping sight distance for a design speed of 65 kmph. Assume suitable data as per IRC recommendations. What are sight distance requirements for descending gradient of 2%?

(b) Calculate the minimum sight distance required to avoid head-on-collision of two cars approaching from the opposite directions at 90 and 60 kmph. Assume a reaction time of 2.5 seconds, coefficient of friction of 0.7 and a brake efficiency of 50 percent, in both the cases.

5.Explain spot speed, running speed, space mean speed, time mean speed and average speed.

6.The speeds of overtaking and overtaken vehicle are 80 and 60 kmph respectively. If the acceleration of the overtaking vehicle is 2.5 kmph per second,

(a) calculate the safe overtaking sight distance

(b) what is the minimum length of overtaking zone?

(c) Draw the minimum length of overtaking zone and show the positions of sign post.

**BEST OF LUCK**