

Total number of printed pages-7

53 (CE 502) TREN-I

2016

TRANSPORTATION ENGG-I

Paper : CE 502

Full Marks : 100

Time : Three hours

***The figures in the margin indicate
full marks for the questions.***

Answer all questions.

1. (a) What are the recommendations and implementations of Jayakar Committee. 5

Contd.

(b) Match the items in **A** with items in **B**.

5

A

- (1) First 20 year Road development plan.
- (2) Macadam Method
- (3) Central Road Research Institute
- (4) Second 20 year Road development plan
- (5) Third 20 year Road development plan.

B

- (a) Delhi
- (b) Bombay
- (c) Nagpur
- (d) First Scientific Method of Road Construction
- (e) Lucknow.

- (c) Define Camber. What are the purposes of providing it ? Why steep camber is not recommended ? Give recommended values of camber as per IRC. 10
2. (a) What is Highway alignment ? Give the details of the factors controlling Highway alignment. 10
- (b) Explain the following : 10
- (i) Map Study
 - (ii) Reconnaissance Survey
 - (iii) Preliminary Survey
 - (iv) Final Location Survey.
3. (a) What is Kerb ? What are its types ? 5
- (b) Calculate SSD to avoid head on collision between two vehicles approaching from opposite direction at 80 *kmph* and 50*kmph*. Assume other required data. 5

- (c) The speeds of overtaking and overtaken vehicles are 80 and 60 *kmph* respectively. If the acceleration of the overtaking vehicle is 2.5 *kmph* per second, calculate OSD for two way traffic. Give the detailed sketch of overtaking zones. 10
4. (a) The load penetration value of CBR test conducted on a soil specimen are given below. Determine the CBR value of the soil if 10 divisions of the load dial represents 20kg load. 5

Penetration of plunger in <i>mm</i>	Load dial reading in divisions.
0	0
0.5	10
1.0	18
1.5	26
2.0	34
2.5	40
3.0	50
4.0	62
5.0	70
7.5	87
10.0	95
12.5	109

- (b) Explain the plate bearing test procedure and how the modulus of subgrade reaction, k is determined. 5
- (c) What are the objects of providing transition curves on the horizontal alignment of highways ? 5
- (d) An ascending gradient of 1 in 50 meets a descending gradient of 1 to 80. Determine the length of summit curve to provide (a) ISD (b) OSD, for design speed of 80 *kmph*.
Assume all other data. 5
5. (a) Design all the geometric elements of a National Highway running on plain terrain.
Clearly write the Assumptions made in the design. 10

- (b) Spot Speed studies were carried out at a certain stretch of a highway with mixed traffic flow and the data collected are given below : 10

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

Determine :

- (i) Upper and Lower values of speed limits for installing speed regulation signs at this road stretch.

- (ii) The design speed for checking the geometric design elements of the highway.

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