

8. (a) Sketch the various types of tunnel sections and also discuss the suitability and limitations of each Section. **10**
- (b) Describe the following methods of driving tunnels in soft ground :
- (i) Needle Beam method **10**
 - (ii) Shield method.

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Roll No. Total Pages : 04
 BT-7/D-13 **8745**

TRANSPORTATION ENGG-II

CE-405-E

Time : Three Hours] [Maximum Marks : 100

Note : Attempt Five questions in all, selecting at least one question from each Unit.

Unit I

1. (a) Discuss briefly the latest IRC guidelines for the design of flexible pavements by CBR method. **12**
- (b) List the various factors affecting design of pavements. Explain with the help of a sketch the determination of ESWL by equivalent stress criterion. **8**
2. Describe the following :
 - (a) Wheel Load stresses in Rigid pavements. **10**
 - (b) Design procedure of cement concrete slab thickners as per IRC recommendations. **10**

Unit II

3. (a) Discuss briefly the construction of cement concrete slabs by Alternate Bay and Continuous Bay methods and discuss their relative advantages and disadvantages. 12
- (b) What is WMM road ? Discuss briefly its construction. 8

4. (a) Explain the construction of :

Prime Coat, Tack Coat and Seal Coat. 12

Discuss briefly their uses also.

- (b) What is Mastic Asphalt ? Where is it used as a flexible pavement ? Discuss briefly its construction. 8

Unit III

5. (a) Describe the maintenance of patches, pot holes, surface treatments and re-surfacing of Bituminous surfaces. 12
- (b) Write a short note on failures in flexible pavements. 8

6. (a) Describe the various types of surface drainage systems in Roads. 12

- (b) Discuss briefly the Geometrics of Hill Roads. 8

Unit IV

7. (a) Write short notes on the following :

- (i) Highway user benefits 10
- (ii) Annual Highway cost.

- (b) It is proposed to improve an existing road length of 30 km. at a cost of Rs. 8 lakhs per km. and the rate of interest is 10% per year. The cost of maintaining the existing road is Rs. 10,000 per km. per year and that of the improved road is Rs. 12,000 per km. per year. The average vehicle operation cost on the existing road is Rs. 8 per vehicle km and on the improved road is Rs. 7 per vehicle km. If present traffic is 3,000 motor vehicles per day and by the end of 15 years design period the traffic is estimated to be 5000 vehicles per day, determine whether the investment on the improvement of the road is economically viable during the 15 years design period or not. 10