Roll No. .....

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BT-7 / M–17

TRANSPORTATION ENGINEERING–II

Paper–CE-405 E

Time allowed : 3 hours] *[Maximum marks : 80*

Note : *Attempt any five questions selecting at least one question from each unit. All questions carry equal marks.*

1. (a) Discuss the functions of various layers in the structure of a pavement.

(b) Design the flexible pavement for a new bypass with the following data :

(i) Carriageway : Two-lane single carriageway,

(ii) Initial traffic in the year of start of construction of road : 800 CV/day (both directions)

(iii) Traffic growth rate per annum : 5.0%

(iv) Design life : 15 years.

(v) Construction period = 02 years

(vi) Vehicle damage factor 3.5.

(vii) Lane distribution factor = 0.5

(viii) 80th %ile CBR of soil of existing ground : 3.5%, CBR of select soil of subgrade : 8.0%, Effective CBR : 6.0%. Pavement thickness and composition

may be read from the following table for CBR of 6.0%

Design traffic (msa)	Bituminous surfacing		Granular base (mm)	Granular subbase (mm)
	Wearing course(mm)	Binder course(mm)		
5	25 SDBC	50 DBM	250 WMM	210
10	40 BC	65 DBM	250 WMM	260
20	40 BC	90 DBM	250 WMM	260

2. (a) Discuss the concept of bottom up cracking and top down cracking to a rigid pavement.

(b) When is an expansion joint needed ? Sketch and explain the working of an expansion joint.

Unit–II

3. (a) What is subgrade ? How is it constructed ? Give the requirements of density for a good subgrade.

(b) Giving the materials used in the construction of a WMM (Wet Mix Macadam) road, explain its construction steps.

4. (a) What is BC ? How is it constructed ?

(b) What is a Paver ? Discuss the working and functions of various components of a paver.

Unit–III

5. (a) How is the design of a flexible overlay over an existing felxible pavement done by Benkelman beam method. Discuss.

   (b) List various types of failures of a flexible pavement and explain giving causes and remedial measures :

   (i) Alligator cracks

   (ii) Pot holes and

   (iii) Settlement.

6. (a) Discuss various types of drainage systems for hill roads.

   (b) What is an hair-pin bend ? Discuss briefly its various design features.

Unit–IV

7. (a) List various methods of economic evaluation of highway projects and discuss IRR method giving its advantages, disadvantages and suitablity.

   (b) Enumerate various sources of financing a highway project and discuss the BOT system.

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8. (a) Giving sequence of construction operations, explain the construction of a tunnel by Liner Plate method.

   (b) Write short notes on any *two* of the following :

   (i) Shaft and pilot tunnel with their functions

   (ii) Factors affecting shape of tunnel and suitability of a cirular shape

   (iii) Slip form paving for CC Road Construction.

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