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RN-7345

B. E. - IV (Sem. VIII) Examination

May / June – 2010

Transportation Engg. - II

Time : **3** Hours] [Total Marks : **100**

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ **B. E. - 4 (Sem. 8)**

Name of the Subject :

☛ **Transportation Engg. - II**

☛ Subject Code No. : **7 3 4 5** ☛ Section No. (1, 2,.....) : **1&2**

Seat No. :

Student's Signature

(2) Figures to the right indicate full marks.

(3) Assume, suitable data if required. State them clearly in answer sheet.

(4) Draw neat and labelled diagrams/sketches wherever necessary.

(5) Answers to the **two** sections must be written in **separate** answer books.

SECTION - I

1 (a) Fill in the blanks : **8**

(i) _____ roads were built straight regardless of gradient. (Tresaguet, Telford, Roman)

(ii) _____ percentile speed is lower speed limit for regulation. (15^{th}, 85^{th}, 98^{th})

(iii) _____ is equivalency factor suggested by IRC for bus (PCU)

(iv) Overtaking prohibited is a _____ type of sign.

(v) Lowering of water table is _____ type of drainage.

(vi) Reflection cracking is a type of _____ pavement failures.

(vii) Overlay construction is a _____ type of repairs/ maintenance.

(viii) National Highway width is _____ m in plain terrain.

(b) Attempt any **four** in brief. **12**

(i) Enlist the factors controlling highway alignment.

(ii) What is the scope of Highway Engineering?

(iii) Write about mud jacking in cement concrete roads.

(iv) What are the types of cross drainage?

(v) One way system

(vi) What are the types of Highway?

2 (a) Find the total width of a pavement on a horizontal curve for a new national highway to be aligned along a rolling terrain with a ruling minimum radius. Assume, necessary data and state them clearly on answer book. **15**

(b) Enlist various surveys carried out for traffic studies. Discuss about origin and destination survey in detail.

OR

(b) Discuss about history of road development.

(c) What is grade separated system? Draw various types of it.

3 Attempt any **three** in detail : **15**

(i) Define cross slope. Draw various shapes of cross slope. Write recommended values of cross slope for different types of road surface.

(ii) Discuss about basic parameters of traffic.

(iii) What is the use of spot speed study in traffic engineering?

(iv) Draw neat and labelled sketch of cross section of road in embankment.

(v) Discuss about highway project estimates preparation.

SECTION - II

4 (a) Do as directed : **10**

(i) Write the formulae of CBR.

(ii) _____ and _____ are the two types of abrasion tests.

(iii) Define soundness of aggregate.

(iv) Define Elongation Index.

(v) Rigid pavements possess noteworthy flexural strength. (State true or false)

(vi) Define cut bank bitumen.

(vii) _____ method is used for design of flexible pavement.

(viii) State the names of any **two** tests on Bitumen.

(ix) Minimum value of ductility for bitumen is _____.

(x) Define softening point.

(b) Answer the following questions in brief : (any **four**) **10**

(i) Write short note on rigid pavement.

(ii) Write a short note on ESWL.

(iii) Differentiate between bitumen and tar.

(iv) What is mud pumping?

(v) CBR test.

(vi) Write short note on construction steps of bituminous pavement.

5 Attempt any **two** of the following :

(i) The CBR value of subgrade soil is 4%. Design a flexible pavement using design chart recommended by IRC for a 8% growth rate. Take n = 3 years. Also design thickness of various courses using following material with 5 cm thick bituminous concrete surfacing

(a) Compacted sandy soil with CBR value of 7%

(b) Poorly graded gravel with CBR value of 20%

(c) Well graded gravel with CBR value of 95%.

(ii) Calculate the stresses at interior, edge and corner regions of a cement concrete pavement using Westergaard's stress equation, using following data :

(a) Wheel load = 5000 kg

(b) Mod. of elasticity of cement concrete 3×10^5 kg/cm^2.

(c) Pavement thickness = 20 cm

(d) Poisson's ratio = 0.15

(e) Modulus of subgrade reaction = 7 kg/cm^3

(f) Radius of contact area = 15 cm

(iii) Write a short note on failures in flexible pavement.

6 Write short note : (any **four**) **16**

(a) Trnasverse joints in cement concrete pavements

(b) Los Angeles abrasion test

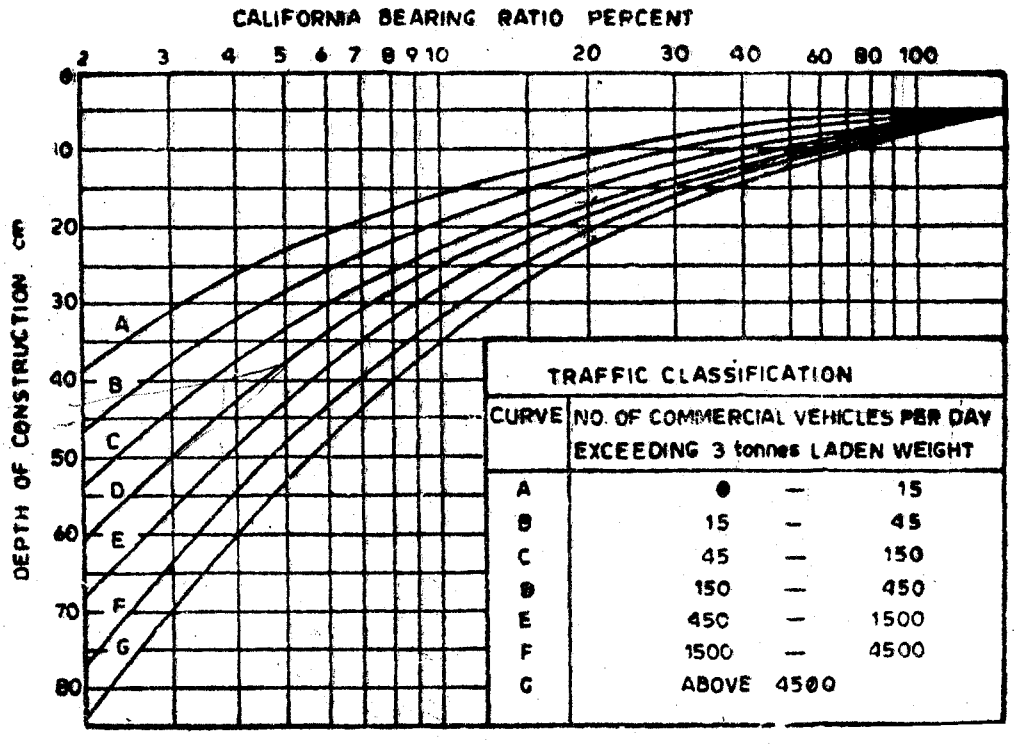
(c) Flexible pavements

(d) Road construction in water logged areas

(e) Penetration test

(f) Selection of Ideal Bridge Site.

IRC Chart



C.B.R. Design Chart (Recommended by IRC)