FACULTY OF ENGINEERING

B.E. 3/4 (Civil) I – Semester (New) (Main) Examination, Nov. / Dec. 2012

Subject : Transportation Engineering

Time : 3 hours   **Max. Marks : 75**

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1. Explain any three important Engineering Surveys essential for highway alignment.

2. What do you understand by vehicle damage factor?

3. Differentiate negative cant and cant deficiency in railways.

4. Write any three reasons for development of creep in rails.

5. Explain the role of cross wind component in orienting the runway.

6. Differentiate between prime coat and tack coat in flexible pavements.

7. Find out the stopping site distance for a two lane highway with design speed of 100 kmph, take f = 0.35.

8. Write any four characteristics of an aircraft.

9. List out three important failure criteria's considered for rigid pavement designs.

10. What is meant by Peak Hour Factor and level of service in traffic engineering?

PART – B (5 x 10 = 50 Marks)

11. a) Explain the concept of mobility and accessibility? Also classify the highway system as per IRC.

    b) Why the highway geometrics play an important role in highway engineering? Derive an expression for finding the super elevation required if the design coefficient of lateral friction is 'f'. Design the super elevation required at a horizontal curve of radius 380 m for the design speed of 100 mph.

12. a) What are the basic objectives of traffic studies? Explain the various traffic characteristics and draw the relationship among them with proper explanation in terms of headways? How do you carryout traffic volume study for a National Highway?

    b) Calculate the 98th and 85th percentile speed from the following spot speed data and also write the importance of the above speeds.

Mid speed	15	25	35	45	55	65	75	85	95
No. of vehicles	0	12	19	38	33	25	16	13	5

13. a) Explain basic technical differences between flexible pavements and Rigid pavements with neat cross sections.

   b) Write the concept of ESWL and ESAL with diagrams? What is the need of conversion of wheel loads and axle loads in to standard axles?

14. a) How do you collect the wind data for better orientation of runway? Explain the orientation of runway procedure with wind rose diagrams.

   b) The proposed runway length under standard conditions is 2120m; the airport site has an elevation of 365m. The monthly mean of the average daily temperature is 40^0C and the monthly mean of the maximum daily temperature is 45^0C at the airport site. Find out the corrected runway length if effective gradient is 0.12%.

15. a) What are the requirements of permanent way in railways? Draw a ideal cross section of permanent and show the components? Explain what kind of forces and loads are acting on track?

   b) Define the terms : cant and equilibrium cant in a railway track. For a main line and a branch line on 5^0 curves, calculate the super elevation and the speed on the branch line if the maximum speed permitted on the main line is 40 km/h.

16. a) What are the various theories that have been put forward to explain the development of creep? Describe percussion and wave motion theory.

   b) How is the rate of change of centrifugal acceleration introduced in transition curve? Calculate the length of transition curve for a design speed of 95 kmph at horizontal curve of radius 260m in rural area having maximum rail fall.

17. Write a short note on any four of the following :

   a) Sleepers types and characteristics
   b) Points and crossings
   c) Critical load positions in rigid pavement analysis
   d) Typical layout of an airport and its components
   e) CBR test procedure

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