D

03000CE308052005

Pages: 2

Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S6 (S, FE) / S6 (PT) (S,FE) Examination May 2024 (2015 Scheme)

Course Code: CE308

Course Name: TRANSPORTATION ENGINEERING - I

Max. Marks: 100 Duration: 3 Hours

PART A

Answer any two full questions, each carries 15 marks. Marks

1 a) Briefly outline the final location and detailed survey to be carried out before finalizing the alignment of a new highway. (7)

b) Draw a neat sketch showing the salient cross-sectional details of a rural road in embankment. (5)

c) What are the special considerations while aligning roads in hilly areas? (3)

2 a) Define camber. Why is camber provided to road surfaces? (4)

b) Find the safe overtaking sight distance for a highway with design speed 80 kmph. Acceleration of overtaking vehicle is equal to 2.5 kmph/sec. (8)

c) Why is grade compensation necessary for design of horizontal curves in hilly terrain? What is the formula recommended by IRC in determining the grade compensation? (3)

3 a) State the reasons for extra widening the carriageway on horizontal curves. Derive an expression for extra widening on horizontal curves. (7)

b) A horizontal curve of radius 300 m is to be designed for a design speed 80 kmph. The road is a two lane road in plain terrain and super elevation is provided by rotating the pavement surface about its centre. The rate of introduction of super elevation is 1 in 150. If the length of wheel base is 6 m, calculate the length of transition curve. (8)

PART B

Answer any two full questions, each carries 15 marks.

4 a) State the desirable properties of aggregates as a pavement material. (4)

b) What are the essential laboratory tests conducted on paving bitumen? Briefly explain the principle of any two. (6)

c) Distinguish between flexible and rigid pavements (5)

5 a) Explain the influence of wheel load and traffic factors in design and performance of flexible pavements. (7)

b) Design a flexible pavement for dual two lane highway with granular base and sub base course as per the guidelines of IRC:37-2012. Given the following data: Initial traffic in the year of completion of construction in one direction = 2000 CVPD, Traffic growth rate per annum = 7%, Design life = 20 years, Vehicle damage factor as per axle load survey = 4.4, CBR value of soil below 500 mm of sugrade = 2.5%, CBR value of soil from borrow pit up to 500 mm of subgrade = 20%. (8)

6 a) What is meant by super pave technology? Enumerate its main features. (6)

b) What is the importance of highway drainage in performance of flexible pavements? (5)

c) What are the applications of spot speed studies? (4)

PART C

Answer any two full questions, each carries20 marks.

7 a) List the vehicular characteristics and briefly explain their influence on traffic performance? (7)

b) What are the ge73ajitha (7)

neral principles of installation of traffic signs? What is the purpose of providing warning signs? What are the features of warning signs provided in India.

c) Illustrate the procedure of design of an isolated signal by Webster's method. (6)

8 a) Explain how the following aircraft characteristics influence the planning and design of airports: (9)

(i) Size of aircraft (ii) Speed of aircraft (iii) Aircraft weight and wheel configuration

b) What are the preliminary information required for runway orientation? Explain how the best orientation of runway is fixed based on the information collected. (11)

9 a) What is meant by basic runway length? How does the actual runway length obtained after applying the necessary corrections? (10)

b) Design an exit taxiway which joins a runway and a main parallel taxiway. The total angle of turning is 40^0. The aircraft can enter the taxiway with a maximum turn off speed of 65 kmph. Coefficient of friction between tyre and pavement surface is 0.13. Draw a neat sketch and indicate all the design elements. (10)

****