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**ANNA UNIVERSITY**  
**B.E. DEGREE (PART-TIME) EXAMINATIONS, April/ May 2014**  
**CIVIL ENGINEERING**  
**III SEMESTER**  
**PTCE 335/ PTCE 375 TRANSPORTATION ENGINEERING**  
**PTCE 9305 HIGHWAY ENGINEERING**

Time : Three Hours

Max Marks : 100

ANSWER ALL QUESTIONS

**Part A**

(10 x 2 = 20)

1. What is meant by an arterial road?
2. List any four obligatory points that influence highway alignment?
3. List the factors influencing the extra widening width on highway curves.
4. What are the factors that have a say in design of super-elevation.
5. What is meant by ESWL?
6. Draw the sketch of flexible pavement cross section and indicate the parts.
7. What is the application of direct shear and unconfined compression test?
8. Enumerate the step for preparation of sub grade during highway construction
9. List the type of failures observed in flexible pavements?
10. What is meant by flexible overlay over rigid pavement?

**Part B**

(5 x 16 = 80)

11. a. Write a brief note on Central Road Fund.  
b. Explain how final location and detailed survey for highway alignment is carried out.
12. a (i) Explain the factors governing width of carriage way.  
(ii) Calculate the stopping sight distance on a highway at a descending gradient of 2% for a design speed of 80 kmph. Assume other data if required as per IRC Standards.  
(OR)
12. b (i) Discuss the factors to be considered in deciding the sight distance at intersections.  
(ii) Design the rate of super elevation for a horizontal highway curve of radius 500 m and the design speed is 100 kmph.
13. a (i) What are the factors considered in pavement design. Discuss their significance.  
(OR)
- 13.b (i) Explain the CBR method of Flexible pavement design.
- 14.a (i) Explain briefly materials required, facilities and steps involved in cement concrete pavement

(OR)

14.b (i) What are the various types of bituminous construction in use ? Discuss their advantages and limitations.

15.a (i) What are the general causes of pavement failure  
(ii) Write briefly how maintenance of cement concrete pavements are carried out.

(OR)

15.b (i) Write brief note on any two of the following:

1. Mud Pumping
2. Spalling of joints
3. Road construction in water logged areas.