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**Question Paper Code : 51252**

**B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2016**

**Fourth Semester**

**Civil Engineering**

**CE 2255/CE 46/CE 1255 A/10111 CE 406/080100022 – HIGHWAY ENGINEERING**

**(Regulations 2008/2010)**

**[Common to PTCE 2255 – Highway Engineering for B.E. (Part-time)**

**Third Semester – Civil Engineering – Regulations 2009 ]**

**Time : Three Hours**

**Maximum : 100 Marks**

**Answer ALL questions.**

**PART – A (10 × 2 = 20 Marks)**

1. What are the objectives of Highway Research Board ?
2. State the classification of roads according to Nagpur road plan.
3. Differentiate 'lag distance' and 'breaking distance'.
4. What do you understand by 'curve resistance' ?
5. What is ESWL ?
6. Explain rigid pavement.
7. Mention the names of tests recommended by Indian Standards for testing highway materials.
8. Define softening point.
9. List the types of defects in flexible pavements.
10. Name the four methods of pavement evaluation.

**PART – B (5 × 16 = 80 Marks)**

11. (a) Explain in detail about second twenty year road plan. (16)  
**OR**  
(b) Write brief notes on : (16)  
(i) Central Road Fund (CRF)  
(ii) Indian Road Congress (IRC)  
(iii) Central Road Research Institute (CRRI)  
(iv) National Highway Authority of India (NHAI).
12. (a) The speeds of overtaking and overtaken vehicles are 80 and 50 kmph respectively, on a two-way traffic road. If the acceleration of overtaking vehicles is  $0.9 \text{ m/sec}^2$ .  
(i) Calculate safe overtaking sight distance. (5)  
(ii) Mention the minimum length of overtaking zone. (5)  
(iii) Draw a neat sketch of the overtaking zone and show the position of the sign posts. (6)  
**OR**  
(b) Calculate the length of transition curve and shift using the following data : (16)  
(i) Design speed = 70 kmph  
(ii) Radius of circular curve = 250 m  
(iii) Pavement width including extra widening = 7.5 m  
(iv) Allowable rate of introduction of super elevation (pavement rotated about the centre line) = 1 in 150.
13. (a) Determine the stresses at interior, edge and corner regions of a rigid pavement using westergards method.  
Take  $P = 4100 \text{ kg}$ ;  $E = 3 \times 10^5 \text{ kg/cm}^2$   $h = 20 \text{ cm}$ ,  $\mu = 0.15$ ,  $k = 4.0 \text{ kg/cm}^2$  and  $a = 15 \text{ cm}$ . (16)  
**OR**  
(b) Explain the steps involved in the IRC method of design of flexible pavements. (16)
14. (a) Explain the importance and procedure of Field density test and Crushing strength test. (16)  
**OR**  
(b) Discuss the merits and demerits of cement concrete roads. (16)
15. (a) Explain the method of evaluation of pavement failure and strengthening. (16)  
**OR**  
(b) Explain the methods of maintaining bituminous surfaces. (16)