

All The best For Exams - Rejinpaul Team

Anna University Exams Nov/Dec 2018 – Regulation 2013
Rejinpaul.com Unique Important Questions – BE/BTECH

CE6504 HIGHWAY ENGINEERING

PART B & PART C QUESTIONS – all 5 units along with problem questions

1. Explain Jayakar committee recommendations.
2. Explain in detail various factors affecting the design highway location.
3. Explain the general principles to be followed in the design of horizontal alignment.
4. Compare the three “second twenty-year road development plan” in India.
5. Write brief notes on: i. Central road fund (CRF) ii. Indian Road Congress (IRC) iii. Central Road Research Institute (CRRI) iv. National Highway Authority of India (NHAI).
6. Describe the conventional and modern methods of engineering surveys to be carried out for highway locations.
7. Elaborate the salient features of highway cross sectional elements.
8. i. Define super elevation. Derive the formula for calculating super elevation on horizontal curves.
ii. A vehicle travels at a speed of 60Kmph. Find the super elevation to be provided if the radius of curvature is 220m
9. i. Describe the types of gradient. ii. Explain with neat sketches about vertical curves.
10. Write in detail about factors affecting sight distances?
11. The speed of overtaking and overtaken vehicles is 80 and 50 KMPH respectively on a two-way traffic road. If the acceleration of overtaking vehicle is 0.9 m/sec^2 i. Calculate safe overtaking sight distance. ii. Mention the minimum length of overtaking zone. iii. Draw a neat sketch of the overtaking zone and show the position of sign posts.
12. Describe the classification of highways in India.
13. Explain in detail about Urban and Rural roads.
14. Explain the steps involved in the geometric design of hill roads.
15. Explain the following (i) Exceptional and minimum gradients (ii) Summit and Valley curves.
16. Explain the components and their functions in flexible pavements.
17. Explain the factors governing the structural design of pavements.
18. Explain the steps involved in the IRC method of design of flexible pavements.
19. Explain the general principles to be followed in design of vertical alignments.
20. Determine the stresses at interior, edge and corner regions of a rigid pavement using Westergaard's 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 $a=15\text{cm}$.
21. (i) A valley curve is formed due to two gradients +2.5% and -1.75%. If the design speed of this highway is 80kmph, determine the stopping sight distance and design the valley curve to fulfil both comfort and head light distance conditions. ii) Calculate the Super-elevation to be provided for a horizontal curve with a radius of 400m for a design speed 100kmph in plain terrain. If super-elevation is restricted to 0.07. Calculate the coefficient of lateral friction mobilized.
22. Calculate the length of transition curve and shift using the following data:
 - i. Design speed = 70KMPH
 - ii. Radius of circular curve = 250m
 - iii. Pavement width including extra widening = 7.5m
 - iv. Allowable rate of introduction of super elevation (pavement rotated about the centre line) = 1 in 150
23. Design the pavement for construction of a new by-pass with the following data:

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Two lane carriage way, Initial traffic in the year of completion of construction = 1500 CVPD (sum of both directions), Traffic growth rate = 5% Design life = 15 years, Vehicle damage factor based on axle load survey = 2.5 standard axle per commercial vehicle. Design CBR of subgrade soil = 6%.

24. What are the objectives of widening of road pavement at horizontal curves? Derive an expression for the extra widening.
25. Explain any two tests on road aggregates.
26. List the desirable properties of aggregate and brief out each.
27. Illustrate about a) Field density test b) Crushing strength test c) Penetration test d) California bearing ratio test e) Viscosity test of bitumen.
28. Describe in detail about any four methods of strengthening of pavements.
29. Examine any three non-destructive testing methods of pavement deflection.
30. Summarize the evaluation of pavement by Benkelman Beam method.
31. The design speed of a highway is 80kmph. There is a horizontal curve of radius 200m on this road. If maximum super elevation of 1 in 15 is not be exceeded, Calculate the maximum allowable speed on the curve. Also determine the extra widening required and length of the spiral transition curve using the following data. Length of the wheel base = 6.1m, Pavement width = 7.2m and number of lanes = 2. Rate of introduction of super elevation is 1 in 200.