



12. (a) Discuss the design principles of horizontal curves, including super elevation and transition curves.

Or

- (b) Describe the pavement components and their role in pavement design.

13. (a) Explain the construction practice of concrete pavements.

Or

- (b) Enumerate the different methods of pavement maintenance and explain their importance in pavement performance. (5+8)

14. (a) Discuss the various defects that can occur in rails and how they can be detected and prevented.

Or

- (b) Explain the role of signalling in railway operation and safety.

15. (a) Paraphrase the construction and maintenance of railway tracks, including conventional and modern methods and materials.

Or

- (b) Discuss the lay out of a terminal railway stations with a neat sketch.

PART C — (1 × 15 = 15 marks)

16. (a) Explain the design principles for vertical curves, including gradients. Calculate the length of a vertical curve for a highway that has a change in grade from +2% to -2%. (10+5)

Or

- (b) Assuming that the highway is constructed as per the design parameters described as per IRC, how would you evaluate the pavement condition after 10 years of operation? What maintenance practices would you recommend to ensure the longevity of the pavement? (10+5)
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