

**Question Paper Code : 50538**

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2024.

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Fourth Semester

Civil Engineering

CE 3405 — HIGHWAY AND RAILWAY ENGINEERING

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

[IRC 37 : 2012 (Respective charts alone has to be provided)]

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List the functions of Indian Roads Congress.
2. Mention the purpose of PMGSY rural road scheme.
3. Classify the types of sight distance.
4. Define 'transition curve'.
5. List any two advantages of rigid pavement over flexible pavement.
6. What is sub-base failure in flexible pavement?
7. Illustrate the three types of rail section.
8. Justify the reason for coning of wheels.
9. Define Shunting operation.
10. List any three types of railway stations.

PART B — (5 × 13 = 65 marks)

11. (a) (i) Discuss the factors influencing the highway alignment. (7)
- (ii) Classify the types of rural and urban roads. (6)

Or

- (b) Elaborate on the four phases of engineering survey for a new highway alignment. (13)

12. (a) (i) Derive an expression for widening at curve. (7)  
(ii) Elaborate and derive with a neat sketch of overtaking sight distance. (6)

Or

- (b) (i) Write step by step procedure for the design of rigid concrete pavement by IRC method. (7)  
(ii) Explain the purpose of providing super elevation and also list the types of gradients. (6)
13. (a) (i) Explain any four types of tests for bitumen. (7)  
(ii) Explain any four types of tests for coarse aggregates. (6)

Or

- (b) (i) Write in detail the step-by-step construction procedure of flexible pavement. (7)  
(ii) Mention the importance of highway drainage. (6)
14. (a) Elaborate with a neat sketch of different components of a permanent way. (13)

Or

- (b) Write a note on different types of rail failures and also explain types of rail joints. (13)
15. (a) Illustrate with a neat sketch a left-hand turnout of a railway track and mention the types of components. (13)

Or

- (b) Highlight on feasibility study, planning and construction of MRTS with an example. (13)

**PART C — (1 × 15 = 15 marks)**

16. (a) Explain in detail the Pavement Management System (PMS) with its effectiveness in pavement maintenance. (15)

Or

- (b) Explain about the role of Indian railways in urban transportation with a case study. (15)