

Roll No. ....

Total Pages : 3

**002501**

**December 2023**

**B.Tech. (Civil Engineering) - V SEMESTER  
RAILWAY AND AIRPORT ENGINEERING  
(PCC-CED-301)**

Time : 3 Hours]

[Max. Marks : 75

*Instructions :*

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*
2. *Answer any four questions from Part-B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*
4. *Assume any missing data accordingly.*

**PART-A**

1. (a) What would be the expression for sleeper density if the rail length used in a track is 19 m and there are 22 sleepers under one rail length? (1.5)  
(b) Explain the function of fish plates. (1.5)  
(c) Write down the expression for minimum depth of ballast section required for a railway track. (1.5)  
(d) What is the formation width required as per Indian Standards for B.G. and M.G. railway tracks? (1.5)  
(e) What is the meaning of the term "throw" in the context of railway switches? (1.5)

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- (f) Discuss the role and purpose of fish plates in railway track infrastructure. (1.5)
- (g) Provide a brief explanation of Long Welded Rails (LWR). (1.5)
- (h) Describe the concept of "looping" within the context of railway stations and yards. (1.5)
- (i) Define the term 'home signal'. (1.5)
- (j) What do you understand by the term basic runway length? (1.5)

### PART-B

- 2. (a) Explain the necessity of sleepers in railway track. What are the desirable qualities or requirements of good sleepers? (10)
- (b) What is creep? What are the effects of creep? (5)
- 3. (a) What type of soil is best suited as subgrade in railway track? (5)
- (b) Mention the functions of ballast and state the requirements of a good ballast material. (10)
- 4. Calculate all the necessary elements required to set out a 1 in 7.5 turnout, taking off from a straight B.G. track with its curve starting from the toe of the switch, *i.e.* tangential to the gauge face of the outer main rail and passes through theoretical nose of crossing, *i.e.* TNC. Given, heel divergence (d) = 10.4 cm. (15)

- (a) What is the necessity of welding of rails? (5)
- (b) What are the functions of a Railway station? Discuss the various requirements of a railway station. (10)

- 6. (a) Write short notes on :
  - (i) High speed trains.
  - (ii) Tunneling in soft ground.
  - (iii) Mucking.
  - (iv) Temperature compensator in interlocking. (10)
- (b) Describe the engineering principles of signaling. (5)
- 7. What is wind rose diagram? What is its utility? What are its types? Explain each type. (15)