

TH3 Railway & Bridge Engineering

Full Marks: 80

Time- 3 Hrs

**Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks.**

1. Answer **All** questions 2 x 10
 - a. List the various gradients that are implemented in railway track design.
 - b. Define ballast and list the various types used in railway construction.
 - c. Mention the various types of railway gauges in Indian Railways and their corresponding dimensions.
 - d. Define creep of rails. Mention two causes of creep in rails.
 - e. Define the terms submersible bridge and non-submersible bridge.
 - f. Differentiate between left-hand and right-hand turnouts.
 - g. State two uses of cofferdam.
 - h. Define equilibrium cant.
 - i. Write the three function of Sleeper.
 - j. Define scour depth
2. Answer **Any Six** Questions 5 X 6
 - a. Define caissons .Briefly explain different types of caissons along with their uses.
 - b. Outline the site characteristics of an ideal bridge.
 - c. Discuss the theories of creep.
 - d. Discuss the advantages associated with welding of rails.
 - e. Explain different types of Wing wall.
 - f. Define permanent way with a neat sketch and list the functions of track components.
 - g. Define switches and explain different types of switches used in railways.

Answer **Any Three** Questions
3. What are the different types of bridge foundation? Describe open foundation and raft foundation with neat sketch. 3+7
4. What are the requirements of rail joints? Discuss different types of rail joints with the help of neat sketches and mention their merits and demerits. 3+7
5. Write the necessity of track maintenance and advantages of maintenance. 10
6. If a 8° Curve track diverges from a main curve of 5° in an opposite direction in the layout of a B.G yard. Calculate the super-elevation and the speed on the branch line, if the maximum speed permitted on the main line is 45 kmph. 10
7. Define causeway. Explain the necessities and classification of causeways. Mention the conditions to be satisfied for providing causeways. 10