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PRESIDENCY UNIVERSITY BENGALURU

**SET-B**

SCHOOL OF ENGINEERING

**END TERM EXAMINATION -MAY /JUN 2024**

**Semester :** Semester IV -2022

**Course Code :** CIV2022

**Course Name :** Railway Engineering and Tunneling

**Program :** B. Tech. Civil Engineering

**Date :** June 19, 2024

**Time :** 9:30 AM - 12:30 PM

# Max Marks : 100

**Weightage :** 50%

# Instructions:

1. *Read all questions carefully and answer accordingly.*
2. *Question paper consists of 3 parts.*
3. *Scientific and non-programmable calculator are permitted.*
4. *Do not write any information on the question paper other than Roll Number.*

**PART A**

**Answer any 10 Questions 10\*2 = 20M**

1. Define coning of wheels.
2. What are the different types of materials that can be used as a ballast?
3. Define tilting of rails.
4. What are the various components of a railway track?
5. What are the different types of gradient that can be come across in a railway track?
6. List the types of switch.
7. Sketch the details of a switch.
8. During periodic maintenance, what all elements of the track has to be checked?
9. Define hauling power of a locomotive.
10. Sketch the details of crossing.
11. Define flangeway clearance and heel divergence.

(CO1) [Knowledge] (CO1) [Knowledge] (CO1) [Knowledge] (CO1) [Knowledge] (CO2) [Knowledge] (CO3) [Knowledge] (CO3) [Knowledge] (CO3) [Knowledge] (CO3) [Knowledge] (CO3) [Knowledge] (CO3) [Knowledge]

1. List the types of vertical curves with figure.
2. Differentiate between tunnel and an open cut.
3. What are the problems encountered during tunnelling?

**PART B**

**Answer any 8 Questions 8\*5 = 40M**

(CO3) [Knowledge] (CO4) [Knowledge] (CO4) [Knowledge]

1. Pandrol Clip falls under which category of fittings and fastenings? What are the requirements of that type of fitting and fastening ?

(CO1) [Comprehension]

1. Superelevation, cant deficiency and cant excess are part of geometric design of a curve to ensure a better distribution of load on both rails and to reduce the wear and tear of the rails and rolling stock. Explain all the three terms.

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(CO2) [Comprehension]

1. Water is the greatest threat to a railway track. It will affect the maintenance of the track greatly. What are the requirements of a good drainage system for a railway track?

(CO3) [Comprehension]

1. A railway station is that place on a railway line booked and dealt with and where trains are given the authority to proceed forward. What are the various facilities required in railway station?

(CO3) [Comprehension]

1. Maintenance of railway tracks is done in two stages, daily and periodic. Why is it necessary to do proper maintenance of the tracks?

(CO3) [Comprehension]

1. Which is the most commonly used type of switch in railways? What are the different classification of the same?

(CO3) [Comprehension]

1. Water is the greatest threat to a railway track. It will affect the maintenance of the track greatly. Justify the need for a proper drainage system on a railway track.

(CO3) [Comprehension]

1. A yard is a system of tracks laid out to deal with the passenger as well as goods traffic. What are the different types of station yards?

(CO3) [Comprehension]

1. Tunnel construction is one of the most challenging construction projects. What are the advantages of tunelling?

(CO4) [Comprehension]

1. The shape of the tunnel cross-section is relevant in terms of the purpose of the tunnel. What are the commonly used shapes for tunnels?

(CO4) [Comprehension]

1. Different materials can be used to meet the objectives of tunnel lining. What are the commonly used materials for tunnel lining?

(CO4) [Comprehension]

1. The process of tunnel contruction is very dangerous. What are the safety measures that need to be taken during tunnel construction?

(CO4) [Comprehension]

**PART C**

**Answer any 4 Questions 4\*10=40M**

1. Survey is the process of gathering all the necessary information before starting of any new project. Explain in detail the various surveys to be conducted before construction of a new railway track.

(CO1) [Application]

1. Find the superelevation and the maximum permissible speed for a 2° BG curve on a route with a maximum sanctioned speed of 75 km/h. The speed for calculating the equilibrium superelevation is 60 km/h and the booked speed of goods trains is 50 km/h.
2. What are the advantages and disadvantages of tunnel construction?

(CO2) [Application]

(CO3) [Application]

1. Various forces offer resistance to the movement of a train on the track. Explain the various factors which offer resistance to the movement of trains.

(CO3) [Application]

1. Calculate the maximum permissible train load that can be pulled by a locomotive having 4 pairs of driving wheels carrying an axle load of 24 tonnes each. The train has to run at a speed of 80kmph on a straight level track (BG).

Also calculate the reduction in speed, if the train has to climb a gradient of 1 in 200.

If the train climbs the gradient with a 2 degree curve, then what would be the reduction in speed?

(CO3) [Application]

1. Explain the 3 stages of tunnel drainage.

(CO4) [Application]