Registration No.: | | | | | | | | | | |

Total Number of Pages: 02

Course: B.Tech / IDD
Sub_Code: RCI5D004

5th Semester Regular/Back Examination: 2024-25
SUBJECT: Railway and Airport Engineering
BRANCH(S): C&EE, CIVIL, CE
Time: 3 Hours
Max Marks: 100
Q.Code: R277

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right-hand margin indicate marks.

Part-I

Q1 **Answer the following questions:** **(2 x 10)**

a) What are the different gauges used in Indian railway?
b) What are the function of check rail and wing rail?
c) Mention various type of Rail section used in Indian Railways for B. G. track.
d) What is the difference between Staggered joint and Square joint?
e) Write are the advantage of welding of Rails.
f) What are the classifications of waterways?
g) Define Hauling Capacity. Calculate the weight of rail required for a locomotive of axle load of 20 tones.
h) Define Calm period. What is the necessity.
i) What is cross wind component? Mention their standard values.
j) Define Breakwater.

Part-II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** **(6 × 8)**

a) What are the requirements of an ideal permanent way?
b) What are the requirements of good ballast?
c) What are the methods to reduce the wear of rail?
d) Calculate maximum permissible train load that can be pulled by a locomotive having 3 pairs of driving wheels carrying an axle load of 25 tons each. The train has to run at a speed of 75 kmph on a straight MG track. Also calculate the reduction in speed if the train has to climb a gradient of 1 in 150 with a 3º radius of curve.
e) Briefly explain about the CST-9 Sleeper.
f) What are the merits and demerits of bearing plates used in Indian rail?

g) If a 6^o curve track diverges from a main curve of 4^o in an opposite direction in the layout of M. G. Yard, calculate the superelevation and the speed on the branch line, if the maximum speed permitted on the main line is 50 kmph.

h) What are the geometric elements of Taxiway? Mention the standard values.

i) Explain the working principle of semaphore signal.

j) Calculate the all the necessary elements required to set out a I in 12 turnouts, taking off from a straight BG track with its curve starting from the toe of the switch. Heel divergence is 10.5 cm.

k) What are the significances of different types of imaginary surface of Airport?

l) Mention the factors which govern the choice of site for a Harbor.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 Draw the schematic diagram of the cross section of a BG railway track in embankment. Explain its component parts. Briefly explain the problem in multi gauge system. **(16)**

Q4 The length of the runway under standard conditions is 2500 m. The airport is to be provided at elevation of 400 m above the mean sea level. Determine the length of runway as per ICAO and FAA with fallowing data: **(16)**

- Mean of the maximum daily temperature is 44^oc
- Mean of the average daily temperature is 27^oc

End to end runway (m)	Grade (%)
0 - 300	+1.00
300 - 900	–0.4
900 - 1500	+0.5
1500 - 1800	+0.8
1800 - 2100	–0.5
2100 - 2700	–0.3
2700 - 3000	+0.2

Q5 Draw the schematic diagram of Left hand Turn out and Right hand Turn out. Discuss in brief the basic function of its various components. **(16)**

Q6 Briefly explain the importance of Inland water transport in India. How does it affect the Indian economy? **(16)**