NATIONAL INSTITUTE OF TECHNOLOGY SRINAGAR
DEPARTMENT OF CIVIL ENGINEERING
RAILWAY AND AIRPORT ENGINEERING (CIV-711-E1)

Exam: End Semester (B. Tech 7th Semester)
Session: Autumn 2019

Max.Marks:90
Max. Time: 03 Hrs.

Note: (i) Attempt any five questions, (ii) Be brief and to-the-point, (iii) Marks and Course outcomes are indicated against each question and (iv) Assume any missing data suitably

Course Outcomes:
CO1: Able to understand the transport system of the country.
CO2: Knowledge about various aspects of railway design
CO3: Able to understand various aspects of airport system and airport pavement design.
CO4: Understanding of Railway planning, design, construction and maintenance and planning and design principles of Airports.

Q1.   CO1 (9, 9)
a) What is the Uni-gauge policy of Indian Railways? Describe the benefits of the Uni-gauge system.
b) Discuss the role of Indian Railways in the social and economic development of the country. Mention briefly the strengths and weaknesses of the Indian Railways.

Q2.   CO2 (9, 9)
a) Explain briefly the functions of the various components of the railway track. Draw a typical cross section of a BG double track in embankment and show therein all the components of the track.
b) Determine the number of sleepers required for the construction of a 640-m long BG railway track, ensuring a sleeper density of (N + 7). Draw a neat sketch showing elevation and plan of CST 9 sleeper

Q3.   CO2 (9, 9)
a) Compare different types of ballast and also justify their suitability. Determine the optimum thickness of the stone ballast required below sleepers of density M + 7 on a BG track.
b) Define 'creep of rail'. What are its effects? Describe various measures adopted to reduce creep. Which portions of the track are more susceptible to creep?

Q4.   CO3 (9, 9)
a) Write short notes on:
    i) Turning radius of aircraft
    ii) Holding Aprons
    iii) Cross wind component
b) Explain briefly the method of determining the runway orientation using wind data (Direction, duration and intensity).

1

CO 4 (12, 6)

Q5.

a) Calculate the super elevation, maximum permissible speed, and transition length for a 3° curve on a high-speed BG section with the following data:

    i) Maximum sanctioned speed = 110kmph

    ii) Equilibrium speed = 80kmph

    iii) Booked speed of good train = 50kmph

b) Determine the suitable rail section for a locomotive carrying an axle load of 22.5 t. Draw a 52kg rail section showing important dimensions.

CO4 (12, 6)

Q6.

a) An airport is proposed at an elevation of 400m above mean sea level where the mean of maximum and minimum average daily temperature are 44.80 C and 26.20 C respectively. Maximum elevation difference along proposed runway is 6.3m. Basic runway length is 1260m. Determine actual length to be provided.

b) Summarize briefly the various taxiway geometrics as recommended by ICAO.

2