

USN Fifth Semester B.E. Degre

17CV552

Fifth Semester B.E. Degree Examination, July/August 2021

Railways, Harbours, Tunneling and Airports

Time: Thrs. ORE . 31

Max. Marks: 100

Note: Answer any FIVE full questions.

- a. Draw a typical cross section of permanent way. Discuss in brief the basic functions of components of permanent way. (10 Marks)
 - b. A 5° curve diverges from 3° main curve in reverse direction in the layout of a B.G. yard. If the speed on the branch line is restricted to 35 kmph, determine the restricted speed on the main line.

 (10 Marks)
- 2 a. Define Creep? What are the causes, effects and how creep is prevented? (08 Marks)
 - b. What are the requirements of ideal ballast material? List the different materials used as ballast. (08 Marks)
 - c. What is coning of wheels?

(04 Marks)

- 3 a. Calculate the Quantities of materials required to construct one km of B.G. railway track taking the sleeper density as (M + 7). (08 Marks)
 - b. What is the necessity of providing drainage facility for railway track? Mention the requirements of good drainage system. (08 Marks)
 - c. What are the advantages of underground railways?

(04 Marks)

- 4 a. Explain tier system of track maintainance.
 - b. Explain briefly the different types of station yards. With the help of neat sketch explain marshalling yard. (08 Marks)
 - c. List the requirements of ideal formation material.

(04 Marks)

(08 Marks)

- 5 a. Draw a neat sketch of artificial harbor and also mention the functions of the harbor components. (10 Marks)
 - b. What is break water? Explain any one type of break water, with advantages and disadvantages. (10 Marks)
- 6 a. Explain various shapes of tunnels with neat sketches. (10 Marks)
 - b. With a neat sketch, explain the needle beam method of tunneling in soft soil. (10 Marks)
- 7 a. Draw a typical layout of airport showing the component parts. Also mention the functions of component parts of airport. (10 Marks)
 - b. What are the points to be considered while selecting a suitable site for airport? Explain in brief. (10 Marks)

8 a. Briefly explain the aircraft characteristics which affect the design of airport.
b. Explain in brief the classification of airports.
c. What are the characteristics of air transport?
(08 Marks)
(08 Marks)
(04 Marks)

9 a. Explain the procedure of orienting the runway using windrose diagram. (10 Marks)

b. An airport is proposed at an elevation of 400m above MSL, where the mean of maximum and mean of average daily temperature of the hottest month are 44.8°C and 26.2°C respectively. The maximum elevation difference along the proposed profile of runway is 6.3m. If the basic length of runway is 1260m. Determine the actual length of runway to be provided.

(10 Marks)

10 a. What are the factors governing the layout and location of taxiways. Explain in brief.

(08 Marks)

b. Design an exit taxiway joining a runway and a parallel main taxiway. The total angle of turn is 35° and the maximum turnoff speed is 80 kmph for the data given:

Radius of Entrance curve = 731m

Runway width = 4.5 m

Taxiway width = 22.5 m

Draw a neat sketch showing all the design elements.

(08 Marks)

c. Explain in brief:

(i) Wind Coverage

(ii) Cross wind component

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(04 Marks)