USN

18CV645

Sixth Semester B.E. Degree Examination, Dec.2023/Jan.2024
Railway, Harbours, Tunnelling and Airports

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Explain Permanent way with a neat sketch. Mention the requirements of an ideal permanent way. **(10 Marks)**
   b. A $5°$ curve diverges from $3°$ main curve in the Reverse direction in the layout of a B.G. yard. If the speed on the branch line is restricted to 33 kmph. Determine the restricted speed on the main line. **(10 Marks)**

OR

2 a. What should be the equilibrium cant on a M.G. curve of $5°$ for an average speed of 60 kmph? Also find out the maximum permissible speed after allowing the maximum cant deficiency. **(10 Marks)**
   b. What are the requirements of good ballast? Mention the different types of Ballast used in permanent way. **(10 Marks)**

Module-2

3 a. Estimate the quantities of materials required to construct 1 km long B.G. railway track taking the sleeper density as (n+6). **(10 Marks)**
   b. With a neat sketch, explain "Marshalling yard". List the components. **(10 Marks)**

OR

4 a. What are the advantages and limitations of underground railways? **(10 Marks)**
   b. Classify station. Illustrate the features of each station. **(10 Marks)**

Module-3

5 a. Write short note on :
      (i) Tunnel ventilation.
      (ii) Tunnel drainage. **(10 Marks)**
   b. Draw a neat sketch of Artificial Harbour and list the various components. **(10 Marks)**

OR

6 a. Explain the different types of Breakwaters. **(10 Marks)**
   b. Mention the objective of tunnel lining. List the materials used for tunnel lining. **(10 Marks)**

Module-4

7 a. Sketch different types of Runways. **(10 Marks)**
   b. List the characteristics of an aircraft which affect the design of an airport. **(10 Marks)**

OR

8 a. Explain the various factors which you would keep in view while selecting a suitable site for an airport. (10 Marks)
   b. What are the various corrections to be applied on to the runway length? Indicate the equations used in applying corrections. (10 Marks)

Module-5

9 a. Determine the orientation of Runway by plotting wind rose diagram I, by using the data given in Table Q9 (a).

Wind direction	N	NNE	NE	ENE	E	ESE	SE	SSE	S
% in each directions	6.10	4.15	1.93	2.85	4.30	10.15	7.80	7.52	6.10

Wind direction	SSW	SW	WSW	W	WNW	NW	NNW
% in each directions	3.15	1.33	3.65	4.00	10.75	7.3	6.92

(10 Marks)

   b. Briefly explain the night time aids provided at airports. (10 Marks)

OR

10 a. Define orientation of runway. Briefly explain the procedure of plotting Type-II Wind Rose diagram. (10 Marks)
   b. The length of runway under standard conditions is 1650 mts. The airport site has an elevation of 275 mts. Its reference temperature is $32.94°C$. If the runway is to be constructed with an effective gradients of 0.2%. Determine the corrected runway length. (10 Marks)

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