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 $^\circ$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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