



**B.E DEGREE EXAMINATIONS: NOV/DEC 2023**

(Regulation 2018)

Seventh Semester

**CIVIL ENGINEERING**

U18CEE0018: Railways, Airport, Dock, and Harbour Engineering

**COURSE OUTCOMES**

- CO1:** Perform geometric design of permanent way.  
**CO2:** Plan for location of railway station, yards, and other amenities.  
**CO3:** Prepare layout of airport and classify the airport.  
**CO4:** Perform the geometric design of airport components.  
**CO5:** Prepare the plan for various dock and harbour structures.

**Time: Three Hours**

**Maximum Marks: 100**

**Answer all the Questions:-**

**PART A (10 x 2 = 20 Marks)**

**(Answer not more than 40 words)**

- |  |     |                   |
|--|-----|-------------------|
| 1. Comment on the type of sleepers used in the current scenario.       | CO1 | [K <sub>2</sub> ] |
| 2. How are railway stations classified?                                | CO2 | [K <sub>2</sub> ] |
| 3. Mention the materials used in the construction of railway track.    | CO1 | [K <sub>1</sub> ] |
| 4. Justify the adaptability of metro trains for urban transportation.  | CO2 | [K <sub>2</sub> ] |
| 5. Mention the details in runway numbering. Give reason for numbering. | CO3 | [K <sub>2</sub> ] |
| 6. List out the components of airport.                                 | CO3 | [K <sub>1</sub> ] |
| 7. What is the optimum location of exit taxiway?                       | CO4 | [K <sub>2</sub> ] |
| 8. How is runway orientation decided?                                  | CO4 | [K <sub>2</sub> ] |
| 9. Comment on the choice of location of a harbor.                      | CO5 | [K <sub>2</sub> ] |
| 10. Differentiate port and harbor.                                     | CO5 | [K <sub>2</sub> ] |

**Answer any FIVE Questions:-**

**PART B (5 x 16 = 80 Marks)**

**(Answer not more than 400 words)**

- |   |   |     |                   |
|---|---|-----|-------------------|
| 11. a) Enumerate the types of rails. Which type of rail is used nowadays and why? | 8 | CO1 | [K <sub>2</sub> ] |
| b) Explain about gradients of the geometric design of railway track.              | 8 | CO1 | [K <sub>2</sub> ] |

12. a) Explain the plate laying techniques in railway track construction. 8 CO2 [K<sub>2</sub>]  
 b) Classify railway yards and write a detailed note on marshalling yard. 8 CO2 [K<sub>2</sub>]
13. a) The length of the runway at mean sea level, standard temperature and zero gradients is 1600 m. The site has an elevation of 320 m, with a reference temperature of 33.6° C. The runway must be constructed with an effective gradient of 0.25%. Determine the actual length of the runway at the site. 8 CO3 [K<sub>3</sub>]  
 b) Explain about the significance and various types of lightings provided in the runway and taxiway. 8 CO3 [K<sub>2</sub>]
14. a) The typical wind data for an airport site is given in the following table. 8 CO4 [K<sub>3</sub>]  
 Determine the best orientation of the runway with the help of a wind rose diagram given in table.

Wind Direction	Percentage of Time	Wind Direction	Percentage of Time	Wind Direction	Percentage of Time
N	6.10	SE	7.80	W	4.00
NNE	4.15	SSE	7.52	WNW	10.75
NE	1.93	S	6.10	NW	7.30
ENE	2.85	SSW	3.15	NNW	12.00
E	3.30	SW	1.33		
ESE	10.15	WSW	3.65		

- b) Discuss the criteria for the site selection of airport. 8 CO4 [K<sub>2</sub>]
15. a) Elaborate on the components of a harbor with a neat sketch of the layout of harbor. 8 CO5 [K<sub>2</sub>]  
 b) Describe the regulations of CRZ in coastal protection. 8 CO5 [K<sub>2</sub>]
16. a) Explain the maintenance procedures of a railway track 8 CO2 [K<sub>2</sub>]  
 b) How does the town planning authority demarcate the zones for restricting the height of a building in airport location? 8 CO3 [K<sub>2</sub>]

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