



B.E DEGREE EXAMINATIONS: NOV/DEC 2022

(Regulation 2018)

Seventh Semester

CIVIL ENGINEERING

U18CEE0018 Railways, Airports, Docks, 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)

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|--|-----|-------------------|
| 1. Draw the left-hand turn-out in the crossings of a railway track and list the parts in the turn-out. | CO1 | [K ₂] |
| 2. What do you understand by the term “negative cant”? | CO1 | [K ₂] |
| 3. Classify the types of stations. | CO2 | [K ₂] |
| 4. Enlist the challenges in the maintenance of a railway track. | CO2 | [K ₂] |
| 5. Give the classification of airports. | CO3 | [K ₂] |
| 6. Justify the statement “The landing and take-off of aircraft is oriented towards head wind”. | CO3 | [K ₂] |
| 7. Which type of pavement is adopted for runway and taxiway? Mention the reasons. | CO4 | [K ₂] |
| 8. List out the zones considered in airport location. | CO4 | [K ₂] |
| 9. What are the repair arrangements in the docks? | CO5 | [K ₂] |
| 10. What are the criteria to be considered for site selection of harbour location? | CO5 | [K ₂] |

Answer any FIVE Questions:-

PART B (5 x 16 = 80 Marks)

(Answer not more than 400 words)

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|--|----|-----|-------------------|
| 11. a) Sketch neatly the cross-section of a railway track and elaborate its components with its functions. | 10 | CO1 | [K ₂] |
| b) Explain the concept of creep in rails. | 6 | CO1 | [K ₂] |
| 12. a) Describe the step-by-step process in construction of railway track. | 10 | CO2 | [K ₂] |

- b) Calculate the materials, namely rails, sleeper, ballast, fish plates and fish bolts required for laying 1km of railway track. 6 CO2 [K₃]
13. a) Elaborate on the factors considered for the airport site selection 10 CO3 [K₂]
 b) Enumerate the airport components and draw the layout of airport. 6 CO3 [K₂]
14. a) The length of the runway at mean sea level, standard temperature and zero gradient is 1600m. The site has an elevation of 320m, with a reference temperature 33.6-degree C. The runway must be constructed with an effective gradient of 0.25%. Determine the actual length of the runway at the site. 10 CO4 [K₃]
 b) Describe the importance and types of runway lighting. 6 CO4 [K₂]
15. a) Explain the following coastal structures namely Breakwater, wharf, piers, fenders and dolphins 10 CO5 [K₂]
 b) Elaborate on environmental concerns of harbour and port. 6 CO5 [K₂]
16. a) A 6° curve branches off from a 3° main curve in an opposite direction in the layout of a B.G yard. If the speed on branch line is limited to 35.5 kmph, determine the speed restriction on the main line. 10 CO1 [K₃]
 b) The typical wind data for an airport site is given in the following table. Determine the best orientation of the runway with the help of a wind rose diagram given in table. 6 CO4 [K₃]

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		
