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P.E.S. College of Engineering, Mandya - 571 401
(An Autonomous Institution affiliated to VTU, Belagavi)
Sixth Semester, B.E. - Civil Engineering
Semester End Examination; July / Aug. - 2022
Basic Transportation Engineering

Time: 3 hrs   Max. Marks: 100

Course Outcomes

The Students will be able to:

CO1: Apply the knowledge of science and engineering to acquire the fundamentals of basic modes of transportation.

CO2: Study of different cross section elements of highway and different types of pavements.

CO3: Identify different components of railway track; design of airport runway and to understand the components of harbor.

CO4: To understand the advanced developments in transportation systems.

Note: I) PART - A is compulsory. **Two** marks for each question.

    II) PART - B: Answer any **Two** sub questions (from a, b, c) for a Maximum of **18 marks** from each unit.

Q. No.	Questions	Marks	BLs	COs	POs
	I : PART - A	**10**			
I a.	Discuss the characteristics of road transport.	2	L2	CO1	1,12
b.	Discuss the requirements of an ideal alignment.	2	L2	CO2	1,2
c.	Highlight the functions of sleepers.	2	L2	CO3	2,4
d.	Highlight the factors to be considered while selecting a site for airport construction.	2	L2	CO3	2,4
e.	Discuss the significance of ITS.	2	L2	CO4	4,12
	II : PART - B	**90**			
	UNIT - I	**18**			
1 a.	Discuss the role of transportation in society and salient features of different types of transportation modes.	9	L2	CO1	1,12
b.	Discuss the classification of roads suggested in the Nagpur Road Plant	9	L2	CO1	1,12
c.	Discuss the significant recommendations of Jayakar Committee Report. Also, highlight how this helped in road development in India.	9	L2	CO1	1,12
	UNIT - II	**18**			
2 a.	Describe obligatory points. With neat sketches, discuss how these control the alignment.	9	L2	CO2	1,2
b.	Draw the cross-section of flexible and rigid pavements and highlight the components. Discuss the functions of each layer in both the pavements.	9	L3	CO2	1,2
c.	Discuss the following terms along with the standard values recommended by IRC for various categories of roads, traffic, geological and climatic conditions.	9	L2	CO2	1,2

   i) Carriageway   ii) Cross slope   iii) Width of roadway

UNIT - III 18

3 a. Define permanent way. Explain the requirements of ideal permanent way. 9 L3 CO3 2,4

  b. Highlight the functions of rails and provide the comparison between the various types of rails. 9 L2 CO3 2,4

  c. Discuss the requirements and functions of ballast. Also, mention the types of ballast used in India. 9 L2 CO3 2,4

UNIT - IV 18

4 a. The typical wind data for all the directions of visibility is provided in Table.1. Analyzing the given data, draw the wind rose diagram and recommend orientation for runway. Using Type-I.

Wind Direction	Percentage of winds				Total
	6 - 24 km/hr	24 - 32 km/hr	32 - 40 km/hr	40 - 56 km/hr	
N	2.4	0.4	0.1	0.0	2.9
NNE	3.0	1.2	1.0	0.5	5.7
NE	5.3	1.6	1.0	0.4	8.3
ENE	6.8	3.1	1.7	0.1	11.7
E	7.1	2.3	1.9	0.2	11.5
ESE	6.4	3.5	1.9	0.1	11.9
SE	5.8	1.9	1.1	0.0	8.8
SSE	3.8	1.0	0.1	0.0	4.9
S	1.8	0.4	0.1	0.0	2.3
SSW	1.7	0.8	0.4	0.3	3.2
SW	1.5	0.6	0.2	0.0	2.3
WSW	2.7	0.4	0.1	0.0	3.2
W	4.9	0.4	0.1	0.0	5.4
WNW	3.8	0.6	0.2	0.0	4.6
NW	1.7	0.6	0.2	0.0	2.5
NNW	1.7	0.9	0.1	0.0	2.7
Clams					8.1
Total					100

9 L2 CO4 2

  b. The length required for landing and take-off under standard atmospheric conditions at sea level are 2000 m and 1700 m respectively. The elevation of the airport site is 200 m above the sea level and the airport reference temperature is 22ºC. Effective runway gradient is 0.5%. Analyze the given data and determine the actual length of the runway required. 9 L4 CO3 2,4

  c. Discuss the various classifications of harbors 9 L2 CO3 2,4

UNIT - V 18

5 a. Explain the components of Intelligent Transportation System (ITS). 9 L3 CO4 4,12

  b. Describe objectives and benefits of Intelligent Transportation System (ITS). 9 L2 CO4 4,12

  c. Briefly explain the types of integration of public transportation. 9 L3 CO4 4,12

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