

BALLARI INSTITUTE OF TECHNOLOGY & MANAGEMENT

(Autonomous Institute under Visvesvaraya Technological University, Belagavi)

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Course Code

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Sixth Semester B.E. Degree Examinations, September/October 2024

TRANSPORTATION ENGINEERING

Duration: 3 hrs

Max. Marks: 100

Note: 1. Answer any FIVE full questions choosing ONE full Question from each Module.
2. Missing data, if any, may be suitably assumed

<u>Q. No</u>	<u>Question</u>	<u>Marks</u>	<u>(RBTL:CO:PI)</u>
<u>Module-1</u>			
1.	a. What is an alignment? Explain the factors controlling alignment with sketches if necessary.	10	(2 :1: 1.2.1)
	b. Demonstrate the engineering surveys of highway alignment.	10	(2 :1: 1.2.1)
(OR)			
2.	a. Classify the different modes of transportation with merits and demerits.	10	(2 :1: 1.2.1)
	b. Explain the recommendations of Jayakar committee and how they were implemented?	10	(2 :1: 1.2.1)
<u>Module-2</u>			
3.	a. With the neat sketches illustrate different cross section elements of highway with neat sketch.	10	(3 :2: 1.2.1)
	b. Explain the various components of flexible pavement with neat sketch.	10	(2 :2: 1.2.1)
(OR)			
4.	a. Calculate the safe stopping sight distance for design speed of 50 kmph. (Assume $f = 0.37$ and reaction time, $t = 25$ sec). For (i) Two way traffic on two lane road. (ii) Two way traffic on single lane road.	10	(3 :2: 2.1.4)
	b. The radius of a horizontal circular curve is 100 m. The design speed is 50 kmph and the design co-efficient of lateral friction is 0.15. (i) Calculate the super elevation required if full lateral friction is assumed to develop (ii) Calculate the co-efficient of friction needed if no super elevation is provided.	10	(3:2: 2.1.4)
<u>Module-3</u>			
5.	a. What are the desirable properties of road aggregates? What are the tests conducted for judging the desirable properties? Mention the significance of each test.	10	(2 :3: 1.2.1)
	b. What are the desirable properties of soil sub grade? Enumerate the identification and classification tests of soil	10	(2 :3: 1.2.1)

(OR)

6. a. Differentiate between 10 (2 :3: 1.2.1)
(i) Prime coat, Seal coat and Tack coat
(ii) Bitumen and Tar (iii) Cutback and Emulsion.
- b. Explain the construction procedure of WBM and WMM in detail. 10 (2 :3: 1.2.1)

Module-4

7. a. With the help of neat sketch, explain how subsurface drainage system is provided to lower the ground water table. 10 (3 :4: 1.2.1)
- b. Categorize highway drainage system and explain the cross drainage structure in brief. 10 (2 :4: 1.2.1)

(OR)

8. a. Compare the annual costs of two types of pavement structures: 10 (3 :4: 2.1.4)
(i) WBM with thin bituminous surface at total cost of Rs.2.2 lakhs per km, life of 5 years, interest at 10 %, salvage value of Rs. 0.9 lakhs after 5 years, annual average maintenance cost of Rs. 0.35 lakh per km.
(ii) Bituminous macadam base and bituminous concrete surface at total cost of Rs. 4.2 lakhs per km, life of 15 years, interest at 8 %, salvage value of Rs. 2.0 lakhs after 15 years, annual average maintenance cost of Rs. 0.25 lakhs per km.
- b. Calculate the annual cost of a stretch of highway from the following particular: 10 (3 :4: 2.1.4)

	Actual cost (lakhs)	Estimated life (year)	Rate of interest (%)
Land	12	100	6
Earthwork	9	40	8
Bridges	7.5	60	8
Pavement	14	15	10

Module-5

9. a. With neat sketch, explain the permanent way and its cross section along with ideal requirements. 10 (2 :5: 1.2.1)
- b. With neat sketch, explain coning of wheels and its advantages and disadvantages. 10 (2 :5: 1.2.1)

(OR)

- 10 a. Explain the various factors which you would like to keep in the view while selecting a suitable site for an airport. 10 (2 :5: 1.2.1)
- b. With a neat typical layout of an airport, explain its components. 10 (2 :5: 1.2.1)

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