SEAT NO. :

[Total No. of Pages : 4]

B. E. (Civil)

ADVANCED TRANSPORTATION ENGINEERING

(2008 pattern) (Elective—IV) (Semester—II)

Time: 3 hours   **Max. Marks: 100**

Instructions to the candidates:

1) *Answer Q. 1 or Q. 2, Q. 3 or Q. 4, Q. 5 or Q. 6 from section-I and Q. 7 or Q. 8, Q. 9 or Q. 10, Q. 11 or Q. 12 from section-II*

2) *Answer to the two sections should be written in separate books.*

3) *Neat diagrams must be drawn wherever necessary*

4) *Figures to the right indicate full marks.*

5) *Use of logarithmic tables slide rule. Mollier charts, electronic pocket calculator and steam tables is allowed.*

6) *Assume suitable data, if necessary.*

Section—I

Q. 1. a) Explain in brief the following projects.   [6]

   i) Metro from Vanaj to Ramvadi.

   ii) Eastern freeway link in Mumbai.

   b) Explain concept of zoning, cordon lines, screen lines, aggregation and segregation of data with an example.   [6]

   c) Discuss the various factors affecting the trip generation within the study area [6]

OR

Q. 2. a) Explain in brief the following projects.   [6]

   i) International Airports in India

   ii) Prime minister's solar energy mission for India.

   b) Explain types of primary and secondary data needed to plan a traffic and transportation project comprehensively.   [6]

   c) Explain modal split with an example   [6]

Q. 3. What is MRTS? Explain the different ways in which MRTS can be achieved? Discuss the present bottlenecks which exist during the implementation of an integrated approach to determine effective solutions for urban traffic management.   [16]

OR

Q. 4. Explain in detail the following urban transport technologies:-

    i) Sky bus. [5]

    ii) Automated cruise controlled traffic systems. [6]

    iii) Automated park lifts and toll plazas. [5]

Q. 5. a) Compare and contrast between. [12]

    i) ARR and IRR

    ii) B T and B O T

    iii) Tangible and intangible benefits to be considered in the alternative of flyovers used to reduce congestion.

    iv) PCU and MSA

    b) What are pavement management systems? How are they useful n the management of Highway projects? [4`]

<div align="center">OR</div>

Q. 6. a) Compare and contrast between. [12]

    i) NPV and PBP

    ii) B O O and B O O S

    iii) Accident costs and prevention cost.

    iv) LCC and conventional costing of transportation projects.

    b) Differentiate between financial analysis and economic analysis with an example. [4]

<div align="center">

Section—II

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Q. 7 Elaborate on the following type of surveys. [18]

    i) Axle load surveys.

    ii) Distress surveys.

    iii) Licensed plate method of surveys.

<div align="center">OR</div>

Q. 8. Elaborate on the following type of surveys:- [18]

    i) Cordon and screen line surveys

    ii) Turning movement surveys, intersection surveys.

    iii) Traffic count surveys.

Q. 9. a) Design a flexible pavement for the following data, as per IRC-37. [10+2=12]

    i) 4 lane dual carriageway

    ii) Expected year of completion—2015.

    iii) CVPD in one direction in the year 2010----3000.

iv) Design life—15 days.

v) Traffic growth rate—3%.

vi) Terrain—plain

vii) CBR for sulgrade—5%

Draw a complete cross-section of the pavement

b) Differentiate between the rigid pavements and flexible pavements on 4 parameters. [4]

OR

Q. 10. a) Design a flexible pavement by using IRC—37 and the data given in problem 9 a, except for the change that the road is a 3 lane single carriageway instead of the 4 lane dual carriageway; and the terrain is hilly. [10+2=12]

Draw a complete cross-section of the pavement.

b) Explain the utility of the Benkelmen-beam method in the pavement design. [4]

Q. 11. What is an overlay? What are different purposes of providing overlays? Which are the different types of overlays? Explain the philosophy adopted by IRC-81 for making the overlay design? [2+4+4+6]

OR

Q. 12 Explain as per IRC-58 the following.

a) Dowel bar design procedure. [4]

b) Axle load surveys data utilization for design [4]

c) Critical loading condition adopted for concrete pavement design. [4]

d) Tie bar design procedure. [4]

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PAVEMENT DESIGN CATALOGUE
PLATE 2 – RECOMMENDED DESIGNS FOR TRAFFIC RANGE .10-150 msa

CBR 5%				
Cumulative Traffic (msa)	Total Pavement Thickness (mm)	PAVEMENT COMPOSITION		
		Bituminous Surfacing		Granular Base & Sub-base (mm)
		BC (mm)	DBM (mm)	
10	660	40	70	
20	690	40	100	
30	710	40	120	Base = 250
50	730	40	140	
100	750	50	150	Sub-base = 300
150	770	50	170	

CBR 5%

GSB   GB   DBM   BC