

Total No. of Questions : 12]

SEAT No. :

P3304

[Total No. of Pages : 4

[4959]-15

B.E. (Civil)

TRANSPORTATION ENGINEERING - II

(2008 Pattern)

Time : 3 Hours]

[Max. Marks : 100

Instructions to the candidates:

- 1) Answer Q.1 or Q.2, Q.3 or Q.4, and Q.5 or Q.6 from Section-I. Q.7 or Q.8, Q.9 or Q.10 and Q.11 or Q.12 from Section-II.
- 2) Answers to the two sections should be written in separate books.
- 3) Figures to the right indicate full marks.
- 4) Use of logarithmic tables, slide rule, Molli's charts, electronics pocket calculator and steam tables is allowed.
- 5) Assume suitable data if necessary.
- 6) Neat diagrams must be drawn wherever necessary.

**SECTION - I**

- Q1)** a) State comparison between First Road Development Plan and second Road Development Plan. [4]
- b) Explain in brief the concept of Saturation system. [6]
- c) Explain in brief the following : [3+3=6]
- i) Traffic Volume Survey
  - ii) Accident Studies

OR

- Q2)** a) Write a short on Origin and Destination Study. [4]
- b) What are the various objectives of preliminary survey for highway location? Explain in brief the various steps involved in conventional method of surveying. [3+3=6]
- c) Explain with a neat sketches various road patterns commonly in use. [3+3=6]

P.T.O.

- Q3)** a) Enumerate the steps for practical design of Super elevation. [6]  
 b) State the various factors governing the overtaking sight distance. Find the safe overtaking sight distance for a highway having design speed of 100 Km/h. [2+4=6]  
 Assume Maximum acceleration of overtaking vehicle =  $0.53/\text{sec}^2$ .  
 c) Derive an expression for finding the Extra Widening required on Horizontal Curve. [6]

OR

- Q4)** a) Design a rate of superelevation for a horizontal highway curve of radius 450 m and design speed of 100 Km/h. [6]  
 b) Write a short note on construction of WBM road. [6]  
 c) Define superelevation. Discuss in brief how it is attained in the field. [1+5=6]

- Q5)** a) State the various desirable properties of aggregates used in road construction. Explain in brief the stepwise procedure of determining Water absorption of Aggregate in the laboratory. [2+4=6]  
 b) Calculate the Stress at interior region of a cement concrete pavement using Westergaard's stress equation. Use the following data : [6]  
 Wheel Load = 5100 Kg,  
 Modulus of Elasticity of concrete =  $3 \times 10^5 \text{ Kg/cm}^2$ ,  
 Pavement thickness = 18 cm  
 Poisson's ratio = 0.15,  
 Modulus of Subgrade reaction =  $6.0 \text{ Kg/cm}^3$ ,  
 Radius of contact area = 15 cm  
 c) Explain in brief the following : [2+2=4]  
 i) Dowel bar  
 ii) WMM

OR

- Q6)** a) A Two lane two way road is at present carrying a traffic of 1500 Commercial Vehicles Per Day (CVPD) It is to be strengthened for growing traffic needs. The VDF has been found to be 3.0. The rate of growth of traffic is 10% per annum. The period of construction is 4.0 years. The pavement is to be designed for 20 years after construction. Calculate the cumulative standard axles to be used in design. [6]

- b) Write a short note on Joints in Concrete Pavement. [4]  
 c) What is softening point of Bitumen? Explain in detail the laboratory procedure of determining the softening point of Bitumen. [1+5=6]

## SECTION - II

- Q7)** a) Explain in brief the following : [1½ × 4 = 6]  
     i) Calm Period  
     ii) Ground speed  
     iii) Air speed  
     iv) Runway  
 b) Explain the characteristics of good airport layout. Draw a neat sketch of typical airport layout of single runway. [4+2=6]  
 c) How Runway orientation should be done? Discuss. [4]

OR

- Q8)** a) What is Basic runway length? Explain in brief the various corrections to be applied. [6]  
 b) Explain the following terms : [2×3=6]  
     i) Apron  
     ii) Terminal Building  
     ii) Finger system  
 c) Explain in brief the advantages and limitation of air transportation. [2+2=4]

- Q9)** a) i) Linear Waterway  
     ii) Natural Waterway  
     iii) Permissible velocity under bridge [2×3=6]  
 b) Differentiate between the following : [2×3=6]  
     i) Temporary Bridges and Permanent bridges  
     ii) Through bridge and Deck bridge  
     iii) Viaduct and Aqueduct  
 c) What is scour depth? How it is measured. State and explain the formula for calculation of scour depth off an Alluvial stream when Linear waterway under the bridge is less than the Regime width. [2+2+2=6]

OR

- Q10)** a) What is mean by Afflux? How does the magnitude of afflux influence the design. [2+4=6]
- b) A bridge is proposed to be constructed across an alluvial stream carrying a discharge of  $300 \text{ m}^3/\text{Sec}$ . assuming value of slit factor as 1.1, determine the maximum scour depth when the bridge consists of Two spans of 40 m each. [6]
- c) Derive an equation for Economical span of a bridge. State the assumption clearly. [4+2=6]
- Q11)** a) Define abutment. State the various types of Abutments. Also State the requirements of good Abutment. [2+2+2=6]
- b) What is Cut water and Ease Water? Why it is necessary? Sketch any two shapes of Cut water and Ease Water. [2+2+2=6]
- c) Write a short note on Types of wing walls. [6]

OR

- Q12)** a) How will you account for the following in the design of Highway Bridge. [2+2+2=6]
- i) Live Load
- ii) Buoyancy
- iii) Longitudinal force
- b) Define Bridge bearing. State the types of bearings. Why Bearings are necessary in bridges. [2+2+2=6]
- c) Explain the following with a neat sketches : [2+2+2=6]
- i) Abutment pier
- ii) Bascule Bridge
- iii) Transporter bridge

