Total No. of Questions : 12]

SEAT No. :

[Total No. of Pages : 4

P3171

B.E. CIVIL
Transportation Engineering
(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Answer any three questions from each section.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right side indicate full marks.***
5) ***Use of Calculator is allowed.***
6) ***Assume suitable data if necessary.***

SECTION - I

Q1) a) Explain the necessity and objects of highway planning. **[6]**

b) Explain in brief the various plans to be prepared after the planning surveys are carried out. **[4]**

c) Explain in brief the following : **[6]**

i) Passenger Car Unit

ii) Spot Speed Studies

OR

Q2) a) Briefly explain the Jaykar Committee and its Recommendations. **[6]**

b) Explain Obligatory Points. How these control the alignment. **[4]**

c) What are the advantages and disadvantages of traffic signals. **[6]**

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Q3) a) Enumerate the factors governing the width of carriageway. State the IRC specifications for width of carriageway for various classes of road. **[4]**

b) State and explain the factors governing the stopping sight distance. **[6]**

c) Determine the Absolute Minimum Radius and Ruling Minimum radius of horizontal curve of a National highway passing through Plain Terrain. Assume suitable data as per IRC Recommendations. **[6]**

OR

Q4) a) Explain ruling, maximum and exceptional gradients. Specify the values recommended by IRC for plains or rolling terrain? **[6]**

b) Discuss how the problem of road construction in water logged areas may be solved? **[4]**

c) Discuss the special care to be taken while aligning hill roads. **[6]**

Q5) a) Discuss the desirable properties of bitumen. Compare tar and bitumen. **[6]**

b) Explain Flexible and Rigid pavements and bring out the points of difference. **[6]**

c) Calculate the radius of relative stiffness of 15cm thick cement concrete slab for modulus of elasticity of cement concrete = 210000 kg/sq.cm. Poisson's ratio = 0.13 and modulus of sub grade reaction = 3.0 kg /sq.cm / cm. **[6]**

OR

Q6) a) Discuss the critical combination of stresses due to wheel load and temperature effects. **[6]**

b) Explain briefly the Marshall stability test. **[6]**

c) Explain the following term : **[6]**

i) Tack Coat

ii) Prime Coat

iii) Bituminous Concrete or Asphalt Concrete

iv) GSB

v) Cutback Bitumen

vi) WMM

SECTION - II

Q7) a) Explain in brief the following : **[4]**

i) Turning Radius

ii) Ruder and Aileron

b) Discuss types of survey to be carried out for site selection of an Airport? **[5]**

c) At an airport site at sea level with standard atmospheric condition, the runway lengths required for take off and landing are 2000 m and 2400 m respectively. The proposed airport is situated at an altitude of 150m. If the airport reference temperature is 25°C and if the effective runway gradient is 0.35 percent, Calculate the length of runway to be provided. **[7]**

OR

Q8) a) Explain with the help of a sketch, three controls for Rolling, Pitching and Yawing Movements of a Aeroplane. **[6]**

b) Give detail classification of Airports. **[5]**

c) How Runway orientation should be done? Discuss. **[5]**

Q9) a) A bridge needs to be constructed across an Alluvial stream having discharge of 500 Cumecs. Calculate the depth of maximum scour when the bridge consists of : **[6]**

i) Two spans of 30 m each, and

ii) Four spans of 30 m each

Assume the value of silt factor = 1.1.

b) Define Economic Span. The following table gives the costs of superstructure per span excluding flooring, railing etc. and that of one pier of a multispan bridge for different span lengths. Determine the most Economic Span for the bridge **[6]**

Span in meters	5m	10m	15m	20m
Cost of Superstructure per Span, in Rs	3,250	12,000	24,300	40,000
Cost of one Pier in Rs	15,900	15,900	16,100	16,100

c) Write a short note on Afflux. **[4]**

OR

Q10) a) Define Bridge. State the various points to be considered while selecting an Ideal Bridge site location. **[4]**

b) A bridge has a Linear waterway of 110m constructed across a stream, whose natural waterway is 190m. If the flood flow is 950 Cumecs and the mean depth of flow is 2.75m, Calculate the Afflux under the bridge. **[6]**

c) Define the following terms : **[6]**

i) Artificial Waterway

ii) Free Board

iii) Scour Depth

Q11) a) Define Abutment. State the requirements of good Abutment. **[6]**

b) What are the Wing Walls? State the various types of Wing Walls. **[6]**

c) Write a short note on Erection and Maintenance of Bridges. **[6]**

OR

Q12) a) How will you account for the following in the design of Highway Bridge. **[6]**

i) Wind Load

ii) Dead Load

iii) Longitudinal Forces

b) Define Bridge bearing. State the types of bearings. Why Bearings are necessary in bridges. **[6]**

c) Explain in brief the necessity of Movable Span bridges. Also state the various types of Movable Span bridges. **[6]**

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