Total No. of Questions : 10]

SEAT No. :

P2143

[Total No. of Pages : 4

[5059]-502
B.E. (Civil)
TRANSPORTATION ENGINEERING
(2012 Course) (End Sem.) (Semester-I)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, and Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10.***
2) ***Figures to the right indicate full marks.***
3) ***Use of logarithmic tables, slide rule, Mollier charts, electronics pocket calculator and steam tables is allowed.***
4) ***Assume suitable data if necessary.***
5) ***Neat diagrams must be drawn wherever necessary.***

Q1) a) Discuss briefly the development of roads since inception of Indian Road Congress. **[5]**

b) For economical road alignment shortest length is usually the best. What circumstances justify a deviation far from the principle? **[5]**

OR

Q2) a) Preventive measures for road accidents consists of Engineering, Enforcement and Education aids. Explain each briefly. Have you any suggestions to prevent road accident. **[5]**

b) Distinguish clearly between Camber and Super elevation. How super elevation is provided in the field. **[5]**

Q3) a) Define SSD. Assuming a brake efficiency of 50% and a total of perception and brake reaction time of 1.5 sec. Calculate the minimum required sight distance to avoid a collision with a car approaching from the opposite direction, if both the cars are assumed to be speeding at 60 kmph. **[5]**

b) Following test results were obtained by CBR test on a subgrade soil:

P.T.O.

Penetration (mm)	Load (Kg)	Penetration (mm)	Load (Kg)
0.00	0.00	3.00	58.00
0.50	5.00	4.00	70.00
1.00	17.00	5.00	78.00
1.50	29.00	7.50	92.00
2.00	42.00	10.00	102.00
2.50	50.00	12.50	108.00

Calculate CBR value at 2.5 mm and 5.00 mm penetration level. **[5]**

OR

Q4) a) Calculate warping stress at Interior and Longitudinal Edge region for concrete pavement of thickness 20 cm with transverse joint at **[5]**

15m spacing and having pavement width of 3.8 m.

Modulus of elasticity of concrete = 3.0×10^5 kg/cm^2

Poisson's ratio = 0.15

Modulus of subgrade reaction = 3.0 kg/cm^3

Temperature differential = 1.0° Celcius per cm

Thermal coefficient of concrete = 7.5×10^{-6} per °Celcius

Radius of loaded area 15 cm

Assume Cx = 1.03 and Cy = 0.60

b) Explain in brief the following: **[5]**

i) Tack coat ii) Prime coat

iii) VG-30 iv) CRMB

v) Cutback

Q5) a) Explain with a neat sketch, how three controls are used to monitor the aircraft movement. **[6]**

b) Explain stepwise procedure of construction of Wind Rose Type II diagram. **[6]**

c) State the various objects of carrying out survey for planning of a new airport. **[4]**

OR

Q6) a) What do you mean by Taxiway? Describe in brief the factors controlling layout of a Taxiway. **[2 + 4 = 6]**

b) Differentiate between Minimum Turning radius and Minimum circling radius. Also state the significance of each term. **[6]**

c) Explain in brief Head wind and Cross wind. **[4]**

Q7) a) Describe the methodology involved in the use of Rational Method for computation of maximum flood discharge from small catchment. **[6]**

b) Define waterway. State the various recommendations for fixing the waterway of different streams. **[4]**

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

i) Causeway ii) Aqueduct

iii) Viaduct

OR

Q8) a) A bridge has 4 spans of 8m each. When the flood water approaches the bridge, the difference of level of water on upstream and downstream side is 1.85m and the downstream depth is 6.8m. The bridge is located on a river with a slope of 1 in 500. The coefficient of losses due to friction because of bridge opening is 0.96. Chezy's coefficient is 50 and hydraulic mean depth for a river is 3.0m. Determine the flood discharge. **[8]**

b) Define Economic Span. Derive an equation for economical span. **[6]**

c) Distinguish between Alluvial and Qasi-alluvial stream. **[2]**

Q9) a) The catchment area of a stream is of sandy soil with light vegetation cover and the area of the catchment is 15000 hectares. The length of the catchment is 26 km and the fall in level from the critical point to the bridge site is 185m. Calculate peak runoff for designing the bridge if the severest storm recorded yielded 18 cm of rain in 4 hours. Assume value of area factor is equal to 0.70 and coefficient to account for losses due to absorption is 0.20. **[6]**

b) What do you understand by movable bridges? Explain any two types of movable bridges with the help of neat sketch. **[6]**

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

i) Live Load

ii) Wind Load

iii) Buoyancy Force

OR

Q10)a) State the various purposes of providing bridge bearings. Why are elastomeric bearings preferable to the usual steel bearings for highway bridges. **[4 + 2 = 6]**

b) Define Pier. Draw a neat sketch of the Hammer head shape pier and Multiple bent pier. **[6]**

c) Explain in brief the need of maintenance and strengthening of existing old bridges. **[6]**

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