

GANPAT UNIVERSITY**B. Tech. Semester: VII Civil Engineering****Regular Examination November – December 2014****2CI 703 Highway and Traffic Engineering.****Time: 3 Hours****Total Marks: 70**

- Instruction:**
1. Attempt all questions.
 2. Make suitable assumptions wherever necessary.
 3. Figures to the right indicate full marks.

Section - I

- Que. – 1**
- A. Explain the objects of highway planning. State the basic principles of planning to meet the objectives **6**
- B. Discuss the factors to be considered in deciding the sight distance at Intersection. **6**

OR

- Que. – 1**
- A. Explain PIEV theory. The speeds of overtaking and overtaken vehicles are 90 and 70 kmph respectively. If the acceleration of the overtaking vehicle is 2.5 kmph per second. Calculate the safe passing sight distance for
i) One way traffic. ii) Two way traffic **6**
- B. Design following geometric elements on horizontal curve of two lane leveled highway for the design speed of 80 kmph and radius of 250m.
(i) Super elevation, (ii) Extra widening and (iii) Set-back distance. **6**

- Que. – 2**
- A. **Define :** **5**
(i) Right of way (ii) Roadway width (iii) Carriage way (iv) Shoulder
(v) Sight distance
- B. Draw the sketch of flexible pavement and rigid pavement with description of components. **6**

OR

- Que. – 2**
- A. Explain ESWL and the concept in the determination of the equivalent load. **5**
- B. Briefly explain: Bitumen, Tar, Cutback, and Emulsion. **6**

- Que. – 3**
- A. Explain the water bound macadam (WBM) road **6**
- B. Determine the spacing between contraction joints for 3.5 m slab width having thickness of 20 cm and $f = 1.5$ for the following two cases: **6**
(i) For plain cement concrete, allowable $SC = 0.8 \text{ kg/m}^2$
(ii) For reinforcement cement concrete, 1.0 cm dia. Bars at 0.30 m spacing.

Section – II

- Que. – 4 A. What is the necessity of surface drainage? Draw the sketch of different types of sand dunes with possible condition of road on ridge. 6
- B. Benkelman Beam deflections studies were carried out on 15 selected points on a stretch of flexible pavement during summer season using a dual wheel load of 4085 kg, 5.6 kg/cm² pressure. The deflection values obtained in mm after making the necessary lag corrections are given below. If the present traffic consists of 750 commercial vehicles per day, determine the thickness of bituminous overlay required, if the pavement temperature during the test was 39°C and the correction factor for subsequent increase in subgrade moisture content is 1.3. Assume annual rate of growth of traffic as 7.5 %. Adopt IRC guidances. 6
- 1.4, 1.32, 1.25, 1.35, 1.48, 1.60, 1.65, 1.55, 1.45, 1.40, 1.36, 1.46, 1.5, 1.52, 1.45 mm

OR

- Que. – 4 A. Explain the principle and uses of Benkelman Beam test. 6
- B. Calculate the warping stresses at interior, edge and corner for a concrete pavement of thickness 20 cm with transverse joints at 4.5 m spacing. The width of slab is 3.5 m. For concrete $E = 3 \times 10^5 \text{ kg/cm}^2$ and $\mu = 0.15$, K value for subgrade = 5 kg/cm³. Temperature differential is 0.9 °C per cm. Assume thermal coefficient for concrete as 10×10^{-6} per °C 6
- Que. – 5 A. Explain the following terms: 6
- (a) Modulus of subgrade reaction
(b) Radius of relative stiffness
(c) Radius of resisting section
- B. Discuss the advantages and limitations of C.B.R method of design. 5

OR

- Que. – 5 A. Explain the construction of penetration (grouted) macadam. 6
- B. Explain the sketches the functioning of joints filler and sealer. Discuss the desirable properties of these materials 5
- Que. – 6 A. (1) What are the objectives of speed studies? 6
- (2) Define – Running Speed, Spot Speed, Journey Speed, Space Mean Speed
- B. Distinguish between Traffic Sign and Traffic Signal. Draw the sketch of Regulatory sign vertical post and Warning sign vertical post with dimension 6

END OF PAPER