

Date: 25/11/2016.

Student Exam No. _____

GANPAT UNIVERSITY

B. Tech. Semester: VII Civil Engineering

Regular / Remedial Examination Nov-Dec 2016

2CI703 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 Discuss briefly the types of Traffic Control signals and their functions. 06
B State the importance of spot speed studies and define Space-Mean speed and Time-Mean Speed 06

OR

- Que. - 1** A The consolidated data collected from speed and delay studies by floating car method on a stretch of urban road length of 3.5 km, running East-West are given below. Determine the average values of (i) traffic volume (ii) journey speed and (iii) running speed of the traffic stream 12

Trip No.	Direction of trip	Journey Time, min-sec	Total stopped delay min-sec	No of vehicles overtaking	No of vehicles overtaken	No of vehicle from opposite direction
1	E-W	6-48	1-50	3	7	270
2	W-E	7-20	1-40	4	3	190
3	E-W	7-10	1-30	5	3	290
4	W-E	7-40	2-10	3	1	220
5	E-W	6-10	1-30	3	6	270
6	W-E	8-00	2-30	2	2	190
7	E-W	6-32	1-50	2	5	320
8	W-E	7-40	1-30	3	2	190

- Que. - 2** A What is the importance of Collision Diagram? Show Merging and Crossing conflict points in a diagram of an intersection having BOTH ROADS TWO WAY TRAFFIC. 06
B Explain the Necessity of Highway Planning. 05

OR

- Que. - 2** A Define the following terms and show their variation with speed 06
1. Travel Time
2. Volume
3. Space Headway-Time Headway

- B Briefly discuss the scope of Highway and Traffic Engineering. 05

- Que. - 3** ANSWER THE FOLLOWING 12

- A What is the necessity of Parapet wall, Retaining wall and Catch Pits in construction of Hill Roads?
B What are Obligatory Points? What is the importance of it?
C Mention only the uses of Map Study and Reconnaissance Survey.

Section – II

- Que. – 4 A What are the objects of Highway of Geometric Design? List the Various geometric elements to be considered in highway design. 06
- B Calculate the length of the transition curve for a design speed of 80 kmph at horizontal curve of radius 300 m in a rural area. Assume suitable data. 06

OR

- Que. – 4 A Explain superelevation. Derive the expression $e + f = \frac{v^2}{gR}$ for the analysis of superelevation. 06

- B Using the data given below, Calculate the wheel load stresses at (a) interior (b) edge and (c) corner regions of a cement concrete pavement using Westergaards stress equations. 06

Wheel load, $P = 5100 \text{ kg}$,

Modulus of elasticity of cement concrete, $E = 3.0 \times 10^5 \text{ kg/cm}^2$,

pavement thickness, $h = 25 \text{ cm}$, poisons ratio of concrete = 0.15.

Modulus of subgrade reaction, $K = 12 \text{ kg/cm}^3$

- Que. – 5 A What are the factors causing warping stresses in rigid pavements? 05

- B What are the various tests on bituminous material in highway construction? Explain application of the bitumen test. 06

OR

- Que. – 5 A Explain ESWL & the concept in the determination of the equivalent wheel load. 05

- B Explain the CBR method of pavement design. How is this method useful to determine thickness of component layers? Discuss the advantages and limitations of C.B.R. method of design. 06

Que. – 6 ANSWER THE FOLLOWING

- A Explain Flexible and Rigid pavements and bring out the points of difference 06

- B What are the functions of tie bars in rigid pavements? 06

A cement concrete pavement has a thickness of 28 cm and lane width of 3.5 m. Design the tie bars along the longitudinal joints using data given below.

Allowable working stress in steel tie bars, $S_s = 1250 \text{ kg/cm}^2$

Unit weight of CC, $W = 2400 \text{ kg/m}^3$

Maximum value of friction coefficient, $f = 1.4$

Allowable tensile stress in deformed tie bar $S_s = 2000 \text{ kg/cm}^2$

Allowable bond stress in deformed bars, $S_b = 24.6 \text{ kg/cm}^2$

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