

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII (NEW) EXAMINATION – WINTER 2018****Subject Code: 2170613****Date: 15/11/2018****Subject Name: Traffic Engineering****Time: 10:30 AM TO 01:00 PM****Total Marks: 70****Instructions:**

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

- Q.1**
- (a) Define : operating speed, design speed, space mean speed. **03**
- (b) How do different vehicular characteristics affects road features ? **04**
- (c) A test car was used on a north-south road 0.75 km long, and the following data, for the moving car was collected. **07**

North trip no.	Travel time(along) in min	No. of vehicles met against	No of vehicles overtaking test car	No of vehicles overtaken by test car
1	2.65	85	1	0
2	2.70	83	3	2
3	2.35	77	0	2
4	3.00	85	2	0
5	2.42	90	1	1

South trip no.	Travel time(along) in min	No. of vehicles met against	No of vehicles overtaking test car	No of vehicles overtaken by test car
1	2.33	110	2	0
2	2.71	115	0	2
3	2.48	120	0	0
4	2.54	125	1	1
5	2.16	105	0	2

Calculate traffic volume, average travel time and space mean speeds in both directions.

- Q.2**
- (a) Explain (any three) physical factors of road user. **03**
- (b) Explain about classified traffic volume count survey with observation table. **04**
- (c) A vehicle is accelerating on an upward gradient of 1.5 % with a rate of 0.8m/sec^2 , from initial speed of 15 to 25 km/h. Calculate various resistances encountered by the vehicle using following data : **07**
1. Mass of vehicle : 1500 kg.
 2. Coefficient for rolling resistance : 0.02
 3. Frontal area of vehicle : 3.5 m^2
 4. Coefficient for air resistance : 0.40 kg/m^3

OR

- (c) A driver travelling at 50 km/hr behind another vehicle decides to overtake it and presses the accelerator. The accelerating behavior of the car is described by the following equation. **07**

$$\frac{dV}{dt} = 1.22 - 0.015 V$$

Where, V is speed in m/sec and t is time in sec

Determine:-

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(1) The maximum speed of vehicle.

(2) The maximum rate of acceleration.

(3) The rate at which the vehicle is accelerating after 3 seconds given by

$$\frac{dv}{dt} = (\alpha - \beta V_0) e^{-\beta t}$$

- Q.3** (a) Define with respect to traffic signal : phase, lost time, red interval **03**
 (b) Explain trial cycle method of signal design. **04**
 (c) What are the advantages and disadvantages of providing traffic signals? **07**

OR

- Q.3** (a) Define with respect to traffic signal : cycle, cycle length, interval, **03**
 (b) Explain Webster's method of signal design. **04**
 (c) Draw at least 5 signs of each (not to scale) **07**
 Regulatory signs, Warning signs and Informatory signs.

- Q.4** (a) Explain enoscope method of spot speed study. **03**
 (b) Find Time mean speed and space mean speed from following data. **04**

Speed range(kmph)	Frequency
0-10	8
10-20	18
20-30	26
30-40	30
40-50	18

- (c) What is the importance of highway lighting ? State the factors influencing night visibility. **07**

OR

- Q.4** (a) Enumerate with an example about intersection delay count survey. **03**
 (b) Calculate Time mean speed and Space mean speed from the following spot speed observations in km/hr. **04**

50,40,60,54,45,31,72,58,43,52,46,56,43,65,33

- (c) Draw layout of lighting on **07**
 (i) Single side of road
 (ii) Both side of road(staggered)
 (iii) Central
 (iv) At T intersection
 (v) At cross roads

- Q.5** (a) Define: Luminous flux, foot candle, Luminaire **03**
 (b) State advantages and disadvantages of over-pass or flyover. **04**
 (c) Draw a neat sketch of rotary intersection, show all design components and explain about them in brief. **07**

OR

- Q.5** (a) Indicate and explain how spacing of street lighting is decided. **03**
 (b) Prepare a check list of facilities to be provided at any terminal. Justify your answer for each of facility to be provided. **04**
 (c) Draw a neat sketch of **07**
 (i) Partial clover leaf intersection
 (ii) Full clover leaf intersection.
 (iii) Diamond interchange.
