USN ☐☐☐☐☐☐☐☐☐☐   **10CV667**

Sixth Semester B.E. Degree Examination, June/July 2017
Traffic Engineering

Time: 3 hrs.   Max. Marks: 100

Note: 1. *Answer FIVE full questions, selecting at least TWO questions from each part.*
    2. *Assume any missing data suitably.*

PART – A

1 a. Define traffic engineering. Briefly explain the scope of traffic engineering indicating the objectives. **(10 Marks)**

   b. A passenger car weighing 2 tonnes is to accelerate at a rate of 3 m/sec^2 in the first gear from a speed of 10 Kmph. The gradient is +1% and the highway has a black topped surface. The frontal exposed area of the car is 2.0m^2 and tyres have radius of 0.33m. The rear axle gear is 3.82 : 1 and the first gear ratio is 2.78 : 1. Calculate the engine horse power needed and the speed of the engine. **(10 Marks)**

2 a. Briefly explain the various vehicular characteristics affecting the road design. **(07 Marks)**

   b. Explain total reaction time of driver with PIEV theory. **(06 Marks)**

   c. An ambassador car travelling at a speed of 60 Kmph on a level WBM road in good condition is suddenly allowed to coast by switching off the engine and putting the gear in neutral. What is the deceleration caused? **(07 Marks)**

3 a. Define the following terms :
     i) Parking index
     ii) Design capacity
     iii) Journey speed
     iv) Running speed. **(04 Marks)**

   b. List the objectives of traffic volume and parking surveys. **(08 Marks)**

   c. A vehicle travelling at 45 Kmph is stopped within 2.5 seconds after the application of brakes. Find out the average skid resistances. **(08 Marks)**

4 a. With a neat sketch, explain condition and collision diagram related to accident studies. **(06 Marks)**

   b. Explain the different forms presenting O and D data. **(06 Marks)**

   c. A vehicle of weight 30 tonnes skids through a distance equal to 50m, before colliding with another parked vehicle of weight 3 tonnes. After collision, both the vehicles skid through a distance equal to 16m, before stopping. Determine the speeds of vehicles assuming f = 0.4.
     i) After collision
     ii) At collision
     iii) Before collision. **(08 Marks)**

PART – B

5 a. Mention the various assumptions made in queueing approach as applied to traffic flow. **(10 Marks)**

   b. The off-peak traffic flow arriving at random at toll booth facility is 90VPH and the peak flow is 180 VPH. The service rate, exponentially distributed, at the booth is 3.5 vehicles per minute. What is the average number of customers in the queue for each flow? **(10 Marks)**

6 a. Explain the following :
i) Chi-square test
ii) Simulation technique   (10 Marks)

b. The spot speeds at a particular location are normally distributed with a mean of 51.7 KPH and a standard deviation of 8.3 KPH. What is the probability that :
i) The speeds exceed 65 KPH?
ii) And the speeds lie between 40 KPH and 70 KPH.
iii) What is the 85th percentile speed?
Take ϕ (1.6) = 0.9542, ϕ (2.21) = 0.9864, ϕ (1.41) = 0.9207, ϕ (1.04) = 0.85.   (10 Marks)

7 a. Enumerate the design factors and advantages of a rotary intersection with neat sketch.   (10 Marks)

b. The average normal flow of traffic on cross roads A and B during periods are 410 and 260 PCU/hour. The saturation flows are 1260 and 1000 PCU/hour respectively. The all red time required for pedestrian crossing is 12 seconds. Design a two phase traffic signal by Webster's method.   (10 Marks)

8   Write short note on :
a. PCU
b. ITS
c. Informatory signs
d. Road side development.   (20 Marks)

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