**AKGEC/IAP/FM/02**

**AJAY KUMAR GARG ENGINEERING COLLEGE, GHAZIABAD**

**DEPARTMENT OF CIVIL ENGINEERING**

**SESSIONAL TEST -2**

Course: B.Tech Semester: V

Session: 2017-18 Section: CE-1& CE-2 Subject: Transportation Engineering-1 Sub. Code: NCE-502

Max Marks: 50 Time: 2 hour

**ANSWER ALL QUESTIONS**

**SECTION A**

**(5 x2 =10)**

**1. Attempts all the parts**

1. Explain the spot speed, running speed, space mean speed and time mean speed.
2. Explain the terms basic capacity, possible capacity and practical capacity.
3. A road is having a horizontal curve of 400m radius on which a super-elevation of 0.07 is provided. The coefficient of lateral friction mobilized on the curve when a vehicle is travelling at 100kmph.
4. An ascending gradient of 1 in 100 meets a descending gradient of 1 in 50. Calculate the length of summit curve required to provide overtaking sight distance of 600m.
5. List the various traffic engineering studies.

**SECTION B**

**(5 x5 =25)**

**2. Attempts all the parts**

1. Explain superelevation. Enumerate the steps for practical design of superelevation considering mixed traffic.
2. Calculate the extra width of pavement required on a horizontal curve of radius 800m on a two lane highway, the design speed being 80kmph. Assume wheel base width is 6m
3. Explain ruling, maximum and exceptional gradient. Specify the values recommended by IRC for plains and hill.
4. Explain summit and valley curves and the various cases when these are formed when two different gradients meets.
5. Explain graphically the relationship between traffic volume, traffic speed and traffic density.

**SECTION C**

**(7.5 x2 =15)**

**3. Attempts all the parts**

1. A horizontal curve portion of a 4 lane undivided carriageway, a transition curve is to be introduced to attain equilibrium superelevation.The design speed is 60kmph and radius of curve is 245m. Assume length of wheel base of a longest vehicle as 6m, superelevation rate as 5% and rate of introduction of superelevation as 1 in 150. What will be the length of the transition curve required, if the pavement is rotated about the inner edge?
2. A valley curve of state highway is formed by a descending gradient of 1 in 20 meeting an ascending gradient of 1 in 30. Design the length of valley curve to fulfill both comfort condition and head light distance required for a design of 80 Kmph. Assume allowable rate of change of centrifugal acceleration 0.6m/sec3 reaction time 2.5 sec and coefficient of longitudinal friction f=0.35.