



SIDDHARTH GROUP OF INSTITUTIONS :: PUTTUR
Siddharth Nagar, Narayanavanam Road – 517583
(AUTONOMOUS)

QUESTION BANK (DESCRIPTIVE)

Subject with Code: Transportation Engineering-I (16CE129)

Course & Branch: B.Tech - CE

Year & Sem: III- B.Tech & II- Sem

Regulation: R16

UNIT –I

ROAD TRANSPORTATION, HIGHWAY ALIGNMENT AND SURVEYS

1. a) What are the characteristics of road transport in comparison with other systems? [L1] [CO1] 6M
b) What are the different modes of transportation? Explain the specific functions of each of them. [L1] [CO1] 6M
2. Explain the classification of roads based on location and function as suggested in the Nagpur road plan. [L2] [CO1] 12M
3. a) What are the salient features of Nagpur road development plan? Discuss. [L1] [CO1] 8M
b) Illustrate the significant recommendations of Jayakar committee report. [L2] [CO1] 4M
4. What are the salient features of Bombay road development plan? In what aspects it differs from Nagpur road development plan? [L1] [CO1] 12M
5. Briefly outline the main features of various road patterns commonly in use. [L2] [CO1] 12M
6. What is the classification of highways adopted in different road development plans? Discuss. [L1] [CO1] 12M
7. Define highway alignment. What are the factors affecting highway alignment? [L1] [CO1] 12M
8. What are the engineering surveys required for fixing highway alignment? Discuss. [L1] [CO1] 12M
9. What are obligatory points? How they influence a change in the alignment? Support your answer With neat diagrams. [L1] [CO1] 12M
10. Give the details of drawings to be prepared in highway project with the recommended scales and Size of the drawings. [L2] [CO1] 12M

Prepared by: **P.NAVEEN**



SIDDHARTH GROUP OF INSTITUTIONS :: PUTTUR
Siddharth Nagar, Narayanavanam Road – 517583
(AUTONOMOUS)

QUESTION BANK (DESCRIPTIVE)

Subject with Code: Transportation Engineering-I (16CE129)

Course & Branch: B.Tech - CE

Year & Sem: III- B.Tech & II- Sem

Regulation: R16

UNIT –II

HIGHWAY GEOMETRIC DESIGN

1. a) What is camber? Why camber is to be provided for a road surface? Explain. Also give the design guidelines for camber to be provided for different types of pavement. [L1] [CO2] 6M
b) What factors influence the geometric design of a highway? Explain. [L1] [CO2] 6M
2. Define ‘Stopping Sight Distance’. Derive an expression for SSD for a road section where the Design speed is V kmph and the coefficient of longitudinal friction is f . [L3] [CO2] 12M
3. Why superelevation is required on a horizontal curve? Clearly analyze the various forces acting on a body of a vehicle moving on a super elevated section of a horizontal curve, derive an equation for the rate of super elevation ‘ e ’. [L4] [CO2] 12M
4. a) Calculate the minimum sight distance required to avoid a head on collision of two cars approaching From the opposite direction at 100 kmph and 80 kmph on a road section. Assume a reaction time of 2.5 seconds, coefficient of friction of 0.7 and brake efficiency of 50% in either case. [L3] [CO2] 6M
b) Describe briefly about PIEV theory. [L2] [CO2] 6M
5. Define Overtaking Sight Distance (OSD). Using a neat diagram, explaining the process of overtaking On a two lane two way road and derive an expression for computing OSD. [L3] [CO2] 12M
6. a) Explain the importance of friction offered by road surface. Also discuss about the factors which influence highway friction. [L2] [CO2] 6M
b) The radius of a horizontal circular curve is 100m. The design speed is 50 kmph and the design Coefficient of lateral friction is 0.15. Calculate the superelevation required if full lateral friction is assumed to develop. [L3] [CO2] 6M
7. a) Explain briefly about different types of transition curves commonly adopted. [L2] [CO2] 6M
b) Design the rate of superelevation for a horizontal highway curve of radius 500m and speed 100 kmph. [L3] [CO2] 6M

8. Calculate the length of transition curve using the following data: [L3] [CO2] 12M

Design speed = 65 kmph

Radius of circular curve = 220 m

Pavement width = 7.5 m

Superelevation = 1 in 150

9. a) What factors influence the design of vertical curves? Explain. [L1] [CO2] 6M

b) A summit curve is to be designed for a speed of 80 kmph so as to have an overtaking distance of 470 m. Calculate the length of the curve, considering an ascending gradient of 1 in 100 and a Descending gradient of 1 in 120. [L3] [CO2] 6M

10. Explain briefly about the following: [L2] [CO2] 12M

a) Pavement surface characteristics

b) Width of pavement or Carriageway

c) Transition curves

d) Extra widening

Prepared by: **P.NAVEEN**



SIDDHARTH GROUP OF INSTITUTIONS :: PUTTUR
Siddharth Nagar, Narayanavanam Road – 517583
(AUTONOMOUS)

QUESTION BANK (DESCRIPTIVE)

Subject with Code: Transportation Engineering-I (16CE129)

Course & Branch: B.Tech - CE

Year & Sem: III- B.Tech & II- Sem

Regulation: R16

UNIT –III

TRAFFIC ENGINEERING

1. Explain briefly about various factors which affect the:
 - a) Road User Characteristics [L2] [CO3] 6M
 - b) Vehicular Characteristics [L2] [CO3] 6M
2. a) Explain the term traffic volume. What are the objects of carrying out traffic volume studies? [L2] [CO3] 6M
 - b) Enumerate the different methods of carrying out traffic volume studies. [L2] [CO3] 6M
3. What are the objectives of speed studies? What are the methods of presentation of speed data? [L1] [CO3]12M
4. a) How are O & D study data represented and interpreted? [L2] [CO3]6M
 - b) Discuss about various Engineering measures that can help in reducing the accident rate. [L2] [CO3]6M
5. Describe various types of traffic signs used in traffic control and regulation giving two Examples for each type. Support your answer with suitable sketches and specifications for the signs.[L2] [CO3]12M
6. Explain the design procedure of Traffic signals according to Webster method. [L2] [CO3]12M
7. a) Explain briefly about various road markings. [L2] [CO3] 6M
 - b) The average normal flow of traffic on cross roads A and B during design period are 400 and 250 pcu/hr; the saturation flow values on these roads are estimated as 1250 and 1000 pcu/hr Respectively. The all-red time required for pedestrian crossing is 12 secs. Design two phase traffic Signal by Webster's method. [L3] [CO3] 6M
8. Define intersection? What are the various types of at grade Intersections and explain them with neat sketches? [L1] [CO3]12M
9. Explain various design factors that are considered in rotary intersections and also discuss the importance of rotary intersections. [L2] [CO3]12M
10. Define the following terms: [L2] [CO3]12M
 - a) Space-mean speed b) Time-mean speed c) Traffic Island
 - d) Passenger car unit (PCU) e) Traffic capacity

Prepared by: **P.NAVEEN**



SIDDHARTH GROUP OF INSTITUTIONS :: PUTTUR

Siddharth Nagar, Narayanavanam Road – 517583

(AUTONOMOUS)

QUESTION BANK (DESCRIPTIVE)

Subject with Code: Transportation Engineering-I (16CE129)

Course & Branch: B.Tech - CE

Year & Sem: III- B.Tech & II- Sem

Regulation: R16

UNIT –IV

HIGHWAY MATERIALS

1. Explain the desirable properties of aggregates to be used in different types of pavement construction. [L2] [CO4]12M
2. List different tests on road aggregates and mention their advantages and limitations. [L2] [CO4]12M
3. Explain the principle of conducting Los Angeles abrasion test. Mention the recommended LA values for paved construction. [L2] [CO4]12M
4. Discuss the desirable properties of paving bitumen & bituminous mixes. [L2] [CO4]12M
5. Briefly explain about aggregate impact test with neat sketch and mention the recommended aggregate Impact values for pavement construction. [L2] [CO4]12M
6. What are the different types of bituminous materials used in road construction? Under what Circumstances each of these materials are preferred? [L1] [CO4]12M
7. What are the various tests carried out on bitumen? Briefly mention the principle and uses of each Test. [L1] [CO4]12M
8. Explain in detail about bitumen penetration test with neat sketch. [L2] [CO4]12M
9. Mention step by step procedure of Marshall method of bituminous mix design. [L2] [CO4]12M
10. What are modified bituminous binders? What are the advantages of these? [L2] [CO4]12M

Prepared by: **P.NAVEEN**



SIDDHARTH GROUP OF INSTITUTIONS :: PUTTUR
Siddharth Nagar, Narayanavanam Road – 517583
(AUTONOMOUS)

QUESTION BANK (DESCRIPTIVE)

Subject with Code: Transportation Engineering-I (16CE129)

Course & Branch: B.Tech - CE

Year & Sem: III- B.Tech & II- Sem

Regulation: R16

UNIT –V

PAVEMENT DESIGN

1. Briefly outline the advantages and limitations of flexible and rigid pavements. [L2] [CO5]12M
2. a) What are the factors should be considered for the design of flexible pavements Discuss the Significance of each. [L1] [CO5]6M
b) A circular load of radius 15 cm with uniform contact pressure of 7.0 kg/cm^2 is applied on the Surface of a homogeneous elastic mass. Determine the vertical stress under the centre of the load at A depth of 45 cm from the surface. [L3] [CO5] 6M
3. Draw a sketch of flexible pavement cross section and show the component parts. Enumerate the Functions and importance of each component of the pavement. [L2] [CO5]12M
4. Explain CBR method of pavement design and discuss the method useful in determining the thickness Of flexible pavement layers. [L2] [CO5]12M
5. Design a new flexible pavement for a two-lane undivided carriageway using the following data:
Design CBR value of subgrade = 8.0%, Initial traffic on completion of construction = 1800cv per day,
Average growth rate = 6.0% per year, Design life = 15 years, VDF value = 2.5. [L4] [CO5] 12M
6. What are the functions of tie bars and dowel bars in rigid pavements? What is the design principle. [L1] [CO5]12M
7. A cement concrete pavement has a thickness of 26 cm and lane width of 3.5 m. Design the tie bars Along the longitudinal joints using the data given below: [L4] [CO5]12M

Allowable working stress in steel tie bars, $S_s = 1250 \text{ kg/cm}^2$
Unit weight of CC, $W = 2400 \text{ kg/cm}^3$
Maximum value of friction coefficient, $f = 1.2$
Allowable tensile stress in deformed tie bar, $S_s = 2000 \text{ kg/cm}^2$
Allowable bond stress in deformed bars, $S_b = 24.6 \text{ kg/cm}^2$
8. With sketch show the different components of a rigid pavement and mention the functions of each. [L2] [CO5] 12M

9. Classify different types of joints in CC pavements and mention the objects of each. [L2] [CO5] 12M
10. Differentiate between flexible pavements and rigid pavements. [L2] [CO5] 12M

Prepared by: **P.NAVEEN**