

PRAGATI ENGINEERING COLLEGE: SURAMPALEM
(AUTONOMOUS)
III B.Tech I Semester Supplementary Examinations, May - 2024
HIGHWAY ENGINEERING
(Civil Engineering)

Time: 3 hours

Max. Marks: 70 M

Answer ONE Question from each Unit
All Questions Carry Equal Marks

Q. No.	Questions	BTL	CO	Marks
UNIT – I				
1.	a) What are the various requirements of the ideal alignment? Discuss them briefly	K2	CO1	7 M
	b) Write short notes on: a) Central road fund b) Indian Road Congress	K2	CO1	7 M
OR				
2.	a) Explain obligatory points. With sketches, discuss how this control the alignment	K3	CO1	7 M
	b) Explain the importance of the third twenty year plan	K3	CO1	7 M
UNIT – II				
3.	a) Develop an expression for the overtaking sight distance for a multilane road.	K3	CO2	7 M
	b) Propose the length of transition curve using the following data. Design speed 65 kmph, radius of circular curve 220m, allowable rate of introduction of super elevation (pavement rotated about the centre line) is 1 in 150. Pavement width including extra widening 7.5m.	K3	CO2	7 M
OR				
4.	a) Explain summit and valley curves and the various cases when these are formed while two different gradients meet.	K3	CO2	7 M
	b) The speed of overtaking and overtaken vehicles are 80 and 60 kmph, respectively on a two way traffic road. If the acceleration of the overtaking vehicle is 0.99 m/s ² . Estimate the following a. safe overtaking sight distance b. minimum length of overtaking zone and draw a sketch of the overtaking zone and show the positions of sign posts.	K3	CO2	7 M
UNIT – III				
5.	a) Explain highway materials & its properties?	K3	CO3	7 M
	b) Explain about Penetration test of bitumen?	K3	CO3	7 M
OR				

6.	a)	Judge the desirable properties and tests for aggregates?	K2	CO3	7 M.
	b)	Write a report on Ductility test of bitumen?	K2	CO3	7 M
UNIT – IV					
7.	a)	Estimate the thickness of cement concrete pavement using the method suggested by IRC. Modulus of elasticity of concrete = 3×10^5 kg/cm ² , Modulus of rupture of concrete = 40 kg/cm ² , Poisson's ratio of concrete = 0.15, Modulus of sub grade reaction = 6 kg/cm ² , Wheel load = 5100kg, Radius of contact area = 15 cm.	K3	CO4	7 M
	b)	Explain 'Radius of relative stiffness'	K3	CO4	7 M
OR					
8.	a)	Explain how to calculate design traffic in flexible pavement design.	K3	CO4	7 M
	b)	Design a new flexible pavement of 2 lane undivided carriage way using the following data. Design CBR value of subgrade = 8%, Initial traffic on completion of construction = 1800 CV per day, Average growth rate = 6% per year, Design life 15 years, VDF = 2.5	K3	CO4	7 M
UNIT – V					
9.	a)	Enumerate the different methods of carrying out traffic volume studies. Indicate the principle of each?	K2	CO5	7 M
	b)	What are the characteristics of parking studies?	K2	CO5	7 M
OR					
10.	a)	Outline the advantages and disadvantages of traffic signals?	K2	CO5	7 M
	b)	Design two phase traffic signal by Webster's method by using the following data. The average normal flow of traffic on cross roads A and B during design period are 400 and 250 pcu per hour; the saturation flow values on these roads are estimated as 1250 and 1000 pcu per hour respectively. The all red time required for pedestrian crossing is 12s.	K3	CO5	7 M