

GUJARAT TECHNOLOGICAL UNIVERSITY**M. E. Sem. – IInd - Examination – June/July- 2011****Subject code: 1721906****Subject Name: Pavement Design & Analysis****Date: 29/06/2011****Time: 10:30 am – 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) Explain factors considered in pavement design with their significance. **07**
- (b) Explain concept of pavement as multilayered elastic system with proper sketches and formulae. **07**

- Q.2** (a) What are the steps followed in design of flexible pavement as per IRC-37-2001. Draw sketch for a typical typical design chart used in IRC-37-2001. **07**
- (b) What are the drainage measures suggested for flexible pavement as per IRC: 37-2001. **07**

OR

- (b) Explain with sketch vertical stress distribution by Boussinesq and Burmister approaches. **07**

- Q.3** (a) The sub grade soil collected from NH project site. The soaked CBR results for the soil are tabulated below: **07**

Penetration, mm	Load, kg	Penetration, mm	Load, kg
0.00	0.0	3.00	56.5
0.50	5.0	4.00	67.5
1.00	16.2	5.00	75.2
1.50	28.1	7.50	89.0
2.00	40.0	10.0	99.5
2.50	48.5	12.5	106.5

The following materials are available at site for construction of pavement:

1. Sandy soil with CBR 7% for GSB
2. Poorly graded gravel 25% for GB
3. Well graded coarse aggregate 95% for DBM

The minimum thickness of BC is 5 cm. The present commercial vehicles per day (CVD) are 950 with growth rate of 7.5% per year. Design and draw full pavement width section including shoulders.

- (b) Explain modulus of sub grade reaction. How is the modulus of sub grade reaction obtained? **07**

OR

- Q.3** (a) Explain fatigue and rutting criteria for flexible pavement. **07**
- (b) Design the thickness for layers of flexible pavement using Kansas Design Method and data given below: **07**

- Wheel load =4100kg
- Radius of contact 15.0cm
- Design deflection 2.5 mm
- Modulus of elasticity of sub grade, sub base base and wearing course being 100, 200, 400 and 1000kg/cm² respectively.
- Saturation coefficient based on rainfall 0.5
- Traffic coefficient 2.0

- Q.4 (a)** What are the component parts of cement concrete block pavement? Explain the design procedure for cement concrete block pavement. **07**
- (b)** What are the advantages and limitations of cement concrete block pavement. **07**

OR

- Q.4 (a)** Explain temperature differential and its impact on rigid pavement design. Explain stresses induced by temperature differential. **07**
- (b)** How will you decide characteristic strength of concrete used for highway pavement construction? Which grades of concrete are used for pavement construction and why? **07**

- Q.5 (a)** Enlist and explain the design steps for dowel and tie bar design. **07**
- (b)** What are overlays? Why overlays are constructed? Explain Benkelmen Beam Method for overlay design. **07**

OR

- Q.5 (a)** Explain methods used for evaluation of riding quality for highway pavement. **07**
- (b)** Explain methods used for evaluation of structural for highway pavement by static and dynamic methods. **07**
