Code No.: **10127** **MR11**

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)
Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad

IV B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, NOVEMBER-2018

Subject: **Pavement Design**

Branch: **CE**

Time: 3 hours **Max. Marks: 75**

Answer any **FIVE** Questions of the following **5x15M=75M**

1. a) Discuss the effects of "Equivalent Axle Load Factor" on rigid pavements and on flexible pavements **[7M]**
   b) What are the different types of pavement and write a short notes on different variables that are to be considered in the design of a pavement **[8M]**
2. a) Write short notes on vehicle pavement interaction **[7M]**
   b) With the aid of neat sketches explain vehicle and pavement interaction **[8M]**
3. a) Explain different mechanical models for characterizing viscoelastic materials **[8M]**
   b) What is Burmister's layered theory? Explain it for a 2 layer system mentioning the assumptions **[7M]**
4. a) Write short notes on:
      i) Stresses due to Curling- effect of temperature.
      ii) Stresses and deflections due to loading- closed form formulas **[7M]**
   b) Calculate the stresses at interior, edge and corner of a cement concrete pavement if
      Modulus of elasticity of Concrete = 3.0×10^6 kg/cm^2
      Poisson's ratio of Concrete = 0.15
      Thickness of Concrete pavement = 18 cm
      Modulus of sub grade reaction = 8.5 kg/cm^3
      Wheel load= 5100 kg
      Radius of loaded area = 15 cm **[8M]**
5. a) What is Soil stabilization and what is its purpose. Explain any one method of soil stabilization in detail ? **[7M]**
   b) Discuss the differences between a resilient modulus test and complex modulus test for bituminous materials **[8M]**
6. a) Explain the method of flexible pavement design as per IRC (37-1970). **[7M]**
   b) A two lane two-way carriageway carries traffic of 1500 cv/day. The growth rate of traffic is 5 percent per annum. The design life is 15 years. The vehicle damage factor is 2.5 . The CBR value of the soil is 6 %. Calculate:
      i) The cumulative number of standard axles to be catered in the design
      ii) The total pavement thickness
      iii) Composition of the pavement use IRC- 37-2012 **[8M]**
7. a) Write short notes on: **[8M]**
      i) CRCP
      ii) Prestressed Concrete Pavements
   b) Write the design steps of IRC method of Rigid pavement design **[7M]**
8. a) What are the types of rural roads and write long term benefits of rural roads **[7M]**
   b) Explain the design criterion for design of low traffic volume roads **[8M]**