NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF INDUSTRIAL TECHNOLOGY
BACHELOR OF ENGINEERING (HONS) DEGREE
DEPARTMENT OF CIVIL AND WATER ENGINEERING
PART III SECOND SEMESTER EXAMINATIONS- JUNE 2010

TRANSPORTATION ENGINEERING AND PLANNING II- TCW3202

Instructions:
Answer question 1 and any other 3 questions

Total marks: 100
Time: 3 hours

QUESTION 1

a. Design a heavy load pavement to accommodate a 480-kip gross load twin twin gear assembly aircraft in a Type B traffic area for 15,000 passes . Design CBR of the .lean clay subgrade is 13, the natural in-place density of the clay is 87 percent extending to 10 feet. The analysis that follows assumes that subgrade does not require special treatment and frost penetration is not a problem.
(25 marks)

b. Describe one of the important environmental considerations in siting of airports
(5 marks)

QUESTION 2

a. Why is it important to perform maintenance work on a railway track? Outline briefly the maintenance work done on a rail track.   **(5 marks)**

b.   With the aid of a diagram, describe the construction of the permanent

way.   **(15 marks)**

c. State the functions of ballast highlighting requirements of good
ballast.   **(5 marks)**

QUESTION 3

a. From first principles and with the aid of neat sketches derive the expression for super elevation for a railway track**.**   **(10 marks)**

b. Briefly explain the characteristics of a horizontal curve of a track. **(5 Marks)**

c. Define gradient & explain the following terms :
   i.   ruling gradient

      ii.   curve resistance
      iii.   grade resistance
      iv.   grade compensation   **(10 marks)**

QUESTION 4

a. Describe the following:
      i.   taxiway
      ii.   runway
      iii.   apron
      iv.   blast pads
      v.   knot   **(5 marks)**

b. With the aid of a neat sketch describe the wind rose diagram and explain its function in the design of runways.   **(10 marks)**

c. Describe the markings and lighting used on a runway highlighting how each contributes to the safe use of the facility**.**   **(10 marks)**

QUESTION 5

a. For a B.G track the ruling gradient is 1 in 250 and there is a 4 degree curve on the track, determine the actual gradient at the curve. Assume the track to be 1620mm width and make any other assumptions.   **(4 marks)**

b. Describe the different types of rail gauges.   **(6 marks)**

c. Describe the three different materials which can be used to make railway sleepers outlining their advantages and disadvantages.   **(15 marks)**