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- AUGUST 2009
TRANSPORTATION ENGINEERING AND PLANNING II- TCW3202

Instructions: Answer any **FOUR** questions

Time: 3 hours
Total marks: 100

QUESTION 1

(a) Explain the factors that should be considered when choosing a site for an airport.
(5 marks)

(b) You have been tasked with designing an airport in Lupane as the provincial capital of Matabeleland North. Write an environmental impact assessment report on the impacts that you expect this airport to have on the surrounding environment, highlighting any mitigation measures that you think would be necessary to make the airport "environmentally friendly". **(20 marks)**

QUESTION 2

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

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

(c) Define gradient & explain the following terms:
(i)   ruling gradient
(ii) curve resistance
(iii) grade resistance
(iv) grade compensation **(10 marks)**

QUESTION 3

(a) Outline briefly the maintenance work done on a rail track. **(5 marks)**

(b) With the aid of a diagram, describe the construction of a rail track. **(15 marks)**

(c) State functions of ballast highlighting requirements of good ballast. **(5 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) Describe the different types of rail gauges.   (**6 marks**)

(b) For a B.G track the ruling gradient is 1 in 50 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**)

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