NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF INDUSTRIAL TECHNOLOGY
BACHELOR OF ENGINEERING HONOURS DEGREE
DEPARTMENT OF CIVIL AND WATER ENGINEERING
AUGUST 2011 SUPPLIMENTARY EXAMINATIONS

FLUID MECHANICS TCW 2101

ANSWER ALL QUESTIONS

TIME ALLOWED: 3 HRS ***TOTAL MARKS : 100***

Question one

With reference to topics covered in fluid mechanics explain why civil engineers should study the course. [25]

Question two

A flat plate is struck normally by a jet of 50mm in diameter with a velocity of 20m/s.

(a) Calculate the force on the plate when it is stationary. [7]

(b) The force on the plate when it moves in the same direction as the jet with a velocity of 10m/s. [8]

(c) The work done per second and the efficiency in the case of (b). [10]

Question three

A pipe AB carries water and tapers uniformly from a diameter of 0.5m at A to 0.7m at B over a length of 3m. Pressure gauges are installed at A, B and also at midpoint of AB. If the centerline slopes upwards from A to B at an angle of 30 degrees and the pressures are recorded at A and B are 2.5 and 2.8 bars respectively, determine the flow through a pipe and the pressure recorded at c neglecting all losses. [25]

Question four

Water flows through a pipe AB diameter 2m at 4m/s and then passes through a pipe BC that is 2.5m in diameter. At C the pipe forks to D and E. Branch CD is1m in diameter and carries one third of the flow in AB. The velocity in branch CE is 3m/s. Find:

(a) the volume rate of flow in AB [7]

(b) the velocity in BC [6]

(c) the velocity in CD [6]

(d) the diameter of CE [[6]

End of examination!!!