



Uva Wellassa University, Sri Lanka
2006/07 BSc in Export Agriculture Degree Programme

2006/07 BSc Degree Programme

End Semester Examination – Repeat

January 2009

EAG 213-2 Principles of Agricultural Engineering

Instructions

Answer for **All** questions

No. of questions: Four (04)

No. of pages: Three (03)

Time: Two hours

Clearly state any assumptions made.

You can assume any missing data.

Question 01

(a) What is an open system and close system?

(20%)

(b) Complete the following table for H_2O :

$T, ^\circ C$	P, kPa	$h, kJ/kg$	x	Phase description
	200		0.7	
120		1800		
	950		0.0	Saturated vapor
25	500			
	800	3161.7		

(40%)

(c) The 100 m^3 air in a room has a pressure of 1 atm, a dry-bulb temperature of $30^\circ C$, and a wet-bulb temperature of $20^\circ C$. Using the Psychrometric chart, determine

- I. Specific humidity
- II. Enthalpy
- III. Relative humidity
- IV. Dew-point temperature
- V. Mass of dry air
- VI. Mass of vapour
- VII. Specific volume

(40%)

Question 02

- (a) Define the three modes of heat transfer.**

(30%)

- (b) Calculate the thermal conductivity of uncooked pastry if measurements show that with a temperature difference of 17°C across a large slab 1.3 cm thick the heat flow is 0.5 J s^{-1} through an area of 10 cm^2 of slab surface.

(30%)

- (c) 2 kg of water, initially a saturated liquid at 150°C , is heated in a closed, rigid tank to a final state where the pressure is 2.5 MPa. Determine the final temperature, in $^{\circ}\text{C}$, the volume of the tank in m^3 , and sketch the process on T-v and p-v diagrams.

(40%)

Question 03

- (a) An inverted U-tube manometer is used to measure the pressure difference between two pipes, one carrying oil of specific gravity 0.8 and the other water. Considering the configurations in Fig Q3(a), determine the pressure differential.

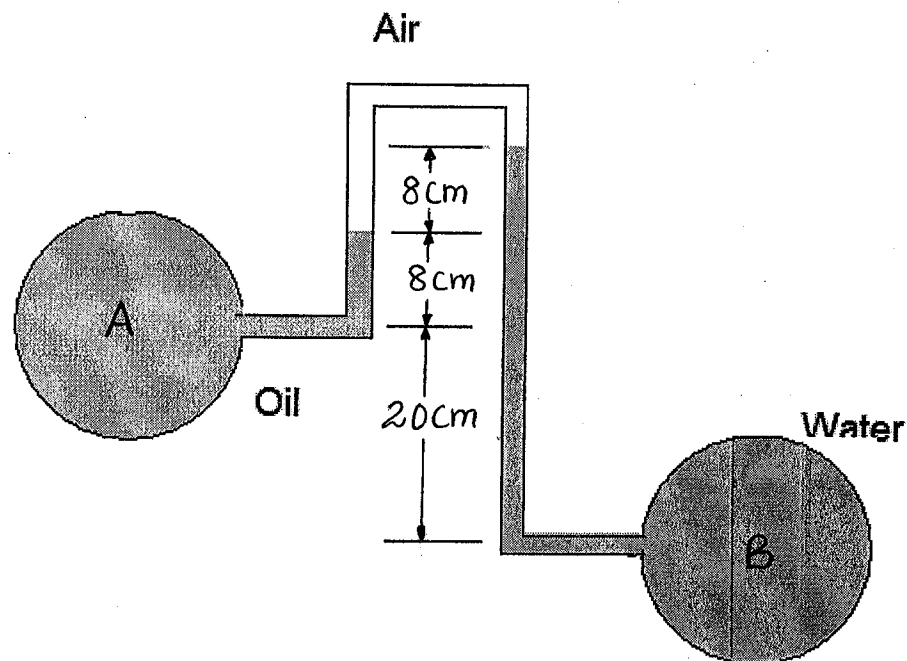


Fig Q3 (a)

(50%)

- (b) Water flows through a tapering pipe as shown in Fig Q3 (b). The diameter at A and B are 10 cm and 5 cm, and the heights above a horizontal datum 5 and 3 meter. The pressure at A is 300 kN/m². Water flow rate is 2 m³/min. if the gravitational acceleration at the location is 9.5 m/s², estimate the pressure at B stating the assumptions made.