Examiner's copy

Uva Wellassa University, Sri Lanka
End Semester Examination – February/March 2012
SCT 262-2 Engineering Physics - Repeat

Time: Two (02) Hours

~~Total 05 Questions~~
Answer **04** questions

1)

I. Draw the T-V diagram of a pure substance for two different pressures P_1 and P_2 ($P_2 > P_1$) with respect to saturation lines. Name the regions.

(10 marks)

II. Complete the following table for H_2O

T, ° C	P, kPa	h ,kJ/kg	x	Phase description
	200		0.7	
140		1800		
	950		0.0	
80	500			
	800	3162.2		

(90 marks)

2)

I. A Carnot heat engine receives 650 kJ of heat from a source of unknown temperature and rejects 250 kJ of it to a sink at 24°C. Determine

a) The temperature of the source and

b) The thermal efficiency of the heat engine

(60 marks)

II. A rigid vessel contains 2 kg of refrigerant-134a at 800 kPa and 120°C. Determine the volume of the vessel and the total internal energy

(40 marks)

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3)

In Fig 3.1 fluid P is water and fluid Q is mercury. If the specific weight of mercury is 13.6 times that of water and the atmospheric pressure is 101.3 kN m^{-2}, calculate the absolute pressure and the gage pressure at A when h_1 = 30 cm and h_2 = 15 cm?

(100 marks)

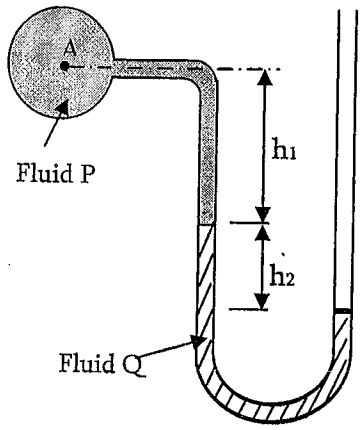

Fig. 3.1

4)

As shown in the Fig. 4.1 two layers of fluid are dragged along by the motion of an upper plate. The bottom plate is stationary. The top fluid put shear stress on the upper plate and lower fluid put shear stress on the bottom plate. Viscosities of fluid 1 and fluid 2 are 0.4 Nsm^{-2} , 0.2 Nsm^{-2} respectively.

I. Determine the shearing stress acting on the bottom plate.

(50 marks)

II. Determine the shearing stress acting on the upper plate.

(50 marks)

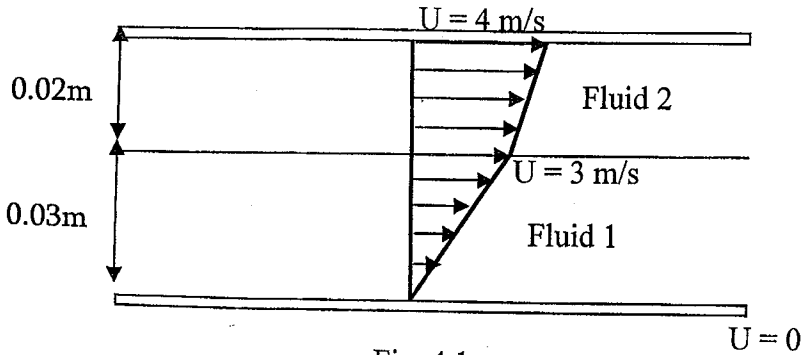

Fig. 4.1

5)

The bar shown in Fig.5.1 has a square cross section for which depth and thickness is 40 mm, if an axial force of 800N is applied as shown in the figure calculate

I. average normal stress (50 marks)

II. average shear stress (50 marks)

acting on the material along a-a section and b-b section.

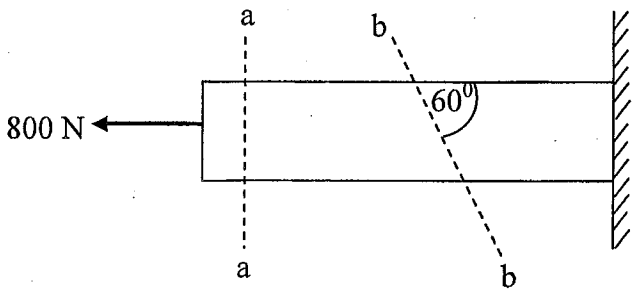

Fig. 5.1

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