UCH305 (Chemical Engineering Thermodynamics I)

Tutorial Sheet No. 3 (Properties of Steam)

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Q. 1. Determine the state of water in the following conditions i.e. whether it is liquid or wet/dry/superheated steam.

i) 120^0 C, 150 kPa	ii) 1.0 MPa, 0.22 m^3/kg
iii) 160^0 C, 0.4 m^3/kg	iv) 500 kPa, 20 m^3/kg
v) 300^0 C, 6 MPa	vi) 5 kPa, 10^0 C

Q. 2. With the help of steam tables complete the following tables:

Sr. No.	Pressure (MPa)	Spl. Vol (m^3/kg)	Temp (^{o}C)	Quality	State
1.	1.4			0.75	
2.		0.25	300		
3.	0.35	0.4			
4.	3.0		320		
5.			160	0.9	
6.	5.0		200		
7.		0.01	300		
8.	0.002		110		

Q. 3. A vessel having a volume of 0.6 m^3 contains 3 kg of liquid- vapour mixture of water at 0.5 MPa. Calculate mass and volume of both liquid and vapour phase?

Q. 4. A vessel of capacity of 0.05 m^3 contains mixture of saturated liquid and saturated steam at 245^0C. If mass of the liquid present is 10kg, determine the pressure, total mass, specific volume, specific enthalpy, specific entropy and specific internal energy?

Q. 5. Water at 200 kPa with a quality of 25% has its temperature raised 20^0C in a contant pressure process. What is the new quality and volume?

Q. 6. Saturated water vapor at 60^0 C has its pressure decreased to increase the volume by 10% keeping the temperature constant. To what pressure should it be expanded?