



KING ABDULAZIZ UNIVERSITY.
Faculty of Engineering, Rabigh Branch.
Mechanical Engineering Department.
Subject: Thermodynamics (I) MEP261.
Fall 1432/1433 H. Final Exam.

Student Name:
Student Number:
Time: 2 hr. Group: ZA.
Property Tables are allowed.

1b) **Complete** these data for H₂O: **(6 Marks)**

$T, ^\circ\text{C}$	p, kPa	$u, \text{kJ/kg}$	$v, \text{m}^3/\text{kg}$	Phase description	x
	400	1450			
220				Saturated vapor	
190	2500				
	4000	3040			

Sol.

Solution: Complete the following table for H₂O:

$T, ^\circ\text{C}$	P, kPa	$u, \text{kJ / kg}$	Phase description
<i>143.61</i>	400	1450	<i>Saturated mixture</i>
220	<i>2319.6</i>	<i>2601.3</i>	Saturated vapor
190	2500	<i>805.15</i>	<i>Compressed liquid</i>
<i>466.21</i>	4000	3040	<i>Superheated vapor</i>

Question (2) **(7 Marks)**

2.a) A frictionless piston–cylinder device contains 2 kg of nitrogen at 100 kPa and 300 K. Nitrogen is now compressed slowly according to the relation $Pv^{1.4} = \text{constant}$ until it reaches a final temperature of 360 K. **Calculate** the work input during this process. **(3 Marks)**