**ME 322 HOMEWORK #11  
(Sample FE Questions on Topics Covered Through Lecture 10)**

**Mark all correct answers. For conceptual problems, supply supporting reasoning.  
For calculations problems, document all equations, conversions, and tables used.**

1-What is the absolute temperature corresponding to 30 F?  
a) 429.67 R  
b) 459.67 R   
c) 489.67 R   
d) 519.67 R

2-What is the gas constant for pure nitrogen?  
a) 0.0709 btu/lbmol-R  
b) 0.0709 ft-lbf/lbm-R  
c) 55.15 ft-lbf/lbm-R  
d) 55.15 btu/lbm-R

3-What is the absolute pressure at 10 psia in lbf/ft^2  
a) 27.5 lbf/ft2  
b) 120 lbf/ft2  
c) 1440 lbf/ft2  
d) 2117 lbf/ft2

4-What is the specific volume of pure nitrogen at 30 F and 10 psia?  
a) 0.016 ft3/lbm  
b) 0.782 ft3/lbm   
c) 12.78 ft3/lbm   
d) 18.72 ft3/lbm

5-Which of the following descriptions apply to tomato plant growing in your garden?  
a) open system  
b) closed system  
c) isolated system  
d) steady-state system

6-Which properties of a compressed liquid at a given temperature and pressure condition can be estimated with a high degree of confidence using only a saturation table?  
a) specific volume  
b) quality  
c) specific internal energy  
d) specific enthalpy

7-Assuming ideal gas behavior and a constant specific heat of .5 kJ/kg-K, what is the change in internal energy of 2 kg of gas when it is heated from 300K to 500K?  
a) 100 kJ  
b) 200 kJ  
c) 300 kJ  
d) 400 kJ

8-If the first law of thermodynamics reduces to dU = Q for a closed system undergoing a particular thermodynamic process, what can you say about this process  
a) it is aergonic  
b) it is adiabatic  
c) it is isochoric   
d) this applies only to ideal gases

9-A process in which enthalpy is constant is also known as  
a) isobaric  
b) isothermal  
c) isochoric  
d) isenthalpic

10-A process in which pressure is constant is also known as   
a) isobaric  
b) isothermal  
c) isochoric  
d) isenthalpic  
11-At any pressure condition above the critical point for a pure substance  
a) the ideal gas law can be applied  
b) two phase behavior will not occur, regardless of the temperature  
c) two phase behavior can occur if the temperature is less than the critical point  
d) the substance could be in a solid state

12-What can be said about thermodynamic conditions along the critical isochore for a pure substance?  
a) below the critical temperature, saturated liquid and saturated vapor phases will always exist  
b) above the critical temperature, saturated liquid can exist   
c) below the critical pressure, some saturated liquid will exist  
d) above the critical pressure, saturated vapor conditions will not exist

13-What state is pure water in if the thermodynamic conditions are 300 F and 14.7 psia?  
a) compressed liquid  
b) saturation  
c) superheated vapor  
d) supercritical region

14-If boiler duty is expressed in Btu/hr what are the fundamental dimensions of this quantity in the MLt system?  
a) L^2/t^2  
b) ML/t^2  
c) ML^2/t^2  
d) ML^2/t^3

15-What can be extracted from a pressure-volume diagram for a closed system?  
a) work for any thermodynamic process  
b) net work for any thermodynamic cycle  
c) heat transfer for any thermodynamic process  
d) net heat transfer for any thermodynamic cycle

16-How many kg are in a one kgmol of propane (C3H8)?  
a) 11 kg  
b) 20 kg  
c) 44 kg  
d) 56 kg

17-Which of the following are state functions?  
a) change in specific volume  
b) change in specific internal energy  
c) specific work  
d) specific heat transfer

18-What is the value of gc on the moon where the gravity is 1/6 earth’s?   
a) 5.63 lbm-ft/lbf-s2  
b) 5.63 lbf-s2/lbm-ft  
c) 32.2 lbm-ft2/lbf-s2  
d) 32.2 lbm-ft/lbf-s2

19-Which of the following apply to helium as an ideal gas?  
a) PV=nRuT  
b) PV=mRuT  
c) Cp-Cv = R  
d) Cp is a constant

20- What is the polytropic exponent for an isothermal process  
a) 0.0  
b) 0.5  
c) 1.0  
d) 1.4