TELANGANA UNIVERSITY
S.S.R. DEGREE COLLEGE, NIZAMABAD (C.C:5029)
II SEMESTER INTERNAL ASSESSMENT I EXAMINATIONS
PHYSICS (THERMAL PHYSICS) QUESTION BANK

I. Multiple choice questions.

1. _____of a gas is due to transport of momentum. [c]

(a) Energy (b) Mass (c) Viscosity (d) Density

2. The mean free path of a gas molecule is inversely proportional to square of the [a]

(a) Diameter of the molecule (b) Radius of the molecule

(c) Density of the molecule (d) Pressure of the molecule

3. The Viscosity of a gas is directly proportional to [c]

(a) $\sqrt{T}$ (b) T^2 (c) Density of gas (d) Temperature

4. The coefficient of thermal conductivity=C_vx [a]

(a) Coefficient of viscosity (b) Temperature

(c) Coefficient of diffiusion (d) Pressure

5. At very low temperatures, the coefficient of viscosity of a gas [a]

(a) Is independent of pressure (b) Decreases with increasing pressure

(c) Is equal to pressure (d) Increases with decreasing pressure

6. The entropy of universe _____ continuously. [c]

(a) Remains constant (b) Independent (c) Increases (d) Decreases

7. The energy of the total system is constant while entropy_____. [c]

(a) Remains constant (b) Remains dependent (c) Increases (d) Decreases

8. The proses in which conduction of heat is along a metal bar and electricity flow along a Resistor is _____. [b]

(a) Reversible Process (b) Irreversible process (c) Isothermal process (d) Adiabatic process

9. The work done in an isothermal expansion of a gas depends on _____. [c]

(a) Expansion ratio (b) Temperature (c) Both (a) and (b) (d) None of the above

10. The change in entropy of universe is given as [a]

(a) $dS_{universe} \geq 0$ (b) $dS_{universe} \leq 0$ (c) $dS_{universe} = 0$ (d) $dS_{universe} \neq 0$

11. The general expression for Joule – Kelvin coefficient is given as μ=_____. [a]

(a) $\frac{1}{Cp}\left[T(\frac{\partial V}{\partial T})p - V\right]$ (b) $\left[T(\frac{\partial V}{\partial T})p + V\right]$ (c) $P\left(\frac{\partial V}{\partial T}\right)_p - \frac{a}{V^2}\left(\frac{\partial V}{\partial T}\right)_p$ (d) $R\left(P - \frac{a}{V^2}\right)$

12. In an adiabatic process, the work done by a system is due to its _____ energy. [a]

(a) Internal (b) External (c) Heat (d) None of the above

13. The phenomenon of changing temperature is known as _____. [b]

(a) Vander Waal's (b) Joule kelvin effect (c) Maxwell's equation (d) Perfect gas

14. The vander waals equation for one mole of a gas is given as, _____ [c]

(a) $\left(P + \frac{a}{V^2}\right)(V + b) = RT$ (b) $\left(P - \frac{a}{V^2}\right)(V - b) = RT$

(c) $\left(P + \frac{a}{V^2}\right)(V - b) = RT$ (d) $\left(P - \frac{a}{V^2}\right)(V + b) = RT$

15. The coefficient of performance of a refrigerator is given by, k = _____ [d]

(a) $\frac{T_1}{T_2 - T_1}$ (b) $\frac{T_2}{T_2 - T_1}$ (c) $\frac{T_1}{T_1 - T_2}$ (d) $\frac{T_2}{T_1 - T_2}$

16. Maxwell's first T.dS equation, T.dS = _____ [a]

(a) C_V dT + T$\left(\frac{\partial P}{\partial V}\right)_P dV$ (b) C_P dT - T$\left(\frac{\partial V}{\partial T}\right)_P dP$

(c) $C_V \left(\frac{\partial T}{\partial P}\right) dP + C_p \left(\frac{\partial T}{\partial V}\right)_P dV$ (d) C_P dV - T$\left(\frac{\partial V}{\partial T}\right)_V dV$

17. The equation for Helmholtz free energy is given as F = [c]

(a) U + TS (b) TS – U (c) U – TS (d) $\frac{TS}{U}$

18. A gas always shows cooling effect in _____ [d]

(a) Adiabatic expansion (b) Joule Thomson expansion (c) Gas expansion (d) Joule expansion

19. The device used for converting high pressure of refrigerant into low pressure is _____ [a]

(a) Evaporator (b) Expansion value (c) condenser (d) Compressor

20. Ideal properties of an refrigerant are _____ [c]

(a) Low viscosity and less expensive (b) Easily available and simple to handle

(c) Both a and b (d) None of the above

II. Fill in the blanks

1. Average velocity can be defined as the average of the velocities of all the gas molecules.
2. The square root of the mean of the velocities of a large number of the gas molecules is root mean square velocity
3. A non-equilibrium gas has different layers with different velocities
4. The relative motion of layers give rise to transport of momentum, which in turn results in viscosity.
5. The expression for average energy per molecule is given by, E = $\frac{3}{2} KT$
6. In isolated system, neither matter nor energies are exchanged with the surroundings as the boundary Is sealed as well as insulated.
7. The entropy of universe remains constant
8. Thermodynamics scale of temperature is introduced by kelvin
9. Reversible process occurs at very slow speed.
10. In Adiabatic process, temperature keeps on changing.
11. The net energy of a system is known as internal energy or intrinsic energy of the system.
12. The expression for enthalpy is given as, H= U + PV
13. The viscosity of the refrigerant is maintained low
14. Refrigerator or vapour compression cycle operates at both high and low pressure
15. In an adiabatic process, dQ= 0 (zero)
16. The boiling point of a substance increases with the increase in pressure.
17. In case of Joule Thomson expansion, cooling effect depends on the external work done by its internal energy.
18. A thermodynamic potential is a scalar quantity used to represent the thermodynamic state of a system.
19. The heat transferred to the working fluid in an evaporator is known as refrigeration load
20. In an adiabatic and Joule Thomson expansion system is not isolated mechanically from the external system.

III. Short Answers.

1. Define coefficient of diffusion?
2. Mention the effect of temperature and pressure on coefficient of diffusion?
3. Write the expression for the mean free path of a gas at pressure P and temperature T ?
4. Define change in entropy?
5. Write the purpose of thermodynamic scale?
6. Define regulation of ice?
7. Define molar specific heat?
8. What is refrigeration?
9. Write the Ratio of Cp and Cv ?
10. Write the expression for Joule-Kelvin coefficient for Vander Waals?