T.D.C. Part - I (Physics Honours)
IInd Paper, (Group - B)
Thermodynamics

1. Thermodynamics mostly deal with
   (a) Measurement of heat energy (b) Change of State
   (c) Conversion of heat in other forms of energy (d) None of these

2. The variables, whose knowledge specifics the state of a thermodynamical system one called
   (a) Thermal variables (b) Rational variables
   (c) Thermodynamic variables (d) Irrational variables

3. Which of the following is not a Thermodynamical variable
   (a) Pressure (b) Temperature (c) mass (d) Volume

4. A thermodynamical process is represent by
   (a) P-V diagram (b) Carnot's cycle (c) T-S diagram (d) All of these

5. A point on a P-V diagram shows
   (a) a thermodynamical process (b) the state of the system
   (c) Workdone on the system (d) Workdone by the system

6. The area under a curve on P-V diagram represents
   (a) A thermodynamical system (b) A cyclic process
   (c) Workdone on a by the system (d) A thermodynamical process

7. The area inside a closed curve on P-V diagram represents
   (a) the state of the system (b) Workdone in a cyclic process
   (c) workdone on a by the system (d) A thermodynamics process

8. A curve drawn between two points on a P-V diagram represents
   (a) the state of the system (b) workdone on the system
   (c) Workdone by the system (d) A thermodynamics process

9. Workdone on a by a system depends on
   (a) Initial state only (b) Both a initial and Final states
   (c) Final state only
   (d) Both on initial and final states as well as on the path adopted between these two states

10. It a system undergoes contraction of volume, then the work done by the system will be
    (a) Positive (b) negative (c) negligible (d) Zero

11. The internal Energy of an ideal gas depends on
    (a) Pressure (b) Volume
    (c) Temperature (d) Size of the molecules

12. The internal energy 'U' is a unique function because change in U

(a) does not depend upon path (b) corresponds to an isothermal process

(c) depends upon path (d) corresponds to an adiabatic process

13. In an adiabatic process, these is no

(a) Change in temperature (b) exchange of heat

(c) Change in internal energy (d) Work done

14. In an Isothermal process, there is no

(a) change in temperature (b) change in internal energy

(c) exchange of heat (d) work done

15. In an isobaric process, there is no

(a) change in pressure (b) change in volume

(c) change in temperature (d) change in internal energy

16. In an Isochoric process, there is no

(a) change in pressure (b) change in temperature

(c) change in volume and work done (d) workdone

17. An Ideal gas undergoes an isothermal change in volume with pressures, then its pressure (P) and volume (V) with follow $\left(\gamma \frac{C_v}{C_v} = constant\right)$

(a) $p_V^v = constant$ (b) ¿

(c) $P V^r = constant$ (d) PV = constant

18. An ideal gas undergoes and adiabatic change in volume with pressure, then it follows the relations

(a) PV= constant (b) $PV^{\gamma} = constant$

(c) (PV) = constant (d) PV = constant

19. First law of thermodynamics concern conservation of

(a) heat (b) work (c) momentum (d) energy

20. If dq heat given to a system makes a change in internal energy dU and performs dW work, then by First law of thermodynamics

(a) dQ=dU+dW (b) dU = dQ + dW (c) dW= dU+dQ (d) None of these

21. If P is the pressure, U in internal energy and dV the volume increase of a system, then by First law of thermodynamics

(a) dU = dQ + P,dV (b) dU = dQ - P.dV (c) dU = dQ + VdP (d) dU= dQ- V.dP

22. When 110 J of heat is added to a gaseous system, internal energy increases by 40 J, the amount of work done in

(a) 150 J (b) 70 J (c) 110 J (d) 40 J

23. A gas has

(a) One specific heat only (b) Two specific heat to

(c) Three specific heats (d) No specific heat

24. Mean kinetic energy per gram molecule for diatomic gas

(a) $\frac{3}{2}RT$ (b) $\frac{4}{2}RT$ (c) $\frac{5}{2}RT$ (d) $\frac{7}{2}RT$

25. The difference between molar specifics of a gas in equal to
    (a) Rydberg constant (b) Stefaris constant
    (c) Gas constant (d) Boltzmann's constant
26. The ratio of two specific heats of a gas (γ) is always
    (a) negative (b) Zero (c) between zero and one (d) More than one
27. When heat is added to a system, which of the following is not possible
    (a) Internal Energy of the system increase (b) Work is done by the system
    (c) Neither internal energy increase nor work is done by the system
    (d) Internal energy increases and also work is done by the system.
28. First law of thermodynamics is a special case of
    (a) Law of conservation of energy (b) law of conservation of mass
    (c) Charles's law (d) Boyle's law
29. A Heat engine converts
    (a) Mechanical energy into heat energy (b) Heat energy into Mechanical energy
    (c) Heat energy into electric energy (d) Electric energy into heat
30. An Ideal heat engine was imagined by
    (a) James Walt (b) Carnot (c) Stefan (d) Boltzmann
31. A heat engine consists of the following parts
    (a) Source, Sink, Working Substance (b) Source, sink and insulating stand
    (c) Source, Piston 8-cylinder (d) gas
32. The working of Carnot's engine involves
    (a) Two processes (b) Three processes (c) Four Processes (d) Five processes
33. The efficiency of a heat engine is defined as
    (a) the ratio of a output and input
    (b) Heat taken from source and heat given to the sink
    (c) work done in one cycle and heat take by the source
    (d) heat taken from the source and work done
34. In a Carnot's engine
    (a) The temp of source in less than that of sink
    (b) The temp of source is greater than that of sink
    (c) Source and sink are at same temperature
    (d) Temperature of source and sink are not related
35. Which of the following statement is correct in carnot's Engine
    (a) Source is a body of low thermal capacity
    (b) Source is a body of very high thermal capacity

(c) sink is a body of very high thermal capacity

(d) All statements are correct

36. Which of the following statements incorrect in a heat engine

(a) The temperature of source is less than that of sink

(b) The temperature of source is greater than that of sink

(c) Source and sink remain at constant temperatures

(d) The temp of source remains always greater than that of sink

37. The most efficient engine is a

(a) Reversible Engine (b) Irreversible Engine

(c) Diesel Engine (d) Steam Engine

38. A reversible Engine is most efficient Engine. This was stated by

(a) Einstein (b) Thomson (c) Lord Kelvin (d) Carnot

39. A reversible process is that process which

(a) Cannot be reversed

(b) Can be reversed by making some change in the system

(c) can be reversed without making any changes in the system

(d) None of these

40. A Heat Engine

(a) takes heat from a hot body and gives it to a cold body

(b) takes heat from a cold body and gives it to a hot body

(c) can transfer heat in both directions

(d) converts work in the heat

41. A refrigerator

(a) Transfers heat energy from hot body to cold body

(b) Transfers heat energy from cold body to hot body

(c) can transfer heat in both directions

(d) converts heat into work

42. The efficiency of a reversible heat engine in η_r and that of an irreversible heat engine is η_i then

$(a)\eta_i > \eta_r$ $(b)\eta_i < \eta_r$ $(c)\eta_i = \eta_r$ $(d)\eta_i > \eta_r \vee \eta_i < \eta_r (both)$

43. In a Carnot's engine, the temperature of the working substance of the end of the cycle is

(a) equal to that at the beginning

(b) more than that at the beginning

(c) less than that the beginning

(d) determined by the amount of heat rejected at the sink

44. The first operation involved in a Carnot cycle is

(a) Isothermal expansion (b) Isothermal compression

(c) Adiabatic expansion (d) adiabatic compression

45. The efficiency of a Carnot heat engine

(a) is independent of the temperature of the source and the sink

(b) independent of the working substance

(c) can be 100%

(d) dependent on the working substance

46. The efficiency of a Heat engine is given by

$(a)\frac{W}{Q_1}$ (b) $\frac{W}{Q_2}$ $(c)\frac{W}{Q_1-Q_2}$ (d) None of these

where W= work done by the engine Q_1 = heat taken from the source Q_2 = Heat given to the sink

47. Which of the following expression of the efficiency of a Heat engine is correct ?

$(a)\frac{Q_1-Q_2}{Q_2}$ (b) $\frac{Q_1-Q_2}{Q_1+Q_2}$ (c) $\frac{Q_1-Q_2}{Q_1}$

(d) $\frac{Q_1+Q_2}{Q_1-Q_2}$

$Q_1=¿$ Heat taken from source, Q_2= Heat rejected to sink

48. If $T_1 \wedge T_2$ be the temperatures of source and sink of a heat engine respectively, then it efficiency will be

$(a)\frac{T_1-T_2}{T_1}\times 100\%$ (b) $\frac{T_1-T_2}{T_2}\times 100$ (c) $1+\frac{T_2}{T_1}\times 100\%$ (d) None of these

49. The efficiency of a Carnot heat engine is 100% only when

$(a)T_1=T_2 (b)T_1=O^o K (c)T_1=O^0 C (d)T_2=O^0 K$

$T_1=Temp\,of\,source, T_2=Temp\,of\,sink$

50. The temperature of the source is 127^{0}C and that of sink is 27^{0}C, then efficiency of this heat engine will be

(a) 50% (b) 25% (c) 100% (d) None of these

51. In a heat engine 8 J heat is taken from the source and after doing work 49J heat is rejected to the sink, then the efficiency of this engine will be

(a) 25% (b) 40% (c) 50% (d) 80%

52. The efficiency of a Carnot engine operating with source and reservoir temp of 100^{0}C and -23^{0}C will be

$(a)\frac{100-23}{100} (b)\frac{100+23}{100} (c)\frac{100+23}{373} (d)\frac{100-23}{373}$

53. An ideal gas A and a real gas B have their volumes increased from V to 2V under isothermal conditions. The interview energy

(a) of A will be more than that of B (b) of B will be more than that of A

(c) will be same in both A and B (d) will be zero in both A and B

54. I gm of an ideal gas expands isothermally, heat will flow

(a) from the gas to the outside atmosphere (b) from outside atmosphere to gas

(c) zero (d) both (a) and (b)

55. The diesel engine receives energy from diesel Vapour at constant

(a) Temperature (b) Pressure (c) volume (d) mass

56. The upper limit of the efficiency of a petrol engine is about

(a) 10% (b) 40% (c) 50% (d) 70%

57. It the temperature of the source in increased, the efficiency of a Carnot Engine

(a) increases (b) decreases

(c) remains constant (d) First increases then decreases.

58. If Δ Q represents the amount of heat given to an ideal gas and ΔW the workdone by the gas in an isothermal expansion, then

(a) $\Delta W = O = \Delta Q$ (b) $\Delta W = \Delta Q$ (c) $dW > dQ$ (d) $dW < dQ$

59. Which of the following engines have 100% efficiency?

(a) Auto engine (b) Diesel engine (c) Carnot engine (d) Stem Engine

60. A Carnot engine has efficiency 40% when its sink is at a temp 27^0C, the Temp of the source is

(a) 273^0C (b) 300^0C (c) 227^0C (d) 327^0C

61. In a Cyclic process, work done by the system is

(a) Zero (b) equal to the heat given to the system

(c) More than the heat given to the system (d) less than the heat given to the system

62. The efficiency of a Carnot engine is 0.6. It rejects 20 J of heat to the sink. The work done by the engine in

(a) 20 J (b) 30 J (c) 33.5 J (d) 50 J

63. In a Carnot's cycle, order of the process is

(a) Isothermal expansion, adiabatic expansion, Isothermal contraction

(b) Isothermal contraction, adiabatic contraction, Isothermal expansion in

(c) Isothermal expansion, adiabatic contraction, adiabatic expansion

(d) Isothermal expansion, adiabatic expansion, Isothermal contraction adiabatic contraction

64. $dW + dU = 0$ is valid for

(a) Adiabatic process (b) Isothermal process

(c) Isobaric process (d) Isochoric process

65. When two bodies A and B are in thermal equilibrium

(a) The kinetic energy of each molecule of A & B will be equal

(b) The average kinetic energy of the molecules A & B will be equal

(c) The interval energies of the two bodies will be equal

(d) None of these

66. In an adiabatic expansion of the gas, its

(a) Pressure increases (b) Pressure decreases

(c) Temperature increases (d) Temperature decreases

67. The complete cycle of an ideal reversible heat engine in called

(a) P-V diagram (b) Carnot's cycle

(c) Irreversible cycle (d) Thermodynamic cycle

68. The second law of thermodynamics implies that

(a) Heat can be completely converted into Mechanical energy

(b) Heat cannot be completely converted into mechanical Energy

(c) Law of conservation of energy

(d) Law of conservation of momentum

69. The Second law of thermodynamics implies that

(a) whole heat cannot be converted into mechanical work.

(b) no heat Engine can be 100% efficient

(c) every heat engine has efficiency 100%

(d) A refrigerator can reduce the temperature to absolute zero

70. The Zeroth law of thermodynamics is actually

(a) law of conservation of energy (b) law of conservation of momentum

(c) Definition of heat (d) Definition of temperature

71. Entropy is a thermodynamically function represents

(a) Temperature of the system (b) Internal energy of the system

(c) Disorderness of the system (d) Orderness of the system

72. Entropy of a system

(a) Can be observed only (b) cannot be seen nor observes

(c) can be seen only (d) can be seen and observed

73. In irregular processes, the entropy of the universe

(a) decreased (b) increases

(c) remains unchanged (d) fluctuates

74. In reversible process, the entropy of the universe

(a) decreases (b) increases

(c) remains unchanged (d) fluctuates

75. Which of the following is not a thermodynamical function

(a) Enthalpy (b) Entropy (c) work done (d) Gibb's function

76. A temperature scale that is independent of the working substance is called

(a) Fahrenheit scale (b) Celsius scale

(c) Absolute scale of Temp. (d) None of these

77. The absolute scale of Temperature is also known as

(a) Plank's scale (b) Kelvin scale

(c) Celestial scale (d) Universal scale

78. The laws of thermodynamics are

(a) Zeroth law, First law, Second law

(b) First law, Second law, third law

(c) Zeroth law, First law, Second law, Third law

(d) First law, Second law, third law, fourth law

79. The third law of thermodynamics is also known as

(a) Definition of Temp. (b) Nernst Heat theorem

(c) law of conservation of energy (d) conversion of heat into work

80. Nernst heat theorem in related to

(a) law of conservation of energy (b) Temperature of heat

(c) Unattainability of absolute zero (d) None of these

81. Entropy change (ds) is expressed as

$(a)\, ds = \frac{dQ}{R}$ $(b)\, dS = \frac{dQ}{T}$ $(c)\, ds = \frac{dT}{R}$ $(d)\, ds = \frac{R}{dT}$

where dQ = change of heat, R = gas constant

82. In an adiabatic process

(a) Entropy change is maximum (b) Entropy change is minimum

(c) Entropy change is Zero (d) None of these

83. Maxwell gave how many number of Thermodynamical relations?

(a) Two (b) Three (c) Four (d) Five

84. Which of the following Tuermodynamical relation is incorrect?

$(a)\left(\frac{\partial S}{\partial V}\right)_T=\left(\frac{\partial P}{\partial T}\right)_v$ $(b)\left(\frac{\partial S}{\partial p}\right)_T=-\left(\frac{\partial V}{\partial T}\right)_p$

$(c)\left(\frac{\partial T}{\partial V}\right)_s=\left(\frac{\partial P}{\partial S}\right)_v$ $(d)\left(\frac{\partial T}{\partial P}\right)_S=\left(\frac{\partial V}{\partial S}\right)_P$

85. Which of the following statement in incorrect

(a) Entropy can be expressed as a function of P & T

(b) Entropy can be expressed as a function of T & V

(c) Entropy can be expressed as a function of T & U (U = Internal Energy)

(d) All statement are correct

86. Which of the following is called First T.ds equation

$(a)T.ds=C_p dT+T\left(\frac{\partial V}{\partial T}\right)_P$ $(b)T.ds=C_p dT-T\left(\frac{\partial V}{\partial T}\right)_P$

(c) $T.ds=C_V dT+T\left(\frac{\partial P}{\partial T}\right)_v dv$ (d) $T.ds=C_V dT-T\left(\frac{\partial P}{\partial T}\right)_v$ dv

87. Which of the following is second T.ds equation

$(a)T.ds=C_p dT+T\left(\frac{\partial V}{\partial T}\right)_P$ $(b)T.ds=C_p dT-T\left(\frac{\partial V}{\partial T}\right)_P$

(c) $T.ds=C_V dT+T\left(\frac{\partial P}{\partial T}\right)_v$ (d) $T.ds=C_V dT-T\left(\frac{\partial P}{\partial T}\right)_v$ dv

88. Using Maxwell's Thermodynamical relations, which of the following law can be derives

(a) Boyle's law (b) Charle's law

(c) Ideal gas equation (d) None of these

89. Which of the following relation can be derived using Maxwell's relation

$(a)T.ds=C_p dT+T\left(\frac{\partial V}{\partial T}\right)_P$ $(b)\left(\frac{\partial P}{\partial T}\right)_{sat}=\frac{L}{T(V_1-V_2)}$

(c) $\left(\frac{\partial V}{\partial T}\right)_{sat}=\frac{L}{T(P_2-P_1)}$ (d) $T.ds=C_V dT-T\left(\frac{\partial P}{\partial T}\right)_v$

90. Which of the following relation is incorrect

(a) $C_P - C_V = R$ (b) $C_P - C_v = T.V.E.\sigma^2$

(c) $C_P - C_v = -T.V.\sigma E^2$ (d) $C_P - C_v = T.V.\sigma V^2$

91. Phase Transition are of

(a) Four types (b) Three types (c) Two Types (d) Only one type

92. First order phase Transition involves

(a) Change of state (b) Change of Temperature

(c) Change of Pressure (d) None of these

93. Which equation is followed in First order phase transition

(a) Ernest Equation (b) Maxwell's equation

(c) Clausius Clapeyron Equation (d) None of these

94. Which equation is followed in second order phase transition

(a) Ernest equation (b) Clausius Clapeyron Equation

(c) Maxwell's equation (d) None of these

95. What is the condition for phase equillibrium

(a) $G_1 = G_2$ (b) $G_1 \neq G_2$ (c) $H_1 = H_2$ (d) $H_1 \neq H_2$

G = Gibb's function H = Helmholtz Function

96. Which of the following is an example of First order phase transition

(a) Transition of Iron from paramagnetic state to Ferromagnetic State

(b) Transition from liquid Helium I to liquid Helium II

(c) Liquid-gas transition

(d) None of these

97. Which of the following is an example of second order phase Transition

(a) Liquid gas transition (b) Solid-Liquid transition

(c) Transition from liquid He I to He II (d) None of these

98. In second order phase Transition

(a) Internal energy does not change

(b) Specific volume does not change

(c) No heat is evolved or absorbed

(d) No change in Heat, Sp- volume and Internal energy

99. In First order phase transition

(a) Specific volume does not change (b) No heat is evolved or absorbed

(c) Temperature changes (d) Temp. remains constant

100. The heat evolved or absorbed in First order phase transition is called

(a) Specific Heat (b) Heat capacity

(c) Latent heat (d) None of these

101. Latent heat is actually the heat evolved or absorbed in

(a) change of phase (b) Change in Temp.

(c) Change in pressure (d) None of these

102. Temperature is a measure of hotness or coldness of an object is based on

(a) Zeroth law of thermodynamics (b) First law of Thermodynamics

(c) Second law of Thermodynamics (d) Newton's law of cooling

103. In adiabatic expansion of a gas

(a) Its pressure increases (b) Its temperature increases

(c) Its temperature decreases (d) Newton's law of cooling

104. If for a gas $\frac{R}{C_V}=0.67$, this gas is made of molecules which are

(a) monoatomic (b) diatomic (c) pdyatomic (d) Mixture of all

105. The process in which the heat is not transferred from one state to another is

(a) isothermal process (b) adiabatic process

(c) Isobaric process (d) isochoric process

106. A given system undergoes a change in which the work done by the system equals the decrease in its internal energy. The system must have undergone an

(a) isothermal change (b) adiabatic change

(c) isobaric change (d) isochoric change

107. Entropy of a thermodynamic system does not change when the system in used for

(a) Conduction of heat from higher to lower temperature

(b) Conversion of heat into work isobarically

(c) Conversion of work into heat isocuorically

(d) Conversion of heat into internal energy

108. Air in a cylinder is suddenly compressed by a piston, which is then maintained at the same position. After some time, the

(a) Pressure will increase (b) Pressure will decreases

(c) Pressure will remain the same (d) pressure becomes zero

109. During adiabatic process, pressure (P) verses density (p) relation is

$(a)\, P\rho^{\gamma}=constant$ (b) $P^{\gamma}\rho^{1+\gamma}=constant$

(c) $P\rho^{-\gamma}=constant$ (d) $P^{1+\gamma}\rho^{\gamma}=constant$

110. Which of the following is not a thermodynamic co-ordinate

(a) P (b) T (c) V (d) R

111. The principle of increase in entropy comes from

(a) First law of entropy (b) second law of thermodynamics

(c) Zeroth law of thermodynamics (d) Third law of thermodynamics

112. Will a heat engine work if the temperature of the is at O^0K

(a) yes (b) No (c) may work (d) may not work

113. What is the lowest possible temperature in Kelvin scale

(a) -273 K (b) -373 K (c) -273^0C (d) -373^0C

114. Why thermodynamic scale of temperature is called absolute scale of temp, because

(a) The temp. in this scale do not depend on working substance

(b) The temp. in this scale depend on working substance

(c) This scale in very useful

(d) This scale is very convenient

115. Why Carnot's engine is practically not achievable because

(a) It is very large in size (b) it uses a real gas

(c) It can be achieved using Ideal gas only (d) All of these

116. Which of the following statement is correct

(a) In a reversible process, entropy change in negative

(b) in an irreversible process, entropy change is negative

(c) In a reversible process, entropy change in zero

(d) In an irreversible process, entropy change is zero

117. Entropy is expressed in terms its

(a) Absolute value (b) Change in entropy

(c) Change in temperature (d) Caloric

118. A body at 427^0C will have which temperature in Absolute scale

(a) 327K (b) 700K (c) 773 K (d) None of these

119. If temp difference to two bodies is 10 is Celesius scale, then their temp difference in Kelvin scale will be

(a) Zero (b) 373 (c) 10 (d) 283

120. Which of the following is a thermodynamics potential

(a) Volume (b) Pressure (c) Entropy (d) Helmholtz Function

121. If R is gas constant for 1 gm mole, C_P and C_V are two specific heats of a gas, then

(a) $C_P - C_V = R$ (b) $C_P - C_v < R$ (c) $C_P - C_V = 0$ (d) $C_P - C_V > R$

122. It $\Delta Q>0$, when heat flows into a system, $\Delta W>O$, when work is done on the system, then, increase in internal energy of the system is

(a) $(\Delta W + \Delta Q)$ (b) $(\Delta W - \Delta Q)$ (c) $(\Delta Q - \Delta W)$ (d) $-(\Delta Q + \Delta W)$

123. If $C_P > C_V$ and $C_P - C_V = 2$ Cal/(gm.mole.K) and $\frac{C_p}{C_v} = 1.66$ then, which of the following in correct

(a) $C_P=4, C_V=2, \frac{C_p}{C_v} = 2$ (b) $C_P = 5, C_V=3, \frac{C_p}{C_v} = \frac{5}{3}$

(c) $C_P=6, C_V=2, \frac{C_p}{C_v} = 3$ (d) None of these

124. A heat engine takes 100 J heat from the heat source and gives 60 Joule heat to the sink, then efficiency of the engine is

(a) $\frac{5}{3}$ (b) $\frac{2}{5}$ (c) $\frac{3}{5}$ (d) None of these

125. A heat engine is working between temperature 300 K and 100K. The efficiency of the engine is

(a) 33.3% (b) 40% (c) 55% (d) 66.6%

126. In Carnot's engine, the piston is supposed to move inside the cylinder

(a) with high friction (b) with very law friction

(c) frictionless (d) by an external force

127. In porous ping experiment, the gas

(a) Is compressed adiabatically (b) Is expanded adiabatically

(c) is compressed isothermally (d) is expanded isothermally

128. In porous plug experiment, the gas is passed

(a) from High pressure region to low pressure region

(b) from low pressure region to high pressure region

(c) from high temp region to low temp region

(d) from low temp region to high temp. region

129. The low temperature is obtained using

(a) liquefaction of Helium (b) liquefaction of Hydrogen

(c) liquefaction of Oxygen (d) liquefaction of Carbon-di-oxide

130. The low temperature is produced by using

(a) Compton effect (b) Joule Thomson effect

(c) Zeeman effect (d) None of these

131. The porous plug experiment in explained by

(a) Joule Thomson Effect (b) Zeeman effect

(c) Compton effect (d) None of these

132. In Joule Thomson effect

(a) Cooling is produced (b) Some times coding, some times heating

(c) Heating is produced (d) Temperature does not change

133. The Temperature of inversion is given by

$(a)\, T_i = \frac{1a}{Rb} \quad (b)\, T_i = \frac{2b}{Ra} \quad (c)\, T_i = \frac{R}{2ab} \quad (d)\, T_i = \frac{2a^2}{Rb}$

134. Cooling in produced in Joule Thomson effect if Room Temp.

(a) is greater than Temp. of inversion (b) isless than Temp. of inversion

(c) Equal to temp of inversion (d) None of these

135. Heating is produced in Joule Thomson effect if Room Temp is

(a) greater than Temp of inversion (b) Less than Temp of inversion

(c) Equal of temp of inversion (d) None of these

136. Which of the following gases show heating effect is Joule Thomson effect

(a) H_2 and O_2 (b) NO_2 and CO_2 (c) H_2 and He (d) He and NO_2

137. Hydrogen produces heating in Joule Thomson effect because its temperature of inversion is

(a) less than (b) greater than (c) equal to (d) negative

138. The temperature of inversion of CO2 is less than the Room temperature, then in Joule thomson effect, it will produce

(a) Heating (b) Cooling

(c) No change in temp. (d) periodic heating and cooling

139. Oxygen produces cooling in Joule thomson effect because its temperature of inversion is

(a) less than (b) greater than (c) equal to (d) negative

140. If P_1, V_1 and P_2, V_2 are pressure and volume respectively of a gas, before and after passing through a porour plug, then the net external work done by the gas is

(a) $(P_1 V_1 - P_2 V_2)$ (b) $(P_2V_2 - P_1V_1)$

(c) $(P_1V_1 + P_2 V_2)$ (d) $(P_1V_2 - P_2 V_1)$

141. In a porous plug experiment, the work done by the gas against the inter-molecular attractive forces

$(a)\left(\frac{a}{V_2}-\frac{a}{V_1}\right)(b)\left(\frac{a}{V_1}-\frac{a}{V_2}\right)(c)\left(\frac{a}{V_1^2}-\frac{a}{V_2^2}\right)(d)\left(\frac{a^2}{V_1}-\frac{a^2}{V_2}\right)$

where a is Vander wail’s constant

142. In porous plug experiment, work done by the gas results

(a) increase in temp (b) decrease in temp (c) change in temperature (d) All of these

143. Enthalpy of a thermodynamical system is given by

(a) (U+P.V) (b) (P-UV) (c) U-PV (d) (P+UV)

144. The enthalpy of a system is conserved in

(a) Isothermal process (b) adiabatic process

(c) throttling process (d) None of these

145. Helmholtz Free energy function in given by

(a) F = U + TS (b) F = U - T.S. (c) F= S - UT (d) F= S+UT

146. Gibbs function is given by

(a) a = U + PV-TS (b) a = U - PV + TS

(c) G = U + PT - SV (d) G = U - PT + SV

147. Gibbs function of a system does not change in

(a) Any thermodynamical process (b) Isobaric process

(c) Phase Transition process (d) Isochoric process

148. Gibb's Helmholtz equation is given by

$(a)\,F=U-T\left(\frac{\partial F}{\partial T}\right)_v$ $(b)\,F=U+T\left(\frac{\partial F}{\partial T}\right)_v$

$(c)\,F=H+T\left(\frac{\partial F}{\partial T}\right)_v$ $(d)\,F=H-T\left(\frac{\partial F}{\partial T}\right)_v$

149. Heat cannot flow by itself from a body at lower temp to a body of higher temp, this is explained by

(a) First law of thermodynamic (b) Zeroth law of thermodynamics

(c) Second law of thermodynamic (d) All of these

150. Which of the following statement is incorrect

(a) Practically, absolute zero temperature can not be reached

(b) Negative value of temp. is possible in Absolute scale

(c) Negative value of temp. is impossible in Assolute scale

(d) Al l value of temp are possible in Absolute scale

T.D.C. Part - I

(Physics Honours)

IInd Paper

(Group - A)

1. Temperature O^OK means temperature

(a) 0^0C (b) 273^0C (c) -273^0C (d) None of these

2. Thermal conductivity of a material increases with

(a) Rise in temperature (b) Increase in length

(c) decrease in length (d) None of these

3. Steady state is reached, when,

(a) all parts of a body has same temperature

(b) all parts of a body has constant temperature

(c) the temperature of all parts of a body is variable

(d) None of these

4. In steady state,

(a) No heat flows through a body

(b) Heat flow is equal to the heat loss

(c) More heat loss takes place than heat flow

(d) Heat flow is greater than the heat loss

5. The amount of Heat flowing through a layer of a body in steady state is

(a) Proportional to the width of the layer

(b) Inversely proportional to the width of the layer

(c) Does not depend on the width of a layer, but it remains constant

(d) inversely proportional to the area of cross section of the layer

6. The coefficient of thermal conductivity of a material indicates

(a) How it will flow the heat through it (b) How it opposes the flow at heat

(c) How it conducts elective current (d) None of these

7. The unit of the coefficient of thermal conductivity is

(a) Cal, m^{-1}, sec^{-1} ok (b) Joule, $m^{-1} sec^{-1} k^{-1}$

(c) Joute m, $Sec^{-10} k$ (d) Cal. m. sec^{-1} ok

8. The standard Fourier Equation holds for

(a) Steady flow of heat (b) periodic Flow of heat

(c) Both types of flow of heat in steady state

(d) Rectangular flow of heat in steady state

9. The thermometric conductivity of heat of a material indicates, How

(a) Heat will flow through that material (b) Temperature will change with distance

(c) Rate of change of temperature (d) None of these

10. The variation of temperature of Earth due to solar radiation is

(a) steady (b) Periodic (c) constant (d) Irregular

11. In deriving Fourier's equation of rectangular flow, it is anumed that, the heating is

(a) constant (b) Periodic (c) steady (d) Irregular

12. The diffusivity of a material is expressed as

(a) $\frac{K}{es}$ (b) $\frac{e}{k.s}$ (c) Kes (d) $\frac{s}{ke}$

where K = cooficient of thermal conductivity S = Specific heat

$P = Density$ of that material

13. According to Newton's law of cooling, the rate of coding of a hot body is proportional to the

(a) temperature of the hot body

(b) Difference of temperature of the hot body and its surrounding

(c) temp of the surrounding

(d) None of these

14. If a rod of infiinite length is heated from one end, then in steady state, the temperature of its often end will be equal to the temperature of the

(a) heater (b) Surrounding (c) Zero (d) infinite

15. The radiation loss of a hot body do not depend on its

(a) Temperature (b) Surface area

(c) temperature of its surrounding (d) Weight

16. According to the kinetic theory of gases, the volume of the gas molecules is regarded as

(a) Very large (b) very small (c) negligibly small (d) None of these

17. According to the kinetic theory of gases, the intermolecular fora acting between any two molecular is

(a) Attractive (b) Repulsive (c) strong (d) negligible

18. The equation of state of an Ideal gas is given by

(a) $PV = \frac{R}{T}$ (b) PV = RT (c) P/V = = $\frac{R}{T}$ (d) PT = $\frac{R}{V}$

19. The assumptions of the kinetic theory of gases are valid for an

(a) Ideal gas (b) Real gas (c) All types of gases (d) All states of matter

20. The equation of State of a real gas is

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

(c) ¿ (d) ¿

where, a, b, R are constants

21. In Vander wall's Equation of State, the correction in the volume of the gas (in Ideal gas equation of state) in due to

(a) Finite intermolecules force (b) Finite size of gas molecules

(c) Change in pressure of the gas (d) None of these

22. In the real gas equation of state, the correction in pressure (in Ideal Equation of State) is due to

(a) small volume of the gas (b) Pressure variation force

(c) Finite intermolecular force (d) negligible size of the gas molecules

23. The experimental graph between P and V at a constant temperature for a real gas was drawn by

(a) Boyle (b) Charles (c) Audrew (d) Vander wool

24. The theoretical curves calculated from Vander Wool's equation differ from the experimental curves at

(a) Very high temperatures (b) low temperatures

(c) All temperatures (d) Donot differ

25. The difference of theoretical results of Vander wool adn experimental results were explained by

(a) Experimental condition (b) Correction in formula

(c) Super heated liquid of super cooled vapour

(d) Super cooled liquid and super heated vapour

26. The velocity distribution formula for gas molecules was given by

(a) Maxwell (b) Planck (c) Stefan (d) Thomson

27. The Maxwell velocity distribution formula was developed by using

(a) quantum mechanics (b) Theory of probability

(c) Quantum Statistics (d) Theory of Uncertainty

28. According to Maxwell velocity distribution formula, the Root Mean square velocity of a gas molecule is

(a) $\sqrt{\frac{8KT}{m}}$ (b) $\sqrt{\frac{3KT}{m}}$ (c) $\sqrt{\frac{3km}{T}}$ (d) $\frac{8km}{T}$

where k = Boltzman constant, T = Temperature m = mass of a gas molecule

29. According to Maxwell Velocity distribution formula the number, of molecules per unit volume having velocity lying between 'C' and '(C+dc) in given by

(a) $dn=4\lambda n a^3 e^{-bc^2} c^2 dc$ (b) $dn=4\lambda n a^3 e^{bc^2} c^2 dc$

(c) $dn=4\lambda n a^2 e^{-bc^2} c^3 dc$ (d) None of these

30. The "most probable velocity" in given by

(a) $\sigma=\sqrt{\frac{2KT}{m}}$ (b) $\sigma=\sqrt{\frac{3KT}{m}}$ (c) $\sigma=\sqrt{\frac{8KT}{m}}$ (d) $\sigma=\sqrt{\frac{KT}{m}}$

31. The relation between R M, S velocity (c) and Most probable velocity (σ) is given by

(a) $\sigma=\sqrt{\frac{3}{2}.C}$ (b) $\sigma=\sqrt{\frac{2}{3}C}$ (c) $\sigma=\sqrt{\frac{2C}{3}}$ (d) $\sigma=\sqrt{\frac{3C}{2}}$

32. The most probable velocity of gas molecules

(a) Does not depend on temperature

(b) Increases as Room Temperature increases

(c) Increases with increase in temperature

(d) Increases as Room temperature increases

33. The K.M.S. velocity of gas molecules

(a) Does not depend on temperature

(b) Does not depend on mass of gas molecules

(c) Increases with increase in temperature

(d) Decreases with increase in temperature

34. The molecular velocities are lying between

(a) Zero and one (b) Zero and infinity

(c) Zero and $\sqrt{\frac{8KT}{m}}$ (d) Zero and $\sqrt{\frac{2KT}{m}}$

35. The distance travelled between two successive molecular collision is called

(a) Free path (b) Mean free path (c) Mean path (d) Path length

36. The motion of gas molecules in Free path is

(a) Accelerated motions (b) Half accelerated motion

(c) uniform motion (d) None of these

37. The mean Free path of the gas molecules

(a) Increases as size of molecules increases

(b) Decreases as size of molecules increases

(c) Does not depend on the size of molecules

(d) Is universal constant

38. The mean free path of gas molecule increases as

(a) Molecular density increases

(b) Molecular density decreases

(c) Whether Molecular density in increased or decreases

(d) None of these

39. The expression for Mean free path is

$(a)\lambda=\frac{1}{n\lambda d^2}$ $(b)\lambda=\frac{\sqrt{2}}{n\lambda d^2}$ (c) $\lambda=\frac{1}{\sqrt{2n\lambda d^2}}$ (d) $\lambda=\frac{1}{\sqrt{2},n\lambda d^2}$

40. The Mean Free path of gas molecules can be determined by the method of

(a) Stern (b) Maxwell (c) Born (d) Boltzman

41. According to the "law of equipartition of energy" the Energy per degree of freedom is

(a) KT (b) $\frac{1}{KT}$ (c) $\frac{1}{2}KT$ (d) $\frac{2}{KT}$

42. In law of equipartion of energy, all types (Degrees) of freedom have

(a) same energy (b) Different energies

(c) same energy Irrespective of temperature

(d) Same energy at a particular temperature

43. In a more atomic gas, the number of degrees of freedom of each molecule is

(a) One (b) Two (c) Three (d) Five

44. In a diatomic gas, the number of degree of freedom of each molecule is

(a) One (b) Two (c) three (d) Five

45. The molar specific heat of a monoatomic gas is

(a) $\frac{3}{2}R$ (b) 3R (c) $\frac{5}{2}R$ (d) 5R

46. The molar specific heat of a diatomic gas molecule is

(a) $\frac{3}{2}R$ (b) 3R (c) $\frac{5}{2}R$ (d) 5R

47. The ratio of two specific heats (C_P & C_V) of a mono atomic gas in

(a) 1.4 (b) 1.66 (c) 1.33 (d) 1

48. Avogadro's Number is a

(a) Constant for all gas (b) Constant for a particular gas

(c) Universal constant (d) Variable

49. Avogadro's Number is equal to, the number of molecules

(a) per unit mass (b) Per kg. molecule

(c) per atomic weight (d) None of these

51. The value of Avogadros' number in

(a) 6.023×10^{23} molecules/kg mole (b) 6.023×10^{26} molecules/kg mole

(c) 6.032×10^{26} molecules/kg mole (d) 6.032×10^{23} molecules/kg mole

52. The Avogadro's number can be determined by using

(a) Boyle's law (b) Charle's law

(c) Brownian motion (d) Rectilinear motion

53. The First observer of Brownian motion was a

(a) Chemist (b) Physicist

(c) Botanist (d) Zoologist

54. Brownian motion means

(a) regular motion of particles (b) regular accelerated motion of particles

(c) Irregular rotational motion (d) Irregular rotational motion of particles

55. Avogadro's Number (N), gas constant (R) and Boltzman constant (K) are related as

$(a)\, N=\frac{R}{K}\; (b)\, N=\frac{K}{R}\; (c)\, NRK=constant\; (d)\, NRK=0$

56. The non-equillibrium motion of gas particles give rise to the phenomenon of

(a) Viscosity (b) Elasticity (c) Surface Tension (d) None of these

57. Which of the following is not a Transport phenomenon

(a) Viscosity (b) Conductivity (c) Super conductivity (d) Diffusion

58. The phenomenon of viscosity arises when

(a) The Average Velocity of gas molecules is not same everywhere

(b) The density of gas is not same everywhere

(c) The Temperature of gas is not same everywhere

(d) the gas is in equilibrium

59. The phenomenon of Thermal conductivity arises when

(a) The Average velocity of gas particle is not same every where

(b) The density of gas is not same everywhere

(c) The Temperature of gas is not same everywhere

(d) The gas is in thermal equilibrium

60. The phenomenon of Diffusion takes place when

(a) The average velocity of gas molecule is not same everywhere

(b) The density of gas is not same everywhere

(c) The temperature of gas is not same every where

(d) The gas is in equilibrium state

61. The phenomenon of viscosity in gases in due to

(a) transfer of momentum (b) Transfer of Energy

(c) Transfer of mass (d) None of these

62. The phenomenon of Thermal conductivity arises due to

(a) Transfer of momentum (b) Transfer of Energy

(c) Transfer of mass (d) None of these

63. The phenomenon of Diffusion is gases takes place due to

(a) Transfer of momentum (b) Transfer of Energy

(c) Transfer of mass (molecules) (d) None of these

64. The coefficient of viscosity of a gas is given by $\eta =$

(a) $\frac{1}{3}\frac{\rho c}{\lambda}$ (b) $\frac{1}{3}\rho c \lambda$ (c) $\frac{1}{3}\frac{\lambda}{\rho c}$ (d) $\frac{1}{3\rho c \lambda}$

where c=Average velocity, $\rho - Density \wedge \lambda - Mean\, free\, path$

65. The coefficient of viscosity of a gas

(a) increases as pressure decreases (b) Decreases as pressure decreases

(c) Independent of pressure (d) None of these

66. The coefficient of viscosity of a gas

(a) Increases as Temperature increase (b) Decreases as Temperature increases

(c) is independent of pressure

67. The relation between thermal conductivity (IK), specific heat (cv) and coefficient of viscosity of a gas is

$(a) K\eta C_v=1$ (b) $\frac{\eta}{KC_v}=1$ (c) $\frac{K}{\eta C_v}=1$ (d) $\frac{C_v}{K\eta}=1$

68. The Experimental value of the ratio K/ηC_v for a mono atomic was found to be

(a) 1 (b) 1.9 (c) 2.5 (d) 1.5

69. The experimental value of the ratio K/ηC_v for a diatomic gas was found to be

(a) 1 (b) 1.5 (c) 1.9 (d) 2.5

70. In the phenomenon of diffusion, the gas molecules more

(a) From higher density region to lower density region

(b) From lower density region to higher density region

(c) No movement

(d) Both way movement

71. The expression for coefficient of Diffusion was given by

(a) Maxwell (b) Mayer (c) Michelson (d) None of these

72. The relation between Diffusion Coefficient (D), coefficient of viscosity (η) and density (ρ) of gas is

$(a)\eta=\frac{\rho}{D}(b) D=\frac{\eta}{\rho}(c)\rho=\eta D(d)¿$

73. The ratio of coefficient of thermal conductivity (K) and electrical conductivity (σ¿ is

(a) constant at all temperature

(b) constant at a particular temperature

(c) constant for al metals

(d) constant for all metals at a particular temperature

74. Both the phenomenon of thermal conductivity and electric conductivity of metals are due to movement of

(a) atoms (b) Molecules (c) Electrons (d) Free electrons

75. According to wiedmann -Frantz law

$(a)\frac{K}{\sigma T}=constant\,(b)\frac{K}{\sigma}=constant\,(c)\frac{K}{T}=constant\,(d)¿$

76. According to kinetic theory of gases, the specific heat (C_V) of a solid in

(a) R (b) R/2 (c) 2R (d) 3R

77. Siv Einstein explained the theory of specific heat by

(a) Kinetic theory (b) Theory of relativity

(c) Plank's Radiation formula (d) None of these

78. Siv Einstein considered that the electrons of a solid vibrate in

(a) Irregular Motion (b) Simple Harmonic Motion

(c) Damped Harmonic Motion (d) Forced Harmonic Motion

79. The emission of radiation takes place due to

(a) Molecular transition (b) Nuclear transition

(c) Electronic transition (d) None of these

80. Einstein's theory of specific heat agree with experimental vesuts at

(a) All temperature (b) All low temperature only

(c) All high temperature (d) Does not agree

81. Debye modified theory of specific of solid by considering

(a) Elastic vibration theory of solids (b) Free Vibration theory

(c) Non-harmonic vibration theory (d) None of these

82. Debye's theory of specific heat agree with experimental results at

(a) All temperature (b) Specially at low temperature

(c) Only at high temperature (d) Doesnot agree

83. The Debye's theory of specifics heat explained

(a) the constant value of sp. heat

(b) The famous T^3 law, at low temperature

(c) The variation of sp. heat at high temperature

(d) The classical theory of Sp. heat

84. The specific heat of solids (metals) at low temperature is

(a) proportional to T (b) proportional to T^2

(c) proportional to T^3 (d) Independent of temperature

85. Specific of a substance depends or its.

(a) mass (b) volume (c) temperature (d) nature

86. If the specific heat of a substance is infinite, it means

(a) heat is given out

(b) heat is taken in

(c) No change in temperature takes place whether heat is taken in or taken out

(d) All the above

87. The amount of heat requires will be minimum when a body is heated through

(a) 1 K (b) 1^0C (c) 1^0F (d) It will be same in all cases

88. The quantity of heat which crosses unit area of a metal plate during conduction depends upon

(a) Density of the metal (b) the temperature gradient

(c) The temperature of the heater (d) Area of the metal plate

89. The mode of transfer of heat which requires no medium in

(a) Radiation (b) Conduction

(c) convection (d) Combusion

90. The mode of transfer of heat which is possible only in fluid is

(a) conduction (b) Convection

(c) Combusion (d) Radiation

91. Under steady state, the temperature of a body

(a) increases with time

(b) Decreases with time

(c) does not change with time and in same at all parts of the body

(d) does not change with time but is not same at all parts of the body

92. The coefficient of thermal conductivity of a metal depends upon

(a) temperature difference between two side (b) Thickness of the metal

(c) Area of plate (d) None of the above

93. Though air is bad conductor yet a body kept in air loses heat quickly. This is due to

(a) Conduction (b) Convection (c) radiation (d) Sun

94. On cold morning, a metal surface will feel colder to touch than a wooden surface because

(a) metal has high specific heat (b) metal has high thermal conductivity

(c) metal has low specific heat (d) metal has low thermal conductivity

95. Newton's law of cooling is a special case of

(a) Stefan's law (b) Botzman law (c) Wien's law (d) Plank's law

96. Which of the following is the example of ideal black body

(a) Charcoal (b) Black board (c) A pin hole in a box (d) None of these

97. Which law explains fully the spectrum of radiation

(a) Stefan's (b) Wien's law (c) Planck's law (d) Rayleigh Jean's law

98. Thermal radiations are

(a) electro magnetic wave (b) Mechanical transverse wave

(c) Mechanical longitudinal wave (d) None of these

99. For a perfect black body, the energy radiated per sec per unit area in directly proportional to

(a) the absolute Temp. (b) The square of absolute Temperature

(c) The Cube of absolute Temperature (d) The fourth power of absolute Temperature

100. The absorption coefficient of a perfect black body in

(a) 0 (b) 1 (c) infinite (d) -1

101. A perfect black body emits radiations of

(a) All wavelength (b) Only one wavelength

(c) A selected wavelength (d) No radiations are emitted

102. According to Kirchhoff's law, a good absorber of radiation is

(a) a good emitter (b) a bad emitter

(c) Can not emit radiation (d) May be a good emitter or a bad emitter

103. Frannhofer lines of solar spectrum are absorbed by

(a) Wien's law (b) Stefan's law

(c) Circhhoff's (d) Plank's law

104. According to wien's displacement law

$(a)\,\lambda_m = constant\;(b)\,\lambda_m T = constant$

$(c)\,\lambda_m T^2 = constant\;(d)\,\lambda_m^2 T = constant$

105. The temperature of the sun can be measured by

(a) Kirchhoff's law (b) Planck's law

(c) Stefan's law (d) Wien's law

106. The total radiation energy emitted by a black body

(a) increases as Temp. increases

(b) Decreases as Temp. increases

(c) Does not change with change in temp.

(d) Sometimes increases some time decreases with increase in temp.

107. The intensity of black body radiation of all wavelengths are

(a) equal (b) Not equal- but increase with wavelength

(c) Maximum at a particum wave length decreasing but increase with wavelength

(d) Maximum at very low & very high wavelengths

108. As Temperature of Black body increases, the wavelength at which Intensity in maximum, shifts

(a) Towards lower wavelength side (b) No Change

(c) Towards higher wavelength side (d) Irregularly changes

109. The wien's Displacement law agrees with experimental results specially at

(a) lower frequencies (b) Higher frequencies

(c) At all frequencies (d) Does not agree at any frequency

110. The Rayleigh Jean's law agrees with experimental results at

(a) lower frequencies (b) Higher frequencies

(c) At all frequencies (d) Does not agree

111. The Planck's law of radiation agrees with experimental results at

(a) Lower frequency range (b) higher frequency range

(c) All frequency ranges (d) Does not agree at any frequency range

112. Planck's radiation formula is the foundation of

(a) quantum Mechanics (b) Classical Mechanics

(c) Statistical Mechanics (d) Computer Science

113. Which of the following can not be explained by Planck's theory of radiation

(a) Newton's law of motion (b) Photo electric effect

(c) Bhor's theory of Hydrogen Atom (d) Compton effect

114. A high frequency ranges, the plank's radiation formula converts into

(a) Rayleigh Jean's law (b) Wien's displacement law

(c) Stefan's law (d) None of these

115. The average velocity of gas molecules in a gas in equilibrium is

$(a) \propto \sqrt{T} (b) \propto T (c) \propto T^2 (d) Zero$

116. The r.m.s. velocity of gas molecules at the same temperature are

(a) the same

(b) directly proportional to the molecular weight

(c) Inversely proportional to the square root of the molecular weight

(d) Inversely proportion to the molecular weight

117. Which of the following gases possesses maximum r.m.s. velocity, al being at the same temperature

(a) Oxygen (b) Carbon dioxide (c) air (d) Hydrogen

118. The absolute temperature of a gas increases 3 times, the r.m.s. velocity of the molecule will become

(a) 3 times (b) 9 times (c) 1/3 times (d) $\sqrt{3} times$

119. The temperature of a gas increases from 27^0C to 927^0C, the r.m.s. velocity of its molecules becomes

(a) Twice (b) half (c) Four times (d) One-fourth

120. The Kinetic energy of gases, one assumes that the collisian between molecules are

(a) perfectly elastic (b) Perfectly inelastic

(c) Partly inelastic (d) None of these

121. The temperature of gas is produced by

(a) the potential energy of its molecules

(b) the kinetic energy of its molecules

(c) the attractive force between its molecules

(d) the repulsive force between in molecules

122. In the equation PV= RT, V represents the volume of

(a) any amount of gas (b) One gram molecule of gas

(c) one gram of gas (d) one litre at gas

123. Under which of the following conditions is the law PV=RT obeyed most closely by a real gas

(a) High pressure and high temperature

(b) Low pressure and low temperature

(c) Low pressure and high Temperature

(d) High pressure and low Temperature

124. Critical pressure of a gas obeying Van der waal's equation in given by

(a) 3.b (b) $\frac{a}{27b^2}$ (c) $\frac{27a}{b^2}$ (d) $\frac{b^2}{a}$

125. Critical temperature of a gas obeying vander wall's equation is given by

$(a)\frac{8a}{27Rb}(b)\frac{a}{27b^2R}(c)3b(d)\frac{1}{27Rb}$

126. The Critical volume of a gas obeying Van der Waal's equation is

$(a)\frac{8a}{27Rb}(b)\frac{a}{27b^2R}(c)3b(d)\frac{1}{27Rb}$

127. If 'H' heat given to a system, produces W work then

(a) $W=\frac{J}{H}(b)W=J.H.(c)H=\frac{1}{W}(d)\frac{H}{W}=unpredictable$

128. In S.I. system, the value of Mechanical equivalent of heat (J) is

(a) 0 (b) 4.2 (c) 1 (d) 4.2×10^3

129. Which of the following statement is wrong ?

(a) Work done is proportional to the Heat taken

(b) Temperature of a body rises as it absorbs heat

(c) Work done is inversely proportional to the Heat taken

(d) Entropy of a system increases if it absorbs heat

130. The amount of heat required to increase unit mass of a gas by one degree is called its

(a) Heat capacity (b) Latent heat

(c) specific heat (d) One Calorie

131. The amount of heat required to increase one gm of pure water by 1^0C is equal to

(a) Specific Heat (b) One Caloric

(c) Heat Capacity (d) One Joule

132. The S.I. units of specific Heat is

(a) Caloric/gm^{0}C (b) Caloric/gm (c) Joule/kg (d) Joule/Kg^{0}K

133. A graph plotted between P and (1/V) of a gas under constant temperature will be a

(a) Straight line (b) ellipse (c) Parabola (d) hyperbola

134. At what temperature under constant volume is the pressure of a gas double that at 0^0C

(a) 546^0C (b) 273^0C (c) 100^0C

(d) 173^0C

135. PV has the same unit as

(a) Temperature (b) work (c) Force (d) Power

136. If the pressure of a closed vessel is reduced by drawing out some of the gas, the mean free path of molecules in side the vessel

(a) increases (b) decreases (c) remains unchanged (d) become Zero

137. The temperature of a gas enclosed in a chamber is increased from 300 K to 600 K. The pressure becomes double because the

(a) mean molecular velocity becomes $\sqrt{2}$fold

(b) root mean square velocity becomes $\sqrt{2}$fold

(c) energy transferred to the wall become half

(d) None of these

138. The speeds of 5 molecular of a gas are 2,3,4,5,6 then the r.m.s. velocity of these molecules will be

(a) 2.91 (b) 4.00 (c) 3.52 (d) 4.24

139. At which temperature would the molecules of a gas have twice the average kinetic Energy they have at 27^0C

(a) 313^0C (b) 373^0C (c) 393^0C (d) 586^0C

140. The Fraunhoffer lines can be explained using

(a) Kirchchoff's law (b) Stefan's law

(c) Wien's law (d) Planck's law

141. The radiation loss from the surface of a perfectly black body is proportional to

(a) Temperature T (b) T^2 (c) T^3 (d) T^4

142. A temperature degree on the Kelvin scale in the same as

(a) a temperature as celesim scale (b) a Temp. in Fahrenheit scale

(c) a temperature in Reanmer scale (d) No other scale

143. The temperature of the sun is measured with

(a) Platinum thermometer (b) gas thermometer

(c) Pyrometer (d) Thermocouple Thermometer

144. The temperature of the sun in approximately

(a) 1000k (b) 7000K (c) 10K (d) 10×10^6K

145. The absolute zero is the temp. at which

(a) water freezes (b) all substances exist in solid state

(c) Molecular motion ceases (d) None of the above

146. If 500 cal of heat is given to 1 kg ice, then what will be the temp of the mixture

(a) 100^0C (b) 50^0C (c) 0^0C (d) 80^0C

147. The number of degrees of freedom of a triatomic gas in

(a) 3 (b) 5 (c) 6 (d) 7

148. In calculating the sp. heat of a monoatomic solid, it is assumed that its potential energy in equal to

(a) 3RT (b) $\frac{3}{2}RT$ (c) $\frac{5}{2}RT$ (d) None of these

149. The value of γ for a triatomic gas is

(a) 1.67 (b) 1.4 (c) 1.19 (d) None of these

150. In a real gas, due to intermolecular force, Pressure increases by a factor (then pressure of ideal gas P)

$(a)\frac{a}{V}(b)\frac{a}{v^2}(c)\frac{a}{V^3}(d)\frac{a^2}{V^3}$