

Che201 Important MCQs+ past papers objective questions (Mid term 2017)

- 1) Which is the study of the underlying physical principle that govern the properties and behavior of chemical system?
a) **Physical chemistry**
b) Organic chemistry
c) Inorganic chemistry
d) Analytic Chemistry
- 2) Chemical system can be studied from a.....is based on the concept of molecules?
A) Macroscopic B) Microscopic point **C) a and b** D) None
- 3) Thermodynamic is aword?
A) Latin **B) Greek** C) British D) None
- 4) Dynamic mean.....?
A) Heat B) Cool down **C) Power** D) Energy
- 5) A key property in thermodynamic is.....?
A) Energy B) Water **C) Temperature** D) All of these
- 6) Irreversible thermodynamic deals with.....system and rare process?
A) Equilibrium **B) Non – Equilibrium** C) Temperature D) Energy
- 7) The part of universe in thermodynamic is called?
A) Equilibrium B) Non – equilibrium thermodynamics **C) System** D) Basic unit of thermodynamics
- 8) Physical chemistry is the study of the underlying physical principles that govern _____ of chemical systems:
a) properties
b) behavior
c) studies
d) all of these
- 9) Equilibrium thermodynamics deals _____ in equilibrium
a) with systems
b) with space
c) with surrounding
d) both a and c
- 10) _____ occur in equilibrium when its macroscopic properties remain constant with time
a) **An isolated system**
b) non-isolated system
c) non-equilibrium system
d) thermodynamic system
- 11) when a non-isolated system occur ?
A non-isolated system occur in equilibrium when:

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- The system's macroscopic properties remain constant with time
- Removal of the system from contact with its surroundings causes no change in the properties of the system

12) If condition (A) holds but (B) does not hold, the system is in ____

- a) steady state
- b) equilibrium
- c) non equilibrium
- d) reversible state

13) Define Mechanical Equilibrium?

No unbalanced forces act on or within the system hence the system undergoes no acceleration, and there is no turbulence within the system.

14) What is Material Equilibrium?

No net chemical reactions are occurring in the system, nor is there any net transfer of matter from one part of the system to another or between the system and its surroundings

15) _____ occurs between a system and its surroundings

- a) Mechanical Equilibrium
- b) Material Equilibrium
- c) Thermal Equilibrium
- d) Reversible equilibrium

16) For thermodynamic equilibrium _____ kinds of equilibrium must be present

- a) One
- b) Two
- c) Three
- d) four

17) A large number of experiments have determined that---- variables are sufficient to define the Physical condition (or state) of a gas is:

- a) 3
- b) 4
- c) 5
- d) 6

18) The first modern chemist, known as the father of chemistry.

- a) Jacques Charles
- b) Robert Boyle
- c) Charles Weismann
- d) Erwin Chargaff

19) _____ is understandable from the picture of a gas as consisting of a huge number of Molecules moving essentially independently of one another.

A) Boyle, s Law

B) Charles Law

c) Avogadro's Law

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D) Ideal Gas Law

20) An-----in volume causes the molecules to hit the walls more often thereby -----the pressure.

A) Increase, decrease

B) Increase, increase

C) Decrease, increase

D) Decrease, decrease

21) Robert Boyle died in:

A) 1690

B) 1691

C) 1692

D) 1693

22) The volume of a fixed amount of gas, as constant pressure, is proportional to-----.

A) Pressure

B) Volume

C) Temperature

D) Density

23) At constant temperature and pressure, the volume of a gas is directly related to the number of moles.

A) Boyle, s Law

B) Charles, Law

C) Ideal gas Law

D) Avogadro's Law

24) Equal volumes of gases at the same temperature and pressure contain equal numbers of molecules.

A) Ideal gas Law

B) Avogadro's Law

C) Charle, s Law

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D) Boyle, s Law

25) Van der Waals in-----modified the ideal-gas equation to give the van der Waals equation for Real gases:

A) 1873

B) 1874

C) 1875

D) 1876

26) Non-zero volumes of gas particles are_____:

A) Attractive

B) Repulsive

C) Collusive

D) None

27) Frequency of collision and the Force of each collision

Both factors affected by their_____:

A) Attractiveness

B) Repulsiveness

C) Collusiveness

D) None

28) Pressure term, P, in ideal gas equation becomes:

A) $[p - a (n/v)^2]$

B) $[p + a (n/v)^2]$

C) $[p - a (v/n)^2]$

D) $[p + a (v/n)^2]$

29) The equation of Boyle, s law of gas is:

A) $V/T = K$

B) $E_k = 3R/2NaT$

C) $PV = K$

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D) All of the above

30) Equal volumes of all the ideal gases at the same temperature and pressure contain equal number of-----:

A) Moles

B) Molecules

C) Both A and B

D) None

31) The volume of the given mass of a gas at constant temperature is inversely proportional to the pressure applied to the gas is the:

A) Boyle, s Law

B) Charles Law

C) Avogadro, s Law

D) Ideal gas Law

32) The value of K will remain the same for same quantity of a gas at the same:

A) Pressure

B) Volume

C) Temperature

D) Density

33) Charles law given by French scientist J.Charles in:

A) 1785

B) 1786

C) 1787

D) 1788

34) The volume of one mole of an ideal gas at STP is:

A) 273.16K

B) 22.414dm³

C) 0.0821atmL/molK

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D) 8.314kPaL/molK

35) The density of an ideal gas is directly Proportional to it's:

A) Molar mass

B) Molecular mass

C) Atomic mass

D) Molecular weight

36) Examples of state variables are:

A) Pressure

B) Volume

C) Temperature

D) All of the above

37) Define Avogadro's hypothesis.

At constant temperature and pressure, the volume of a gas is directly

Proportional to the number of moles.

$V=K_n$

38) Sir Johannes Diderik van Der Waals in----- modified the Ideal Gas Equation:

A) 1873

B) 1874

C) 1875

D) 1876

39) The temperature at and above which vapors of the substance cannot be liquefied, no matter how much pressure is applied:

A) Critical pressure

B) Critical temperature

C) Critical Volume

d) None

40) The pressure required to liquefy the gas at critical temperature is called its:

A) Critical pressure

B) Critical volume

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C) Critical temperature

D) None

41) The-----law allows us to assert the existence of temperature as a state function:

A) Zeroth law

B) First law

C) Second law

D) Third law

42) Two systems that are each found to be in thermal equilibrium with a third system will be found to be in thermal equilibrium with each other:

A) Zeroth law of thermodynamics

B) First law of thermodynamics

C) Second law of thermodynamics

D) Third law of thermodynamics

43) Which of the following is also the law of conservation of energy?

A) Zeroth law of thermodynamics

B) First law of thermodynamics

C) Second law of thermodynamics

D) Third law of thermodynamics

44) The energy change associated with a chemical reaction is the statement of:

A) Enthalpy of a reaction

B) Entropy of a reaction

C) Thermal Energy

D) Energy of a system

45) Entropy is a state function just as enthalpy:

A) $S = S_{\text{final}} - S_{\text{initial}}$

B) $S = S_{\text{final}} + S_{\text{initial}}$

C) $S = S_{\text{initial}} - S_{\text{final}}$

D) $S = S_{\text{initial}} + S_{\text{final}}$

46) The exact process by which a system reaches the final state from its initial state is-----i.e. the transition is independent of the particular path taken:

A) Immature

B) Immaterial

C) Material

D) Independent

47) Yet, real processes are:

A) Reversible

B) Irreversible

C) Both A and B

D) None

48) It is impossible to construct a device that operates in a cycle and Produces no other effects than the performance of work and the exchange of heat with a single reservoir:

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A) Clausius Statement

B) Kelvin-Planck Statement

C) Calvin Statement

D) None

49) Entropy of the universe remains unchanged in an:

A) Reversible Process

B) Irreversible Process

C) Spontaneous Process

D) Equilibrium Process

50) Third law of thermodynamics explains the behavior of -----at very low temperature:

A) Liquids

B) Solids

C) Gases

D) All of the above

51) Importance of Third law of Thermodynamics?

52) The Quantitative study of heat changes is called:

a) Thermodynamics

b) Thermochemistry

c) Thermostatics

d) All of the above

53) In order to define the thermochemical properties of a process, it is first necessary to write a -----that defines the actual change taking place:

a) Physical Property

b) Chemical property

c) Thermochemical equation

d) All of the above

54) The quantity 40.7 is known as the?

a) Enthalpy of atomization

b) Enthalpy of Vaporization

c) Enthalpy of formation

d) None

55) Thermochemical equations for reactions taking place in solution must also specify the concentrations of the-----?

a) Thermodynamic property

b) Physical property

c) Dissolved species

d) All of the above

56) -----of a compound is defined as the heat associated with the

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Formation of one mole of the compound from its elements in their standard states.

- a) Enthalpy of atomization
- b) Enthalpy of Vaporization
- c) Enthalpy of formation
- d) None

57) The standard heat of-----of a compound is always taken in reference to the forms of the elements that are most stable at 25°C and 1 atm pressure.

- a) Vaporization
- b) Atomization
- c) Formation
- d) Solution

58) Although the formation of most molecules from their elements is an?

- a) Exothermic Process
- b) Endothermic process
- c) Both A and B
- d) None

59) The standard enthalpy of formation of gaseous atoms from the element is known as the:

- a) Heat of Solution
- b) Heat of atomization
- c) Heat of vaporization
- d) None

60) The amount of heat absorbed or evolved when one mole of the compound is formed from its elements is known as:

- a) Heat of Solution
- b) Heat of atomization
- c) Heat of vaporization
- d) Heat of formation

61) Germain Henri Hess formulated his famous law in:

- a) 1802
- b) 1850
- c) 1840
- d) 1837

62) Define Hess, s law?

63) energy of C (diamond) + O₂ (g) → CO₂ (g) is_____?

- a) -393.51 kJ mol⁻¹
- b) -395.51 kJ mol⁻¹
- c) -395.40 kJ mol⁻¹
- d) -393.40 kJ mol⁻¹

64) energy of C (graphite) → C (diamond) is_____?

- (a)-393.51 kJ mol⁻¹
- (b)-395.40 kJ mol⁻¹

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(c) 1.89 kJ mol⁻¹

(d) -393.40 kJ mol⁻¹

65) The measurement of----is generally known as Calorimetry:

a) Q

b) Delta H

c) Both A and B

d) None

66) q is equal to the standard enthalpy change only when the reactants and products are both at the same temperature, normally at:

a) 15 °C

b) 25 °C

c) 35 °C

d) 45 °C

67) Define Bomb Calorimeter?

68) -----is an important tool for measuring the heat capacities of liquids and solids, as well as the heats of certain reactions.

a) Bomb calorimeter

b) Glass calorimeter

c) Ice calorimeter

d) All of the above

69) This, combined with the heat of fusion of ice, gives the quantity of heat lost by the sample as it cools to-----?

a) 0 °C

b) 25 °C

c) 50 °C

d) 75 °C

70) ----- is usually used for the accurate determination of the enthalpy of combustion for food, fuel, and other compounds.

a) Bomb calorimeter

b) Glass calorimeter

c) Ice calorimeter

d) All of the above

71) The amount of heat needed to increase the temperature of one mole of a substance by one degree is the:

a) Heat capacity

b) Molar heat capacity

c) Specific heat capacity

d) Molal heat capacity

72) The specific-----is defined as the quantity of heat energy that is necessary to raise one unit of weight (pounds or grams) with no change of temperature in the surroundings.

a) Heat capacity

b) Latent heat of atomization

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c) Latent heat of fusion

d) Latent heat of vaporization

73) Which one of the following specifies the specific latent heat quantifies the transfer of energy when a substance's state changes from a solid to a liquid or from a liquid to a solid.

a) Heat capacity

b) Latent heat of atomization

c) Latent heat of fusion

d) Latent heat of vaporization

74) Which is also used to measure of the ability of the substance to absorb heat?

a) Specific heat

b) Heat capacity

c) Both A and B

d) None

75) As the substance heats up, the average kinetic energy of the molecules----

a) Increases

b) Decreases

c) Both A and B

d) None

76) Conventional thermodynamic expression predicts that the heat capacity decreases with increasing-----?

a) Volume

b) Pressure

c) Temperature

d) Density

77) There are-----types of thermodynamics processes.

a) 2

b) 3

c) 4

d) 5

78) Define Reversible and Irreversible process?

79) Heat transfer between a reservoir and a system is an?

a) Reversible process

b) Irreversible process

c) Spontaneous process

d) Non-spontaneous process

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80) Totally reversible or simply reversible process means:

- a) Internally process
- b) Externally process
- c) Both A and B
- d) None

81) Process is one in which heat is transferred through a finite temperature.

- a) Reversible process
- b) Irreversible process
- c) Spontaneous process
- d) Non-spontaneous process

82) -----are associated with dissipating effects within the working fluid.

- a) External irreversibility
- b) Internal irreversibility
- c) Both A and B
- d) None

83) Mechanical friction occurring during a process due to some external source is an example of:

- a) External irreversibility
- b) Internal irreversibility
- c) Both A and B
- d) None

84) Which one of the following requires an input energy to precede the process?

- a) Reversible process
- b) Irreversible process
- c) Spontaneous process
- d) Non-spontaneous process

85) Which one of the following process is capable of proceeding in a given direction without needing to be driven by an outside source of energy?

- a) Reversible process
- b) Irreversible process
- c) Spontaneous process
- d) Non-spontaneous process

86) Which one of the following process will not take place unless it is “driven” by the continual input of Energy from an external source?

- a) Reversible process
- b) Irreversible process
- c) Spontaneous process
- d) Non-spontaneous process

87) -----is a reaction that absorbs energy from its surroundings.

- a) Endergonic reaction
- b) Exergonic reaction
- c) Both A and B
- d) None

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88) Define Spontaneous and Non-Spontaneous Process?

Spontaneous process is a process on its own without any outside assistance and moves from a non-equilibrium state towards an equilibrium state. It is a spontaneous process.

Non-Spontaneous is the reverse of spontaneous process. It does not take place on its own and does not occur in nature.

89) Which one of the following can proceed in both the forward and backward directions?

- a) Reversible process
- b) Irreversible process
- c) Spontaneous process
- d) Non-spontaneous process

90) Define Equilibrium constant?

Equilibrium Constant is the ratio of forward rate and backward rate constant for a reaction at given condition.

- 1) K_c is a constant for a specific reaction at a specific ____ ?
 - a) Pressure
 - b) Temperature
 - c) Rate
 - d) Both a and b
- 2) Temperature is directly proportional to ____ in equilibrium constant?
 - a) Pressure
 - b) Temperature
 - c) K_c
 - d) Rate of reaction
- 3) The reaction must be balanced with the coefficients written as the ____ values in order to get the correct value for K_c .
 - a) Highest possible integer
 - b) lowest possible integer
 - c) Natural possible integer
 - d) None

4) Difference between homogeneous equilibrium and heterogeneous equilibrium?

A homogeneous equilibrium has everything present in the same phase.

For example

conversion of sulphur dioxide to sulphur trioxide.

A heterogeneous equilibrium has things present in more than one phase.

For example

If steam is in contact with red hot carbon equilibrium will be established

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5) The equilibrium constant of concentration gives _____ for a reaction that is at equilibrium.

- a) the ratio of concentrations of reaction over reactants
- b) the ratio of concentrations of reactants over products
- c) the ratio of concentrations of products over reactants
- d) the ratio of concentrations of products over reactions

6) How equilibrium constant expression is written as K_c ?

Equilibrium constant expression is written as K_c as: If $K > 1$ then equilibrium favors products If $K < 1$ then equilibrium favors the reactants

7) What is mathematical products notice for every equilibrium constant?

The mathematical product of chemical product raised the power of coefficient is numerator

And reactants raised the power of coefficient is denominator

8) Gaseous reaction equilibria are not expressed in terms of concentration, but instead in terms of _____

- a) partial pressures
- b) Partial temperature
- c) Pressure
- d) Temperature

9) The equilibrium constant of pressure is written as _____

- 1. K_{pre}
- 2. K_t
- 3. K_p
- 4. K_c

10) Which equation is used to convert K_c to K_p ?

To convert K_c to K_p , the following equation is used:

where: $R = 0.0820575 \text{ L atm mol}^{-1} \text{ K}^{-1}$ or $8.31447 \text{ J mol}^{-1} \text{ K}^{-1}$, T = Temperature in Kelvin

$\Delta n_{gas} = \text{Moles of gas (product)} - \text{Moles of Gas (Reactant)}$

11) What are the application of equilibrium constant?

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1. The magnitude of the equilibrium constant, K , indicates the extent to which a reaction will proceed

2. Predicting the Direction of a Reaction

If $Q = K_c$, then the system is already at equilibrium

If $Q > K_c$, then essentially we have too much product and the reaction will proceed to the left

3. Calculation of the Equilibrium Concentration of a Reactant or Product

4. Solving equilibrium concentrations of all components in a reaction

12) the enthalpy of the system minus the product of the temperature times the entropy of the system is called?

a) Gibbs free energy

b) Delta free energy

c) Delta heat

d) System energy

13) $G = ?$

a) $\Delta H - \Delta(TS)$

b) $H - TS$

c) $\Delta H - \Delta S$

d) $\Delta H - \Delta T$

14) $\Delta G = ?$

a) $\Delta H - \Delta S$

b) $\Delta H - \Delta(TS)$

c) $\Delta G - \Delta H$

d) $\Delta H - \Delta T$

15) standard-state free energy of reaction is _____?

a) ΔG°

b) ΔH°

c) ΔS°

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d) ΔT_o

16) $\Delta G =$

a) $Gibseq$

b) $RTGibs$

c) $EqRT$

d) $RT\ln K$

17) $\Delta G_o = - R T \ln K$

$\Delta G_o + R T \ln K = 0$

$\Delta G = 0.$

18) What happened when delta G is positive, negative and zero?

When ΔG is positive, the reverse reaction is spontaneous.

When ΔG is negative, the forward reaction is spontaneous.

When ΔG is zero, the system has reached an equilibrium state.

19) The Gibbs-Helmholtz equation was first deduced by the German physicist ____?

a) Gibbs-Helmholtz

b) Robert-Helmholtz

c) Gibbd-von-Helmholts

d) Hermann von Helmholtz

20) The Gibbs-Helmholtz equation provides information about the _____ of the Gibbs free energy

a) Temperature Independence

b) temperature dependence

c) pressure dependence

d) Pressure independence

21) What is Gibbs-Helmholtz equation?

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22) Fugacity Measures Nonideality of

- a) Gas
- b) Liquid
- c) Solid
- d) All of these

23) The pressures of an _____ is equivalent when the chemical potential is the same

- a) ideal gas
- b) real gas
- c) Non ideal gas

d) Both a and b

24) If _____ In this case, the ratio of products to reactants is less than that for the system at equilibrium.

- a) $K > Q$
- b) $Q < K$
- c) $K > K$
- d) $Q < Q$

25) What is Van't Hoff Equation? No option

$$\frac{d \ln K}{dT} = \frac{\Delta H}{RT^2}$$

Ans is.....

26) From the van't Hoff equation, we see that at constant _____, a plot with $\ln K_{eq}$ on the y-axis and $1/T$ on the x-axis has a slope given by $-\Delta H / R$.

- a) Temperature
- b) Pressure
- c) Heat
- d) Equilibrium

27) For an endothermic reaction, the slope is negative and so as the temperature _____, the equilibrium constant _____

- a) Increases, decrease
- b) Decrease, decrease
- c) Decrease, increases
- d) Increases, increases

28) Define Le Chatelier's Principle?

Le Châtelier's principle states that if the system is changed in a way that increases the concentration of one of the reacting species, it must favor the reaction in which that species is consumed.

29) Which of the following is a condition of a chemical reaction at equilibrium?

- a) changing the concentration of one of the components of the reaction

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- b) changing the pressure on the system
c) changing the temperature at which the reaction is run
d) All of these
- 30) the reaction quotient is represented by which of the following symbol?
a) K_c
b) K_p
c) K_t
d) Q_c
- 31) Which of the following equation is referred to increasing the concentration?
a) $C + 2D \rightleftharpoons A + B$
b) $A + 2B \rightleftharpoons C + D$
c) $A + B \rightleftharpoons C + D$
d) $B + 2B \rightleftharpoons C + C$
- 32) This only applies to reactions involving gases, although not necessarily all species in the reaction need to be in the gas phase
a) Le Chatelier's Principle
b) Van't Hoff principle
c) Gibbs-Helmholtz principle
d) Both c and b
- 33) According to the Le Chatelier principle Pressure is caused by _____ hitting the sides of their container.
a) gas molecules
b) solid molecules
c) liquid molecules
d) all of these
- 34) when Adding products it makes _____
a) Q_c smaller than K_c
b) Q_c greater than K_c
c) K_c greater than Q_c
d) K_c smaller than Q_c
- 35) When volume is _____ the change occurs in the direction that produces more moles of gas.
a) Increased
b) Decreased
c) Stops
d) Fast
- 36) The Quantitative study of heat changes is called:
a) Thermodynamics
b) Thermochemistry
c) Thermostatics
d) All of the above
- 37) In order to define the thermo chemical properties of a process, it is first necessary to write a _____ that defines the actual change taking place:
a) Physical Property

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- b) Chemical property
c) Thermo chemical equation
d) All of the above
- 38) The quantity 40.7 is known as the?
a) Enthalpy of atomization
b) Enthalpy of Vaporization
c) Enthalpy of formation
d) None
- 39) Thermo chemical equations for reactions taking place in solution must also specify the concentrations of the-----?
a) Thermodynamic property
b) Physical property
c) Dissolved species
d) All of the above
- 40) -----of a compound is defined as the heat associated with the Formation of one mole of the compound from its elements in their standard states.
a) Enthalpy of atomization
b) Enthalpy of Vaporization
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d) None
- 41) The standard heat of-----of a compound is always taken in reference to the forms of the elements that are most stable at 25°C and 1 atm pressure.
a) Vaporization
b) Atomization
c) Formation
d) Solution
- 42) Although the formation of most molecules from their elements is an?
a) Exothermic Process
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- 43) The standard enthalpy of formation of gaseous atoms from the element is known as the:
a) Heat of Solution
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- 44) The amount of heat absorbed or evolved when one mole of the compound is formed from its elements is known as:
a) Heat of Solution
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c) Heat of vaporization
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- 45) Germain Henri Hess formulated his famous law in:
a) 1802
b) 1850
c) 1840
d) 1837
- 46) Define Hess, s law?
 $\text{C (diamond)} + \text{O}_2 (\text{g}) \rightarrow \text{CO}_2 (\text{g}):$
a) $-393.51 \text{ kJ mol}^{-1}$
b) $-395.51 \text{ kJ mol}^{-1}$
c) $-395.40 \text{ kJ mol}^{-1}$
d) $-393.40 \text{ kJ mol}^{-1}$
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(b) $-395.40 \text{ kJ mol}^{-1}$
(c) 1.89 kJ mol^{-1}
(d) $-393.40 \text{ kJ mol}^{-1}$
- 48) The measurement of-----is generally known as Calorimetry:
a) Q
b) Delta H
c) Both A and B
d) None
- 49) q is equal to the standard enthalpy change only when the reactants and products are both at the same temperature, normally at
a) 15°C
b) 25°C
c) 35°C
d) 45°C
- 50) Define Bomb Calorimeter?
- 51) -----is an important tool for measuring the heat capacities of liquids and solids, as well as the heats of certain reactions.
a) Bomb calorimeter
b) Glass calorimeter
c) Ice calorimeter
d) All of the above
- 52) This, combined with the heat of fusion of ice, gives the quantity of heat lost by the sample as it cools to-----?
a) 0°C
b) 25°C
c) 50°C
d) 75°C
- 53) ----- is usually used for the accurate determination of the enthalpy of combustion for food, fuel, and other compounds.
a) Bomb calorimeter

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- b) Glass calorimeter
c) Ice calorimeter
d) All of the above
- 54) The amount of heat needed to increase the temperature of one mole of a substance by one degree is the:
a) Heat capacity
b) Molar heat capacity
c) Specific heat capacity
d) Molal heat capacity
- 55) The specific-----is defined as the quantity of heat energy that is necessary to raise one unit of weight (pounds or grams) with no change of temperature in the surroundings.
a) Heat capacity
b) Latent heat of atomization
c) Latent heat of fusion
d) Latent heat of vaporization
- 56) Which one of the following specifies the specific latent heat quantifies the transfer of energy when a substance's state changes from a solid to a liquid or from a liquid to a solid.
a) Heat capacity
b) Latent heat of atomization
c) Latent heat of fusion
d) Latent heat of vaporization
- 57) Sir Johannes Diderik van Der Waals in----- modified the Ideal Gas Equation:
A) 1873
B) 1874
C) 1875
D) 1876
- 58) The temperature at and above which vapors of the substance cannot be liquefied, no matter how much pressure is applied:
A) Critical pressure
B) Critical temperature
C) Critical Volume
d) None
- 59) The pressure required to liquefy the gas at critical temperature is called its:
A) Critical pressure
B) Critical volume
C) Critical temperature
D) None
- 60) The-----law allows us to assert the existence of temperature as a state function:
A) Zeroth law
B) First law

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- C) Second law
D) Third law
- 61) Two systems that are each found to be in thermal equilibrium with a third system will be found to be in thermal equilibrium with each other:
A) Zeroth law of thermodynamics
B) First law of thermodynamics
C) Second law of thermodynamics
D) Third law of thermodynamics
- 62) Which of the following is also the law of conservation of energy?
A) Zeroth law of thermodynamics
B) First law of thermodynamics
C) Second law of thermodynamics
D) Third law of thermodynamics
- 63) The energy change associated with a chemical reaction is the statement of:
A) Enthalpy of a reaction
B) Entropy of a reaction
C) Thermal Energy
D) Energy of a system
- 64) Entropy is a state function just as enthalpy:
A) $\Delta S = S_{\text{final}} - S_{\text{initial}}$
B) $\Delta S = S_{\text{final}} + S_{\text{initial}}$
C) $\Delta S = S_{\text{initial}} - S_{\text{final}}$
D) $\Delta S = S_{\text{initial}} + S_{\text{final}}$
- 65) The exact process by which a system reaches the final state from its initial state is---
-----i.e. the transition is independent of the particular path taken:
A) Immature
B) Immaterial
C) Material
D) Independent
- 66) Yet, real processes are:
A) Reversible
B) Irreversible
C) Both A and B
D) None
- 67) It is impossible to construct a device that operates in a cycle and
Produces no other effects than the performance of work and the exchange of heat
with a single reservoir:
A) Clausius Statement
B) Kelvin-Planck Statement
C) Calvin Statement
D) None
- 68) Entropy of the universe remains unchanged in an:
A) Reversible Process

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- B) Irreversible Process
C) Spontaneous Process
D) Equilibrium Process
- 69) Third law of thermodynamics explains the behavior of -----at very low temperature:
A) Liquids
B) Solids
C) Gases
D) All of the above
- 70) Sir Johannes Diderik van Der Waals in----- modified the Ideal Gas Equation:
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 - C) Spontaneous Process
 - D) Equilibrium Process
- 81) Third law of thermodynamics explains the behavior of -----at very low
temperature:
- A) Liquids
 - B) Solids
 - C) Gases
 - D) All of the above
- 82) The Quantitative study of heat changes is called:
- a) Thermodynamics
 - b) Thermochemistry
 - c) Thermostatics
 - d) All of the above
- 83) In order to define the thermo chemical properties of a process, it is first necessary to
write a -----that defines the actual change taking place:

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- a) Physical Property
b) Chemical property
c) Thermochemical equation
d) All of the above
- 84) The quantity 40.7 is known as the?
a) Enthalpy of atomization
b) Enthalpy of Vaporization
c) Enthalpy of formation
d) None
- 85) Thermochemical equations for reactions taking place in solution must also specify the concentrations of the-----?
a) Thermodynamic property
b) Physical property
c) Dissolved species
d) All of the above
- 86) -----of a compound is defined as the heat associated with the Formation of one mole of the compound from its elements in their standard states.
a) Enthalpy of atomization
b) Enthalpy of Vaporization
c) Enthalpy of formation
d) None
- 87) A large number of experiments have determined that---- variables are sufficient to define the Physical condition (or state) of a gas is:
A) 3
B) 4
C) 5
D) 6
- 88) the first modern chemist, known as the father of chemistry.
A) Jacques Charles
B) Robert Boyle
c) Charles Weismann
D) Erwin Chargaff
- 89) -----is understandable from the picture of a gas as consisting of a huge number of Molecules moving essentially independently of one another.
A) Boyle, s Law
B) Charles Law
c) Avogadro's Law
D) Ideal Gas Law
- 90) An-----in volume causes the molecules to hit the walls more often thereby -----the pressure.
A) Increase, decrease
B) Increase, increase
C) Decrease, increase

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- D) Decrease, decrease
- 91) Robert Boyle died in:
- A) 1690
 - B) 1691**
 - C) 1692
 - D) 1693
- 92) The volume of a fixed amount of gas, at constant pressure, is proportional to-----
- A) Pressure
 - B) Volume
 - C) Temperature**
 - D) Density
- 93) At constant temperature and pressure, the volume of a gas is directly related to the number of moles.
- A) Boyle, s Law
 - B) Charles, Law
 - C) Ideal gas Law
 - D) Avogadro's Law**
- 184) Equal volumes of gases at the same temperature and pressure contain equal numbers of molecules.
- A) Ideal gas Law
 - B) Avogadro's Law**
 - C) Charles, s Law
 - D) Boyle, s Law
- 185) Van der Waals in-----modified the ideal-gas equation to give the van der Waals equation for Real gases:
- A) 1873**
 - B) 1874
 - C) 1875
 - D) 1876
- 186) Non-zero volumes of gas particles are:
- A) Attractive
 - B) Repulsive**
 - C) Collusive
 - D) None
- 187) Frequency of collision and the Force of each collision Both factors affected by their:
- A) Attractive**
 - B) Repulsive
 - C) Collusive

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- D) None
- 188) Pressure term, P , in ideal gas equation becomes:
A) $[p-a (n/v)^2]$
B) $[p+a (n/v)^2]$
C) $[p-a (v/n)^2]$
D) $[p+a (v/n)^2]$
- 189) The equation of Boyle, s law of gas is:
A) $V/T=K$
B) $E_k=3R/2NaT$
C) $PV=K'$
D) All of the above
- 190) Equal volumes of all the ideal gases at the same temperature and pressure contain equal number of-----:
A) Moles
B) Molecules
C) Both A and B
D) None
- 191) The volume of the given mass of a gas at constant temperature is inversely proportional to the pressure applied to the gas is the:
A) Boyle, s Law
B) Charles Law
C) Avogadro, s Law
D) Ideal gas Law
- 192) The value of K will remain the same for same quantity of a gas at the same:
A) Pressure
B) Volume
C) Temperature
D) Density
- 193) Charles law given by French scientist J.Charles in:
A) 1785
B) 1786
C) 1787
D) 1788
- 194) The volume of one mole of an ideal gas at STP is:
A) 273.16K
B) 22.414dm³
C) 0.0821atmL/molK
D) 8.314kPaL/molK
- 195) The density of an ideal gas is directly Proportional to it's:
A) Molar mass
B) Molecular mass
C) Atomic mass

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- D) Molecular weight
- 196) Examples of state variables are:
- A) Pressure
 - B) Volume
 - C) Temperature
 - D) All of the above
- 197) Which is the study of the underlying physical principle that govern the properties and behavior of chemical system?
- a) Physical chemistry
 - b) Organic chemistry
 - c) Inorganic chemistry
 - d) Analytic Chemistry
- 198) Chemical system can be studied from a is based on the concept of molecules?
- A) Macroscopic
 - B) Microscopic point
 - C) a and b
 - D) None
- 199) Thermodynamic is a word?
- A) Latin
 - B) Greek
 - C) British
 - D) None
- 200) Dynamic mean.....?
- A) Heat
 - B) Cool down
 - C) Power
 - D) Energy
- 201) A key property in thermodynamic is.....?
- A) Energy
 - B) Water
 - C) Temperature
 - D) All of these
- 202) Irreversible thermodynamic deals with.....system and rare process?
- A) Equilibrium
 - B) Non – Equilibrium
 - C) Temperature
 - D) Energy
- 203) The part of universe in thermodynamic is called?
- A) Equilibrium
 - B) Non – equilibrium thermodynamics
 - C) System
 - D) Basic unit of thermodynamics

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- 204) Physical chemistry is the study of the underlying physical principles that govern ____ of chemical systems:
a) properties
b) behavior
c) studies
d) all of these
- 205) Equilibrium thermodynamics deals _____ in equilibrium
a) With systems
b) With space
c) With surrounding
d) Both a and c
- 206) _____ occur in equilibrium when its macroscopic properties remain constant with time
a) An isolated system
b) Non-isolated system
c) Non-equilibrium system
d) Thermodynamic system
- 207) If condition (A) holds but (B) does not hold, the system is in ____
a) steady state
b) equilibrium
c) non equilibrium
d) reversible state
- 208) _____ occurs between a system and its surroundings
a) Mechanical Equilibrium
b) Material Equilibrium
c) Thermal Equilibrium
d) Reversible equilibrium
- 209) For thermodynamic equilibrium _____ kinds of equilibrium must be present
a) One
b) Two
c) Three
d) four
- 210) Volume of Intensive thermodynamic property value does not depend on the.....?
A) Size
B) Water
C) Energy
D) Temperature
- 211) If microscopic property is constant throughout the system, the system is.....?
A) Heterogeneous
B) Homogenous
C) Homogeneous

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- D) All of these
- 212) A homogenous parts of the system is called?
A) Thermodynamic property
B) Phase
C) Thermodynamic state
d) None
- 213) A system consist of two are morephases?
A) Homogenous
B) Heterogeneous
C) Homogeneous
D) None
- 214) Thermal equilibrium have.....temperature?
a) Same
B) Different
C) Equal
d) Same and different
- 215) The magnitude of perpendicular force per unit area exerted by the system on its surrounding called?
A) Gravitational Force
B) Pressure
C) Temperature
D) Equilibrium
- 216) If external.....fields act on the system?
A) Electric
B) Magnetic
C) A and B
D) Thermal
- 217) The standard used in.....?
A) 1960
B) 1961
C) 1962
D) 1963
- 218) The ratio of the average mass of a molecule of the substances totimes?
A) $\frac{1}{2}$
B) $\frac{1}{11}$
C) $\frac{1}{12}$
D) $\frac{1}{13}$
- 219) The number of ^{12}C atoms is exactly?
A) 10g
B) 11g

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C) 12g

D) 13g

220) Define surface tension?

The magnitude of the force that controlled that controlled the shape of the liquid is called surface tension.

221) The force act on the liquid in the form of the surface tension is th

A) unidirectional

B) multidirectional

C) All directional

D) A and B

222) : Change in shape of a liquid due to surface tension is by the imbalance of

A: Cohesive forces

B: Attractive forces

C: Intermolecular forces

D: All

223) During the surface tension of the water molecules the energy states that

A: Interior molecules get lower energy then that of exterior

B: Interior molecules get higher energy then that of exterior

C: Exterior molecules get lower energy then that of exterior

D: Exterior molecules get higher energy then that of exterior

224) What is the term viscosity mean?

Water has cary

Low viscosity

High viscosity

low viscosity then honey

A and C

225) Viscosity is also termed as

A: friction of fluid molecules

B: interaction

C: hinderence

D: All

226) Name the apparatus to measure the viscosity?

Ostwald viscometer

227) The ostwald Viscometer consist of

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- A: Reservoir bulbs
B: Solid tank
C: capillary tubes a
D: A and C
- 228) To calculate the viscosity equation????
 $\nu = KT$
K= is termed as viscosity
T=time of the test liquid
- 229) what is refractive index??
- 230) The refractive index can be measured by the
A: angle of refraction
B: angle of defraction
C: angle of incidence
D: A and C
- 231) The factor affect on the refractive index
A: Area
B: wavelength
C: Temprature
D: Surface tension
E: B and C
- 232) The tempretature become higher then the liquid become
A: Denser
B: less denser
C: high denser
D: less viscous
E: Both B and D
- 233) The sodium D have wavelength
A: 566 nm
B: 598 nm
C: 798 nm
- 234) When atom of a molecule shared in an electron is called a
A: Viscosity
B: surface tension
C: Dipole moment
D: A and B
- 235) The Dipole moment is the measure of the
A: net polarity

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- B: magnitude of charge
C: distance between charges
D: all
- 236) _____ larger the difference of electronegativities of bonds of atom in
A: larger the dipole moment
B: smaller the dipole moment
C: higher the dipole moment
- 237) _____ molecular dipole moment occurs due to
A: attraction of charges
B: interaction
C: sharing of electron
D: A and C
E: A and B
- 238) _____ Water is a universal solvent due to its
A: Bondings of atom
B: non polar
C: polarity
D: less viscosity
- 239) _____ Water molecules create a strong dipole from which angle
A: 105.5
B: 104.5
C: 106.5
D: 102.5
- 240) _____ Colligative properties are the physical change that result from adding
A: Solvent to a solute
B: Solute to a solvent
C: Solution to a solute
D: a and B
- 241) _____ Colligative property depends on
A: concentration of solute
B: concentration of solvent
C: concentration of solution
- 242) _____ Example of colligative properties is
A: vapour pressure
B: freezing point
C: Boiling point

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D: all

243) Who was 1st described the analogous property

A; Charls

B: leeivan Hook

C: Jacobus vaa'nt Hoff

D: Krick

244) Define ideal solution?

245) The ideal solution r ideal solution of mixture have enthalpy

A: zero enthalpy

B: one enthalpy

C: decrease enthalpy

D: increase enthalpy

246) Henry law formulated by the

A: William

B: Krick

C: William Henry

D: j. Henry

247) As the Henry Law stated "the amount of given gas that dissolved in a given type of solution and a volume of liquid is directly propotional to the

A: Temperature of liquid

B: pressure

C: Partial pressure

D: All

248) Mention the equation pf Henry Law

No option

249) Non ideal behaviour of the vapour pressure of a solution follows the Henry law at

A: at high concentration

B: at low concentration

C: at atmospheric pressure

D: A and C

250) Henry Law only works if the molecules are

A: at equilibrium

B; Non-equilibrium

C: both

D: at constant

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- 251) Define electrolyte solution?
No option
7c
- 252) For an ionic compound formed a solution the concentration of ion dipole and inter ionic
A: Ion dipole forces >inter ionic
B: Ion dipole forces <inter ionic
C: Ion dipole forces =inter ionic
- 253) The reaction at which energy can be absorbed
A: endothermic
B: Exothermic
C: Constant
D: Enthalpy
- 254) The enthalpy of the solution is depend on the
A: intermolecular forces of solute
B: intermolecular forces of solute and solvent
C: intermolecular forces of solvent
D: intermolecular forces between ions
- 255) The becomes ideal when its
A: Enthalpy is 0
B: solute-solute attraction becomes 0
C: solvent-solvent attraction becomes 0
D: all
- 256) The inter ionic attraction discovered from which theory
A: Dalton's theory
B: Arrhenious theory
C: Einstein's theory
D: all
- 257) "ions exist in a solid substance and dissociated from each other once the solid dissolved" is the theory of
A: Dalton's theory
B: Arrhenious theory
C: Einstein's theory
D: all
- 258) The theory of electrolytes is brought in

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A:1923

B:1924

C:1925

D:1027

259) The anions of the solution could be completely surrounded by
th

A: cations

B:anions

C:positive ions

D:negative ions

E: A and C

260) Concentration are often expressed in

A: units

B: base units

C:relative unita

D: percentage

E:C and D

261) The volume percent is used to express the concentration of a solution when the volume of a solute and the volume of a solution is in percentage is called

A:Mass percentage

B:Volume percentage

C: Ratio percentage

D:all