"Dissemination of Education for Knowledge, Science and Culture"

- **Shikshanmaharshi Dr. Bapuji Salunkhe**

Shri Swami Vivekanand Shikshan Sanstha Kolhapur's

RAJE RAMRAO MAHAVIDYALAYA, JATH

Dist- Sangli (Maharashtra) 416 404

UGC Recognition under 2F & 12 (B) UGC Act 1956

(Affiliated to Shivaji University, Kolhapur)

NAAC Reaccrediated : "B" (Third Cycle)

Department of Chemistry

B. Sc. I Sem. - II Paper No. III (Physical Chemistry)

Question bank

Q. 1 Choose the most correct alternative and rewrite the sentence.

1) Bond energy is also known as bond ……. Energy

A. dissociation B. association C. formation D. none of these

2) In endothermic reaction the enthalpy of products is …….enthalpy

A. less than B. greater than C. equal to D. much less than

3) In isochoric process …….

A. $\Delta P = 0$ B. $\Delta H = 0$ C. $\Delta V = 0$ D. none of these

4) The velocity constant of second order reaction depends on the …….of concentration.

A. values B. change C. units D. none of these

5) Inversion of cane sugar is an example of …….. reaction.

A. first order B. second order

C. third order D. Pseudo unimolecular

6) The rate of a reaction depends on ……

A. temperature B. pressure C. concentration D. all of these

7) The velocity of the reaction when the concentrations of all the reactants are unity is known as ……

A. velocity constant B. velocity coefficient

C. specific reaction rate D. all of these

8) In all simple reaction, the rate of reaction ….. with increase in concentration of reactants.

A. increases B. decrease

C. remains same D. none of these

9) The quantity of a given substance which undergoes change in unit time is known as …….

A. rate of the reaction B. velocity of the reaction

C. both a & b D. none of these

10) The rate of second order reaction is directly proportional to the product of concentration of …… reactants.

A. two B. three C. four D. Five

11) Rate of reaction affects by.....

A. concentration of reactants. B. temperature

C. catalyst. D. All of these

12) The unit of first order rate constant are.....

A. dm3 mol-1 sec-1. B. dm3 mol-1. C) sec-1. D) sec

13) The order of reaction whose rate is expressed as, dx/dt = k[A]1/2 [B]3/2 is.....

A. 1 B. 3/2. C. 4 D. 2

14) The standard state of a substance is the most stable of the substance at one atmosphere pressure and at a temperature.....

A. 273 degree. B. 0 Kelvin C. 273 Kelvin D. 298 Kelvin

15) The entropy of a perfectly crystalline substance is..... at zero Kelvin.

A. zero B. negative. C. infinite D. positive

16) In adiabatic process, …….

A. q= W B. q≠1 C. q=0 D. q=1

17) No machine has…… efficiency.

A. 50% B.100% C.10% D. 20%

18) Sink represents…….. reservoir.

A. hot B. cold C. sink D. all of these

19)In cyclic process, change in each state function is……..

A. zero B. one C. two D. three

20) Which of the following equation is not correct ?

A. $\Delta H = \Delta E + P\Delta V$ B.H = E + PV C. $\Delta H = H_1 - H_2$ D. $\Delta H = \Delta E - P\Delta V$

21) Bond energy is also known as bond ……. Energy

A. dissociation B. association C. formation D. none of these

22) In endothermic reaction the enthalpy of products is …….enthalpy

A. less than B. greater than C. equal to D. much less than

23) The velocity constant of second order reaction depends on the …….of concentration.

A. values B. change C. units D. none of these

24) Inversion of cane sugar is an example of …….. reaction.

A. first order B. second order

C. third order D. pseudounimolecular

25) The rate of a reaction depends on ……

A. temperature B. pressure C. concentration D. all of these

26) In all simple reaction, the rate of reaction ….. with increase in concentration of reactants.

A. increases B. decrease

C. remains same D. none of these

27) The quantity of a given substance which undergoes change in unit time is known as …….

A. rate of the reaction B. velocity of the reaction

C. both a & b D. none of these

28)The rate of second order reaction is directly proportional to the product of concentration of …… reactants.

A. two B. three C. four D. five

29) If the concentration unit for first order reaction are increased by X time, then rate constant , K will be…..

A. k B.k.x C. k/x D. k+x

30) Velocity constant k of second order reaction is expressed in ……..

A. mol. Lit^{-1} s^{-1} B. dm_3 . $mole.^{-1}$ s^{-1} C. $lit.^{-1}ole.^{-1}$ s^{-1} D.all of these

31) While studying the distribution law…….

A. the temperature should be constant throughout

B. there should be no association or dissociation of the solute

C. the concentration of the solute in solvents

D. all of the above

32) If a mixture of gases is in contact with a liquid, the partial pressure of the individual gas determines the mass of each gas dissolving i.e., the solubility of each gas is proportional to its ……

A. total pressure B. concentration of the liquid

C. partial pressure D. Temperature

33) In liquid-liquid chromatography technique, the component with ……. distribution coefficient is extracted first

A. lower B. higher C. intermediate D. none of these

34) The Nernst's distribution law does not hold good if……

A. the temperature throughout the experiment is not constant

B. concentrations of the solute in two solvents are high

C. there is association or dissociation of the solute in one of the solvents
D. all of the above

35) When a bottle of soda-water is opened, the partial pressure of CO2…….
A. decreases B. increases C. remains the same D. none of these

36) The change from liquid to solid, or the reverse of melting, is called…….
A. condensation B.boiling C. sublimation D. freezing

37) Boyle's law states that for a fixed amount of gas at a constant
A. pressure, the volume increases as the temperature decreases.
B. temperature, the volume increases as the pressure increases.
C. temperature, the volume decreases as the pressure increases.
D. pressure, the volume decreases as the temperature increases.

38) According to Charles's law, when the temperature of a gas increases at constant pressure, its
A.volume increases B. mass increases
C.volume decreases D. particles move more slowly.

39) The greater the speed of gas particles in a container, the……
A. fewer collisions there will be B.lower the temperature.
C. greater the pressure D.lower the pressure.

40) During the process of sublimation,…….
A. a solid turns directly into a gas B. a solid turns into a liquid
. C. a gas turns directly into a solid D. a liquid turns into a gas.

41) A radioisotope of argon, ^{35}Ar, lies below the "band of stability: (n/p ratio too low). One would predict that it decays via _____.
A. neutron emission B. beta emission C. positron emission D. alpha emission

42) A positron has a mass number of _____, a charge of _____, and a mass equal to that of a(an) _____.
A. 0, 1+, proton B. 1, 2+, proton C. 0, 1+, electron D. 1, 2+, electron

43) The "magic numbers" for atoms are
A. numbers of electrons that confer atomic stability.
B. numbers of protons and/or neutrons that confer nuclear stability.
C. n/p ratios that confer nuclear stability.
D.atomic masses that confer nuclear stability.

44) A Geiger-Muller tube is a ……..

A. gas ionization detector B. cloud chamber
C. fluorescence detector D. spectrophotometer

45) Emission of which one of the following leaves both atomic number and mass number unchanged?
A. positron B. neutron C. alpha particle D. gamma radiation

46) In adiabatic process, …….
A. q= W B. q≠1 C. q=0 D. q=1

47) No machine has…… efficiency.
A. 50% B.100% C.10% D. 20%

48) Sink represents…….. reservoir.
A. hot B. cold C. sink D. all of these

49) In cyclic process, change in each state function is……..
A. zero B. one C. two D. Three

50) Which of the following equation is not correct ?
A. $\Delta H = \Delta E + P\Delta V$ B.H = E + PV C. $\Delta H = H_1 - H_2$ D. $\Delta H = \Delta E - P\Delta V$

Q2. Long answer type questions

1. What is thermodynamics? Explain any FOUR basic terms involved in thermodynamics.
2. Give the statements with examples of First law, Second law and Third law of thermodynamics.
3. Explain the variation of enthalpy of a reaction with temperature.
4. Explain the thermodynamics parameters, free energy change (ΔG) and standard free energy change (ΔG^0) in a chemical reaction.
5. Derive the thermodynamically the law of chemical equilibrium.
6. Derive the relations between critical constants and constants of van der Waal's equation.
7. Derive the equation for rate constant of a second order reaction with equal concentrations of reactants.
8. Explain in brief Characteristics of first or second order reactions.
9. What are pseudounimolecular reactions? Explain with suitable examples.
10. Discuss in detail, order and molecularity of a reaction.

Q3. Short answer type questions

1. What is thermodynamics? how is it related to energy and work.
2. What are thermodynamic variables and change of state
3. give the statement of first law second law and third law of thermodynamics

4. Distinguish between spontaneous and nonspontaneous process
5. Write a short note on second law of thermodynamics
6. What is carnot cycle how is it represented by indicator diagram
7. Explain in brief efficiency of carner cycle
8. Give the characteristic of chemical equilibrium
9. Explain the effect of catalyst and inert gas on a state of equilibrium
10. What is kinetic theory of gases how is it formalted
11. What are different states of matter give the various properties of gases state
12. Explain Kinetic study of inversion of king sugar
13. Distinguish between order and molarity of a reaction
14. Give the examples of first and second order reactions
15. Define second order reaction give in its of velocity constant of a second order reaction
16. You brief account of the units of velocity and velocity constant
17. So that for first order reaction the value of velocity constant is independent of units of concentration
18. Explain the term temperature Coefficient or energy of activation
19. Explain in short velocity of chemical reaction
20. .How will you confirm a first order reaction by graphical method