

M.SC. I SEM-I, PHYSICAL CHEMISTRY- PSCH 101

SAMPLE QUESTIONS_

1) Thermodynamics properties like pressure temperature and volume depend on initial and final state of the system and not the path followed used to carry out the changes, so these are ----

- a) State function
- b) Path function
- c) Eigen function
- d) None

2) Which of the following is not the intensive property?

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

3) The entropy change in reversible process is _____.

- a) Infinite
- b) One
- c) Zero
- d) Negative

4) Work done in a free expansion process is-----

- a) + ve
- b) - ve
- c) Zero
- d) Maximum

5) Which of the following laws was formulated by Nernst?

- a) First law of thermodynamics
- b) Second law of thermodynamics
- c) Third law of thermodynamics
- d) None of the above

6) The temperature above which a gas heats up upon expansion is called inversion temperature. Its value is -----

- a) $\frac{Rb}{2a}$
- b) $\frac{Rb}{3a}$
- c) $\frac{Rb}{4a}$
- d) $\frac{Rb}{5a}$

7) In Maxwell equations one equation is $-\left(\frac{\delta S}{\delta P}\right)_T = \text{-----}$

a) $\left(\frac{\delta V}{\delta T}\right)_P$

b) $\left(\frac{\delta P}{\delta T}\right)_V$

c) $\left(\frac{\delta V}{\delta S}\right)_P$

d) $\left(\frac{\delta P}{\delta S}\right)_V$

8) What is the value of Joule-Thomson co-efficient for an ideal gas?-----

a) + ve

b) - ve

c) 0

d) ∞

9) The normalized wave function must have _____ norm

(a) Infinite

(b) Zero

(c) finite

(d) Complex

10) Force acting on the pendulum is proportional to _____

(a) Velocity

(b) Displacement

(c) Time

(d) Acceleration

11) The intensity of the diffraction pattern is proportional to _____ of the wave function

(a) Forth power

(b) Cube

(c) Sixth power

(d) Square

12) Eigen values of a self adjoining operator is _____

- (a) Always 0
- (b) Infinite
- (c) Real
- (d) imaginary

13) According to the wave function and its first partial derivative should be _____ functions for all values of

- (a) Zero
- (b) Continuous
- (c) Infinity
- (d) discontinuous

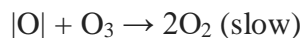
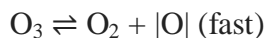
14) _____ principle states that the actual path taken by the light ray is one which minimizes the integral

- (a) Heisenberg
- (b) Hamilton's
- (c) Maupertuis'
- (d) Fermat's

15) If the particle moving in a _____ potential then the solution of the wave equation are describe as a stationary states

- (a) Time independent
- (b) Time dependent
- (c) Velocity dependent
- (d) Velocity independent

16) The chemical reaction, $2\text{O}_3 \rightarrow 3\text{O}_2$ proceeds as-----



The rate law expression will be

- (a) Rate = $k [\text{O}] [\text{O}_3]$
- (b) Rate = $k [\text{O}_3]^2 [\text{O}_2]^{-1}$

- (c) Rate = $k [O_3]^2$
(d) Rate = $k [O_2] [O]$

17) If the rate of a reaction is expressed by, rate = $A [A]^2 [B]$, the order of reaction will be-----

- (a) 2
(b) 3
(c) 1
(d) 0

18) For a unimolecular reaction-----

- (a) the order and molecularity of the slowest step are equal to one
(b) molecularity of the reaction can be zero, one or two
(c) molecularity of the reaction can be determined only experimentally
(d) more than one reacting species are involved in one step

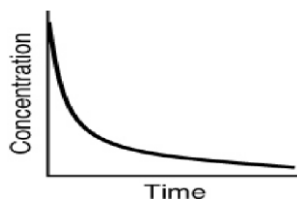
19) In the combustion of methane, $CH_4(g) + 2 O_2(g) \rightarrow CO_2(g) + 2 H_2O(g)$, which reactant has the greatest rate of disappearance?-----

- (a). CH_4
(b) O_2
(c) CO_2
(d.) H_2O

20). Assuming that each of the following graphs has the same concentration and time axes,

Which has the greatest initial rate of disappearance of reactant?

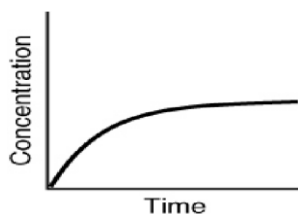
a)



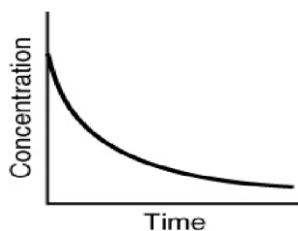
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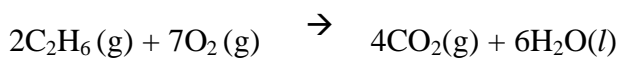
c)



d)



21). The combustion of ethane (C_2H_6) is represented by the equation:



In this reaction: -----

- (a) The rate of consumption of ethane is seven times faster than the rate of consumption of oxygen.
- (b) Water is formed at a rate equal to two-thirds the rate of formation of CO_2 .
- (c) The rate of consumption of oxygen equals the rate of consumption of water.
- (d) CO_2 is formed twice as fast as ethane is consumed.

22). Which statement is false? -----

- (a) If a reaction is thermodynamically spontaneous it may occur slowly.
- (b) Activation energy is a kinetic quantity rather than a thermodynamic quantity.
- (c) If a reaction is thermodynamically nonspontaneous, it will not occur spontaneously.
- (d) If a reaction is thermodynamically spontaneous, it must have a low activation energy.

- 23). An explosion is _____
- A rapid expansion in volume associated with an extremely vigorous outward release of energy
 - A rapid expansion in mass, usually with low temperature
 - The generation of heat in small quantities
 - The reversible process in combustion
- 24) The resistance of the conductor in the electrolytic cell _____ with an increase in temperature.
- Increase
 - Decrease
 - Slightly increase
 - Do no change
- 25) Which of the following are the strong electrolytes? -----
- HCl
 - Acetic acid
 - Propinoic acid
 - H_2SO_3
- 26) The degree of ionisation is given by _____
- $\alpha = \lambda_v * \lambda_\alpha$
 - $\alpha = \lambda_v / \lambda_\alpha$
 - $\alpha = \lambda_v - \lambda_\alpha$
 - $\alpha = \lambda_v + \lambda_\alpha$
- 27) In electrolyte, ionization _____ on dilution.
- Increases
 - Decreases
 - Becomes very small
 - Do not change

28) The specific conductance of the electrolyte _____ on dilution.

- a) Increases
- b) Decrease
- c) Slightly increases
- d) Cannot be determined

29) The electrolyte is placed in a special type of cell known as _____

- a) Conductivity cell
- b) Conductance cell
- c) Equivalent cell
- d) Conduction cell

30) A device that converts the energy of combustion of fields like hydrogen and methane directly into electrical energy is known as-----.

- (a) Electrolytic cell
 - (b) Dynamo
 - (c) Ni-Cd cell
 - (d) Fuel
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