

Q1. An ideal gas obeying kinetic theory equation can be liquefied if :

- (1) Its temperature is more than critical temperature
- (2) Its pressure is more than critical pressure
- (3) Its pressure is more than critical pressure but temperature is less than critical temperature
- (4) It cannot be liquefied at any value of Pressure and Temperature.

Q2. A quantity of gas is collected in a graduated tube over the mercury. The volume of gas at 18°C is 50 ml and the level of mercury in the tube is 100 mm above the outside mercury level. The barometer reads 750 Torr. Hence the volume of gas at STP is approximately is :

- (1) 22 ml
- (2) 40 ml
- (3) 20 ml
- (4) 44 ml

Q3. Ti^{+2} is purple while Ti^{4+} is colorless ,because :

- (1) There is no crystal field effect in Ti^{4+}
- (2) Ti^{+2} has $3d^2$ configuration
- (3) Ti^{4+} has $3d^2$ configuration
- (4) Ti^{4+} is a very small cation when compared to Ti^{2+} and hence, does not absorb any radiation

Q4. Aluminium phosphate is 100% ionised in a 0.01 molal aqueous solutions. Hence $\frac{\Delta T}{K_b}$ is :

- (1) 0.01
- (2) 0.015
- (3) 0.0175
- (4) 0.02

Q5. Which of the following azeotropic solutions has the boiling point less than boiling point of the constituent liquids A and B ?

- (1) $CHCl_3$ and CH_3COCH_3
- (2) CS_2 and CH_3COCH_3

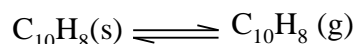
(3). CH_3CH_2OH and CH_3COCH_3

(4). CH_3CHO and CS_2

Q6. Under the same reaction conditions, initial concentration of $1.386 \text{ mol dm}^{-3}$ of a substance becomes half in 40 second and 20 second through first order and zero order kinetics, respectively. Ratio k_1/k_0 of the rate constants for first order (k_1) and zero order (k_0) of the reaction is :

- (1) $0.5 \text{ mol}^{-1} \text{ dm}^3$
- (2) $1 \text{ mol}^{-1} \text{ dm}^3$
- (3) $1.5 \text{ mol}^{-1} \text{ dm}^3$
- (4) $2 \text{ mol}^{-1} \text{ dm}^3$

Q7. Naphthalene ,a white solid used to make mothballs ,has a vapour pressure of 0.1 mm of Hg at 27°C . Hence K_p and K_c for the equilibrium are



- (1) .1 and .1
- (2) .1 and .0041
- (3) .000132 and .00000534
- (4) .00000536 and .000132

Q8. Two different hexoses were found to give the same osazone .Which one of the following statements is correct with respect to their structural relationship ?

- (1) The carbon atoms 1 and 2 in both have the same configuration
- (2) The carbon atoms 3 and 4 and 5 have same configuration
- (3) Both of them must be aldoses
- (4) They are epimeric at C-3

Q9. Kiliani Fischer synthesis converts an aldopentose to a :

- (1) Mixture of aldohexoses and ketohexose

(2). Mixture of aldohexoses differing in configuration of C₆

(3). Mixture of aldohexoses differing in configuration of C₂

(4). Single aldohexose.

Q10. Which amino acid can form covalent sulphur –sulphur bonds ?

- (1) cysteine
- (2) glycine
- (3) proline
- (4) methionine

Q11. Native silver metal forms a water soluble complex with a dilute aqueous solution of NaCN in the presence of :

- (1) nitrogen
- (2) oxygen
- (3) carbon dioxide
- (4) argon

Q12. Detection of elements in organic compounds is done using sodium fusion method which is called :

- (1) Middleton's fusion method
- (2) Lassaigne fusion method
- (3) Hofmann's fusion method
- (4) Hinsberg's method

Q13. The substance which can act both as an analgesic and as an antipyretic is :

- (1) quinine
- (2) aspirin
- (3) penicillin
- (4) insulin

Q14. A hybrid propellant uses :

- (1) a solid fuel and a liquid oxidiser
- (2) a composite solid propellant
- (3) a biquid propellant
- (4) a monoliquid propellant

Q15. Which of the following reaction does not involve electrophilic substitution ?

- (1) Rosenmund
- (2) Riemer and Tiemann
- (3) Friedel crafts
- (4) Gattermann –koch

Q16 Which of the following allotropes of Phosphorus is thermodynamically most stable ?

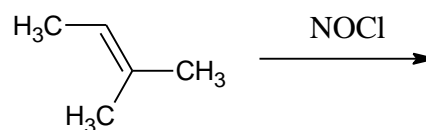
- (1) Red
- (2) White
- (3) Black
- (4) Yellow

Q17. Which silicate is formed from [SiO₄]⁴⁻, tetrahedral units by sharing 3 oxygen atoms?

- (1) Sheet silicates
- (2) Pyro silicates
- (3) Linear chain silicates
- (4) 3 dimensional silicates

Q18. The temperature of 4 moles of an ideal gas is raised from 300 K to 350 K. What is the value of $\Delta H - \Delta E$ for this process ?

- (1) 0
- (2) 415 J
- (3) 41.5 J
- (4) 1660 J



Q19. If $\Delta H_f^0 (H_2O)$ is -286.2 kJ , then $\Delta H_f^0 (OH^-)$ is

:

- (1) -228.9 kcal
- (2) $+228.9 \text{ kcal}$
- (3) -343.5 kcal
- (4) $+343.5 \text{ kcal}$

Q20. When a certain conductivity cell was filled with 0.01 M solution of KCl , it had a resistance of 160 ohm at 25°C , and when filled with 0.005 M NaOH , it had a resistance of 190 ohm . If the specific resistance of KCl solution is 700 ohm-cm , the specific conductance of NaOH solution is

- (1) $.00120$
- (2) $.00170$
- (3) $.00180$
- (4) $.00190$

Q21. An enantiomerically pure acid is treated with racemic mixture of an alcohol having one chiral carbon. the ester formed will be ?

- (1) optically active mixture
- (2) pure enantiomer
- (3) meso compound
- (4) racemic mixture

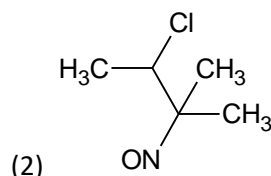
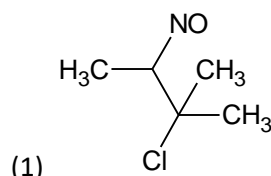
Q22. Hydration of an alkyne :

- (1) takes place through carbocation
- (2) Is a reversible reaction
- (3) Follows S_N^1 mechanism
- (4) Follows all of the above reaction.

Q23 When MnO_2 is fused with KOH , a colored compound is formed. The product and its colour are :

- (1) K_2MnO_4 , Purple green
- (2) KMnO_4 , Purple
- (3) Mn_2O_3 , brown
- (4) Mn_3O_4 , brown

Q24. The product in the following reaction is

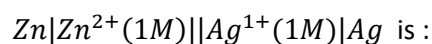


- (3) Both (1) and (2)
- (4) None of these

Q25. For the cell



E_{cell}^0 is 1.10 V , $E_{\text{Cu}^{2+}/\text{Cu}}^0 = 0.34 \text{ V}$ and for the cell $\text{Cu} | \text{Cu}^{2+}(1M) || \text{Ag}^+(1M) | \text{Ag}$, $E_{cell}^0 = 0.46 \text{ V}$ hence, E_{cell}^0 of the cell



- (1) -0.04 V
- (2) $+0.04 \text{ V}$
- (3) $+0.03 \text{ V}$
- (4) $+1.56 \text{ V}$

Q26. Electro-osmosis is observed when :

- (1) dispersion medium begins to move in an electric field
- (2) dispersed phase begins to move in an electric field
- (3) In both (1) and (2)
- (4) In none of the above

Q32. The reagent which gives a precipitate with acetaldehyde is :

Q27. A sample of $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ contains 3.782 g of Cu. How many grams of oxygen are in this sample (Cu = 63.5)

- (1) 0.952 g
- (2) 3.80 g
- (3) 4.761 g
- (4) 8.576 g

Q28. If angular momentum quantum number can take value of n also (in addition to other possible values) then total number of electrons in first orbit would have been :

- (1) 2
- (2) 6
- (3) 8
- (4) 10

Q29. The nodal plane in the π bond of ethane is located in :

- (1) The molecular plane
- (2) A plane parallel to the molecular plane
- (3) A plane parallel to the molecular plane which bisects the carbon-carbon σ bond at right angle
- (4) A plane perpendicular to the molecular plane which contains the carbon-carbon σ bond

Q30. To an acidified dichromate solution, a pinch of Na_2O_2 is added and shaken. What is observed :

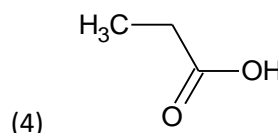
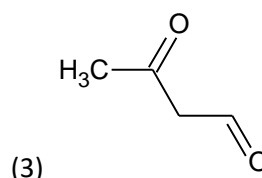
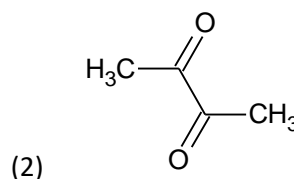
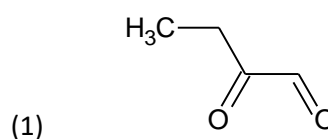
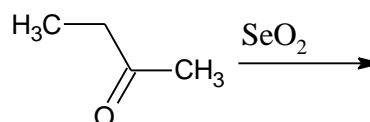
- (1) Blue colour
- (2) Red colour changing to green
- (3) Copious evolution of oxygen
- (4) Bluish green precipitate.

Q31. The enolic form of acetone contains :

- (1) 8σ bonds, 2π - bonds and 1 - lone pair
- (2) 9σ bonds, 1π - bonds and 2 - lone pair
- (3) 9σ bonds, 2π - bonds and 1 - lone pair

- (1) Sodium carbonate
- (2) Dilute Sodium hydroxide
- (3) 2,4- Dinitro phenyl hydrazine
- (4) Bromine

Q33. Identify the correct product of the following oxidation reaction :



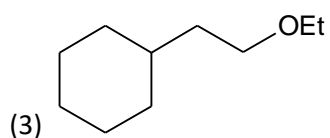
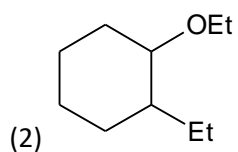
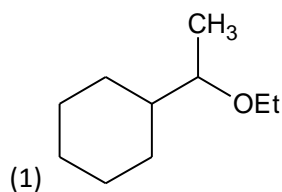
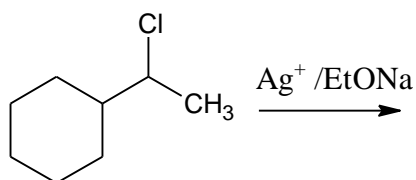


(4) 10σ bonds, 1π – bonds and 1 – lone pair

Q34. What is the correct statement about dichlorocarbene :

- (1) It is a electrophile- Lewis base
- (2) It is a nucleophile- Lewis base
- (3) It is an electrophile-Lewis acid
- (4) It is a nucleophile –Lewis acid

Q35. The predominant product of the following reaction is





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