

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 P and T.

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 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 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 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 hexoses were found to give the same osazones . 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  $C_6$

(3). Mixture of aldohexoses differing in configuration of  $C_2$

(4). Single aldohexoses.

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

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

Q11. Generally all the amino acids have primary amino function with the exception of :

- (1) alanine
- (2) proline
- (3) leucine
- (4) isoleucine

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. A substance which can act both as an analgesic and 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 biliquid propellant
- (4) a monoliquid propellant

Q15. Which of the following reaction does not involve  $S_E$  ?

- (1) Rosenmund
- (2) Reimer tiemann
- (3) Friedel crafts
- (4) Gattermann –koch

Q16. Azo compounds can :

- (1) Display cis-trans isomerism and trans-isomer is more stable
- (2) Display cis-trans isomerism and cis – isomer is more stable
- (3) Display enantiomerism due to presence of chiral centre
- (4) Display nuclear isomerism

Q17. Which of the following phenols is more likely to be soluble in aqueous sodium bicarbonate than the rest ?

- (1) 2,4 –dihydroxyacetophenone
- (2) P-cyanophenol
- (3) 2,4-dicyanophenol
- (4) 2,4,6-tricyanophenol

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  $-286.2 \text{ kJ}$ , then  $\Delta H_f^0 (OH^-)$  is :

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

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

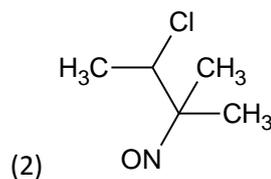
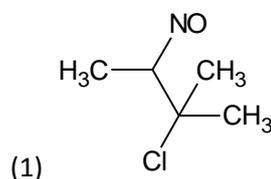
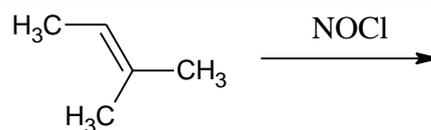
Q22. Hydration :

- (1) Takes place through carbocation
- (2) Is a reversible reaction
- (3) Follows  $\text{SN1}$  mechanism
- (4) Follows all of the above

Q23. Jones reagent is :

- (1)  $\text{MnO}_2$
- (2)  $\text{N}_2\text{O}_4$  in  $\text{CHCl}_3$
- (3)  $\text{CrO}_3$  in aqueous acetone
- (4)  $\text{PCC}$

Q24. The product of the following reaction is ?



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

Q25. For the cell  $\text{Zn}|\text{Zn}^{2+}(1\text{M})||\text{Cu}^{2+}(1\text{M})|\text{Cu}$ ,

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

$\text{Zn}|\text{Zn}^{2+}(1\text{M})||\text{Ag}^+(1\text{M})|\text{Ag}$  is :

- (1)  $-0.04 \text{ V}$
- (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

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  $\pi$  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  $\sigma$  bond at right angle
- (4) A plane perpendicular to the molecular plane which contains the carbon-carbon  $\sigma$  bond

Q30. To an acidified dichromate solution, a pinch of  $\text{Na}_2\text{O}_2$  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.

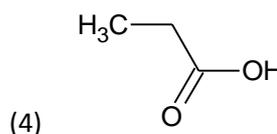
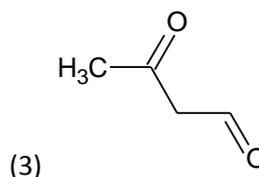
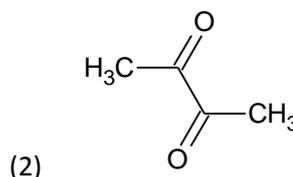
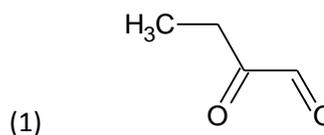
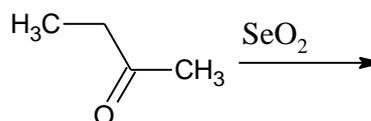
Q31. The enolic form of acetone contains :

- (1)  $8\sigma$  bonds,  $2\pi$  - bonds and 1 - lone pair
- (2)  $9\sigma$  bonds,  $1\pi$  - bonds and 2 - lone pair
- (3)  $9\sigma$  bonds,  $2\pi$  - bonds and 1 - lone pair
- (4)  $10\sigma$  bonds,  $1\pi$  - bonds and 1 - lone pair

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

- (1) Sodium carbonate
- (2) Dilute Sodium hydroxide
- (3) 2,4- DNP
- (4) Bromine

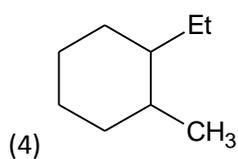
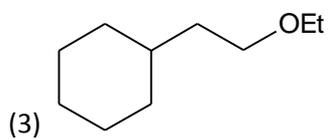
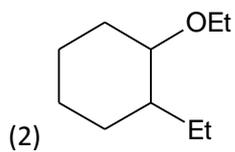
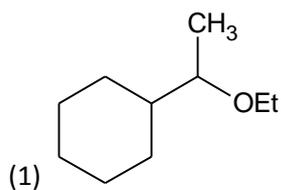
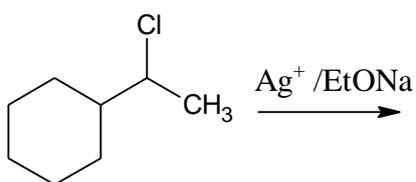
Q33. Identify the correct product of the following oxidation reaction :



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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