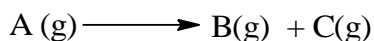




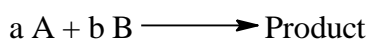
Q1. For the reaction given below, the rate law is



$-\frac{d[A]}{dt} = k[A]$. At start the pressure is 100 mm and after 10 min, pressure is 120 mm. Hence the rate constant is (in mole/min)

- (1) $\frac{2.303}{10} \log\left(\frac{6}{5}\right)$
- (2) $\frac{2.303}{10} \log 5$
- (3) $\frac{2.303}{10} \log\left(\frac{5}{4}\right)$
- (4) $\frac{2.303}{10} \log\left(\frac{5}{6}\right)$

Q2. For the reaction



$\frac{dx}{dt} = k[A]^a[B]^b$. If concentration of A is doubled, rate increases four times. If concentration of B is made four times, rate is doubled. Then :

- (1) $-\frac{d[A]}{dt} = -\frac{d[B]}{dt}$
- (2) $-\frac{d[A]}{dt} = -4\frac{d[B]}{dt}$
- (3) $-4\frac{d[A]}{dt} = -\frac{d[B]}{dt}$
- (4) none of these

Q3. Concentration of glucose in a solution is 25% by weight. What percent by weight is this relative to solvent

- (1) 20%
- (2) 25%
- (3) 33.3%
- (4) 16.66%

Q4. Human blood gives rise to an osmotic pressure of approximately 7.65 atm at body temperature, 37°C. Hence molarity of an intravenous glucose solution be to have same osmotic pressure as blood

Is :

- (1) 0.3 M
- (2) .2 M
- (3) .1 M
- (4) .5 M

Q5. Osmotic pressure of an insulin solution at 298 K is found to be 0.0072 atm. Hence, height of water column due to this pressure is :

- (1) .76 cm
- (2) .7 cm
- (3) 7.4 cm
- (4) 76 cm

Q6. Which statement comparing solutions with pure solvent is not correct ?

- (1) A solution containing a non-volatile solute has a lower vapour pressure than a pure solvent
- (2) A solution containing a non-volatile solute has a lower boiling point than a pure solvent
- (3) A solution containing a non-volatile solute has a lower freezing point than a pure solvent
- (4) A solution will have a greater mass than an equal volume of pure solvent if the solute has a molar mass greater than the solvent

Q7. To liquefy a gaseous substance whose critical temperature is below room temperature requires :

- (1) High pressure and lowering of temperature (below T_c)
- (2) Low pressure and raising of temperature (above T_c)
- (3) High pressure and raising of temperature (below T_c)
- (4) Low pressure and lowering of temperature (below T_c)

Q8. A mixture of nitrogen and oxygen has a density of 1.00 g/L and average molecular

weight of 31.2 g/mol at 27°C and 600 mm of Hg pressure. The mole fraction of nitrogen, assuming ideal gas behaviour, is :

- (1) .78
- (2) .6
- (3) .4
- (4) .2

Q9. How fast is an electron moving if it has a wavelength equal to the distance it travels in one second ?

- (1) $\sqrt{\frac{h}{m}}$
- (2) $\sqrt{\frac{m}{h}}$
- (3) $\sqrt{\frac{h}{p}}$
- (4) $\sqrt{\frac{h}{2K.E}}$

Q10. Which of the following wave properties is proportional to energy for the electromagnetic radiation ?

- (1) Velocity
- (2) Wave number
- (3) Wavelength
- (4) Amplitude

Q11. . Select the correct statement :

- (1) Radial probability density function gives the probability of finding the electron at a distance r from the nucleus
- (2) The maximum in the curve corresponds to the distance at which the probability of finding the electron is maximum
- (3) This distance is called the radius of maximum probability

(4). All the statements are correct.

Q12. Q12. $\alpha - D - \text{glucose}$ and $\beta - D - \text{glucose}$ differ from each other due to difference in carbon atom with respect to its

- (1) structure
- (2) conformation
- (3) configuration
- (4) none of these

Q13. Hyperconjugation involves overlap of the following orbitals :

- (1) $\sigma - \sigma$
- (2) $\sigma - p$
- (3) $p - p$
- (4) $\pi - \pi$

Q14. Q14. Aqueous solution of $\text{Na}_2\text{S}_2\text{O}_3$ on reaction with Cl_2 gives :

- (1) $\text{Na}_2\text{S}_4\text{O}_6$
- (2) NaHSO_4
- (3) NaCl
- (4) NaOH

Q15. 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

Q16. A gas obeying by vander Waals equation :

- (1) behaves similar to an ideal gas in the limit of large molar volumes

(2). behaves similar to an ideal gas in the limit of large pressures

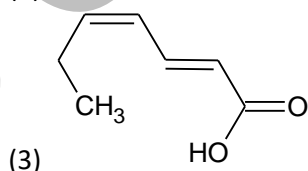
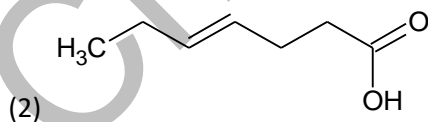
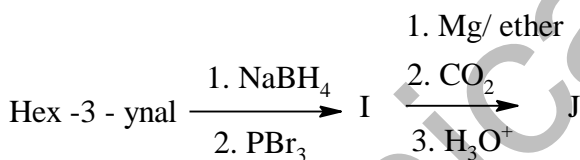
(3). is characterized by vander Waals coefficients that are dependent on the identity of the gas but are independent of the temperature .

(4). None of these

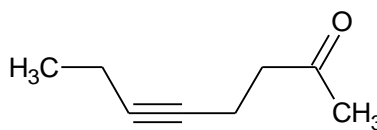
Q17. White phosphorus on reaction with NaOH gives PH_3 as one of the products. This is a

- (1) dimerization reaction
- (2) disproportionation reaction
- (3). condensation reaction
- (4). precipitation reaction

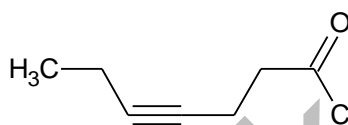
Q18. The product J in the reaction given below is



(4).

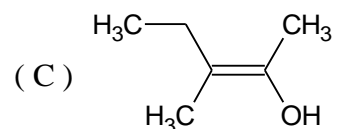
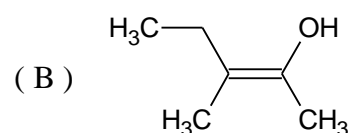
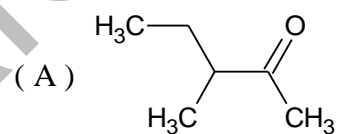


Q19. If the product J in the previous question (Q18), is treated with a reagent K, we get the following compound, then the reagent K can be



- (1) Cl_2
- (2) SOCl_2
- (3) $\text{CH}_3\text{SO}_2\text{Cl}$
- (4) None of these

Q20. Consider structures (A), (B) and (C)



For the above three structures, which of the following statements are correct

- (a) A,B and C are resonance structures
 - (b) A,B and C are tautomers
 - (c) B and C are geometrical isomers
 - (d) B and C are diastereomers
- (4) Only (a) and (b)
 (5) Only (b),(c),(d)

(3) Only (b) and (c)

(4). None of these

Q21. The IUPAC name of $[\text{Ni}(\text{NH}_3)_4]^{2+}[\text{Ni}(\text{Cl})_4]$ is

- (1) Tetrachloronickel(II)-tetraaminenickel (II)
- (2) Tetraaminenickel (II)- tetrachloronickel(II)
- (3) Tetraaminenickel (II)-tetrachloronickelate (II)
- (4) Tetrachloronickel(II)-Tetraaminenickelate(0)

Q22. Among the following ,the coloured compound is

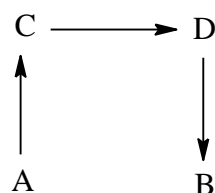
- (1) CuCl
- (2) $\text{K}_3[\text{Cu}(\text{CN})_4]$
- (3) CuF_2
- (4) $[\text{Cu}(\text{CH}_3\text{CN})_4]\text{BF}_4$

Q23. Electrolysis of dilute aqueous NaCl solution was carried out by passing 10 milli ampere current. The time(in seconds) required to liberate 0.01 mol of H_2 gas at the cathode is (1 Faraday = 96500 C/mol)

- (1) 96500
- (2) 193000
- (3) 289500
- (4) 386000

Q24. The simplest ketone and its next homologue are reacted with NH_2OH to form oximes.

- (1) Two different oximes are formed
- (2) Three different oximes are formed
- (3) Both form optically active oximes
- (4) All oximes are optically inactive



Given that

$$\Delta S (\text{A TO C}) = 50 \text{ e.u.}$$

$$\Delta S (\text{C TO D}) = 30 \text{ e.u.}$$

$$\Delta S (\text{B TO D}) = 20 \text{ e.u.}$$

Where e. u is entropy unit. Then

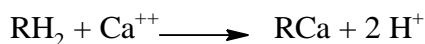
$\Delta S (\text{A TO B})$ is

- (1) +100 e.u
- (2) +60 e.u
- (3) -100 e.u
- (4) -60 e.u

Q26. The edge length of unit cell of a metal having molecular weight 75 g/mol is 500 nm which crystallizes in cubic lattice. If the density is 2 g/cc then find the radius of metal atom. ($N_A = 6 \times 10^{23}$). The answer in pm is :

- (1) 214
- (2) 215
- (3) 216
- (4) 218.

Q27. RH_2 (ion exchange resin) can replace Ca^{2+} in hard water .If 1 L of hard water after passing through RH_2 has a pH 2 . Hence hardness in ppm of Ca^{2+} is :



- (1) 200
- (2) 100
- (3) 50
- (4) 125

Q25. The direct conversion of A to B is difficult, hence it is carried out by the following shown path :

- (1) Copper
- (2) Iron
- (3) Zinc
- (4) Cobalt

Q28. The isoelectric point of an amino acid is :

- (1) The pH at which it exists in basic form
- (2) The pH at which it exists in acid form
- (3) The Ph at which it exists in zwitter ion form
- (4) The pH equals to its pK_a

Q29. Which one of the following answers positive Fehling's solution test ?

- (1) Sucrose
- (2) Glucose
- (3) Fats
- (4) Protein

Q30. To a sodium fusion extract chlorine water and carbon tetrachloride were added and shaken well. There is violet colour in the lower part (organic layer). This indicates the presence of :

- (1) Bromine
- (2) Iodine and bromine
- (3) Chlorine
- (4) Iodine

Q31. Which factor is most important in determining the chemistry of an organic molecule ?

- (1) The melting point
- (2) The functional group
- (3) The number of branches in the carbon chain
- (4) The number of carbon hydrogen bonds

Q32. Which of the following hormones regulates sugar metabolism in the body?

- (1) Adrenaline
- (2) Insulin
- (3) Thyroxine
- (4) Estrone

Q34. Amoxillin is semi-synthetic modification of :

- (1) Pencillin
- (2) Streptopmycin
- (3) Tetracycline
- (4) Chloroamophenicol

Q35. which one is not a water pollutant?

- (1) Automobile exhaust
- (2) Plant nutrients
- (3) Oxygen demanding wastes
- (4) Disease causing agent



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Q33. A metal which forms complex with insulin is :

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