

SECTION I

Single Correct Answer Type

This section contains 10 multiple choice questions. Each question has four choices A), B), C) and D) out of which **ONLY ONE** is correct.

21. A space capsule is filled with neon gas at 1 atmosphere and 298K. It effuses through a pinhole into outer space at such a rate that the pressure drops by 0.3 torr s^{-1} . If the capsule were filled with 30 mole % of He, 20 mole % of O_2 and 50 mole % of nitrogen, what would be the rate of pressure drop under similar conditions?

- A) 0.29 B) 3.22
C) 2.9 D) 0.32

22. A first order reaction is 45 % complete in 10 min. The time taken for 90% completion of the reaction is

- A) 20 min B) 40 min
C) 30 min D) >20 min

23. Which of the following is high spin complex.

- A) $[Co(H_2O)_6]^{+3}$ B) $[Co(H_2O)_3F_3]$
C) $[Co(CN)_6]^{-3}$ D) $[Co(NH_3)_6]^{+3}$

24. $Hg_2^{+2} \rightleftharpoons Hg + Hg^{+2}$ Disproportionation can be increased in presence of

- A) Cl^- B) S^{2-}
C) NO_3^- D) both (A)&(B)

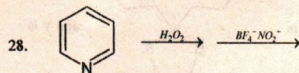
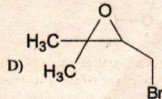
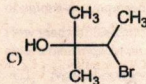
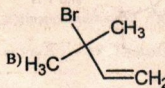
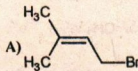
25. Aluminium chloride exist as dimer Al_2Cl_6 in solid state as well as in solution of non-polar solvent such as benzene. When dissolved in water it gives

- A) $Al_2O_3 + HCl$ B) $[Al(H_2O)_6]^{+3} + 3Cl^-$
C) $[Al(OH)_6]^{-3} + 3HCl$ D) $Al^{+3} + 3Cl^-$

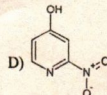
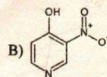
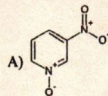
26. Pure HI kept in bottle shows the change $4HI + O_2 \rightarrow 2H_2O + I_2$. The liberated iodine gets dissolved in HI to impart

- A) Brown colour B) Violet colour
C) Blue colour D) Yellow colour

27. The major product formed in the reaction of 2-methyl but 3-en-2-ol with HBr is

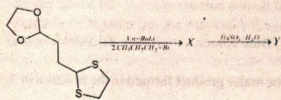


Major product formed in this sequence is:

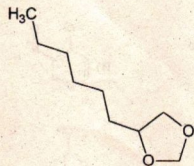
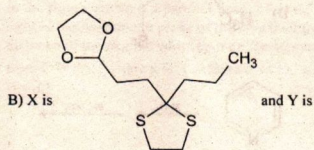
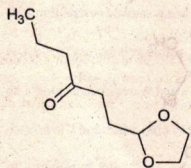


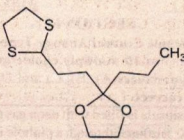
29. In the following reaction sequence the structure of

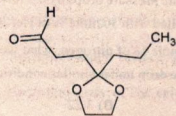
the major products X and Y are



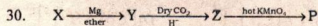
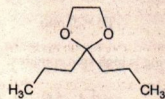
A) X is  and Y is



C) X is  and Y is



D) X is  and Y is



The two isomeric compounds which will give the same tricarboxylic acid after above sequence of reactions, are



A) I and II

B) III and IV

C) I and IV

D) II and III

SECTION III

Multiple Correct Answer(s) Type

This section contains 5 multiple choice questions. Each question has four choices A), B), C) and D) out of which **ONE or MORE are correct.**

31. Identify incorrect among the following about a lyophilic sol.
 A) Irreversible sol
 B) prepared from inorganic compounds
 C) Coagulated by adding an electrolyte
 D) self stabilized
32. Which of the following is true about silicones?
 A) They are formed by hydrolysis of R_2SiCl_2
 B) They are polymers made up of R_2SiO_2 unit
 C) They are made up of SiO_4^{4-} units
 D) They are macro molecules.
33. In which of the following $-O-O-$ link is present
 A) Caro's acid B) dithionic acid
 C) thiosulphuric acid D) Marshall's acid
34. True statement(s) among the following is/are:
 A) o-tolidine is more basic than aniline
 B) piperidine is more basic than pyridine
 C) di-chloroacetic acid is more acidic than nitroacetic acid
 D) cyclopropene is more acidic than cyclopenta-1,3-diene
35. Select the correct statement(s) regarding Bakelite :
 A) Bakelite is phenol-formaldehyde resin.
 B) Formation of Bakelite is an example of electrophilic aromatic substitution.
 C) Bisphenol-A is formed if we use acetone (in place of HCHO), with 2 moles of phenol.
 D) Bakelite has methylene bridges between phenol molecules at ortho and para positions

SECTION III

Integer Answer Type

This section contains 5 questions. The answer to each question is single digit integer, ranging from 0 to 9 (both inclusive).

36. How many of the following changes proceed with positive entropy change?
 (i) $NaCl(s) + H_2O \rightarrow Na^+(aq) + Cl^-(aq)$
 (ii) White Phosphorous \rightarrow Red phosphorous
 (iii) $2Cl(g) \rightarrow Cl_2(g)$
 (iv) $C(\text{diamond}) \rightarrow C(\text{graphite})$
 (v) $NH_4(l) \rightarrow NH_3(g)$

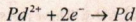
37. 56g of N_2 and 6g of H_2 were kept at $400^\circ C$ in 1 liter vessel. If equilibrium mixture contains 17 g of

NH_3 , K_c will be approximately $\frac{x}{10} \text{ mol}^2 \text{ lit}^{-2}$.

"x" is _____.

38. $PdI_4^{2-} + 2e^- \rightarrow Pd + 4I^-$

$$E^0 = 0.18 \text{ V} \dots\dots\dots(1)$$



$$E^0 = 0.92 \text{ V} \dots\dots\dots(2)$$

Formation constant of PdI_4^{2-} from its ions is reported as $\log K_f = 5x$. Find value of x ?

39. $NO_3^-, Cl^-, CO_3^{2-}, S^{2-}, NO_2^-, SO_3^{2-}$ the number of anions decomposed by $dil. H_2SO_4$ is:

40. How many of the following compounds produces m-chloro benzoic acid on heating with $Cl_2 / NaOH(\text{excess})$, followed by hydrolysis ?

