1. The geometry with respect to the central atom of the following molecules are: $N(SiH_3)_3$; Me_3N; $(SiH_3)_3 P$
(A) Planar, pyramidal, planar
(B) planar, pyramidal, pyramidal
(C) Pyramidal, pyramidal, pyramidal
(D) pyramidal, planar, pyramidal

2. A compound of vanadium has a magnetic moment of $\sqrt{8}$ B. M. Hence the vanadium ion is
(a) V^{2+} (b) V^{+} (c) V^{4+} (d) V^{3+}

3. $C_{(graphite)} + O_{2(g)} \rightarrow CO_{2(g)}, \quad \Delta H = -94.05 \text{ kcal mol}^{-1}$

$C_{(diamond)} + O_{2(g)} \rightarrow CO_{2(g)}, \quad \Delta H = -94.50 \text{ kcal mol}^{-1}$

(I) $C_{(diamond)} \rightarrow C_{(graphite)}, \quad \Delta H = 450 \text{ cal mol}^{-1}$

(II) $C_{(graphite)} \rightarrow C_{(diamond)}, \quad \Delta H = 450 \text{ cal mol}^{-1}$

(III) Graphite is stable than diamond

(IV) Diamond is stable allotrope than graphite

Then, which of the following is(are) correct?

(A) I, II   (B) II, III   (C) I, IV   (D) II, IV

4. If 10 gm of V_2O_5 is dissolved in acid and is reduced to V^{2+} by zinc metal, how many mole of I_2 could be reduced by the resulting solution if it is further oxidised to VO^{2+} ions (Atomic mass of V = 51 gm./mol)
(A) 0.11 mole of I_2 (B) 0.22 mole of I_2
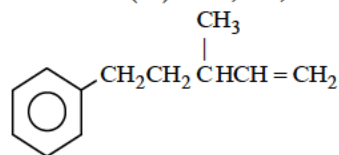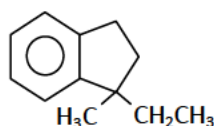(C) 0.055 mole of I_2 (D) 0.44 mole of I_2

5.
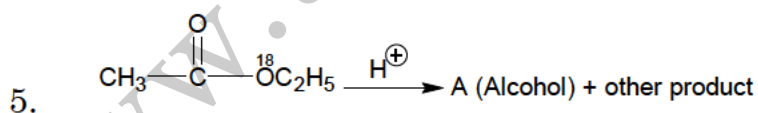
The compound (A) is
(a) $C_2H_5 - OH$ (b) $CH_3 - OH$ (c) $C_2H_5 - \overset{18}{O}H$ (d) $CH_3CH_2CH_2 - \overset{18}{O}H$

6. Which of the following cannot be oxidized further with a strong oxidizing agent ?
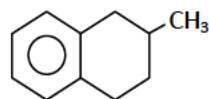
   I. SO_2 II. MnO_3 III. Al_2O_3 IV. CrO_3

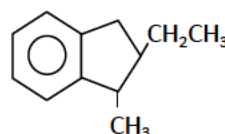   (A) II, IV   (B) I, II, IV   (C) III, IV   (D) I, II

7. $\xrightarrow{H^+}$ X ; X is :
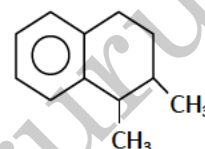

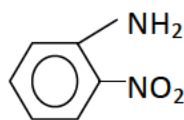   (A)   (B)   (C)   (D)
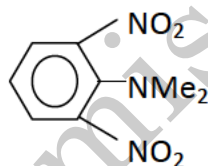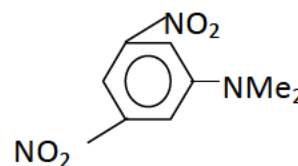
8. Arrange the Basicity order of following compounds

   I   II   III

   (A) I > II > III   (B) I > III > II   (C) II > III > I   (D) I = II < III
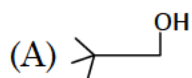
9. Which alkene will NOT give optically active diol with Baeyer's reagent?
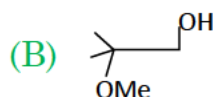   (A) 1-butene   (B) Propene   (C) cis-2-butene   (D) trans-2-butene

10. In which anti markownikoff's addition doesn't take place ?

   (A) $CH_3 - CH = CH_2 \xrightarrow[HBr]{(C_6H_5CO)_2 O_2}$ (B) $CH_3CH = CH_2 \xrightarrow[H_2O_2]{HCl}$

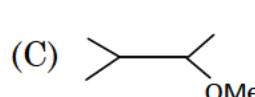   (C) $CF_3 - C(NO_2) = CH_2 \xrightarrow{HCl}$ (D) $CF_3 - CH = CH_2 \xrightarrow{HBr}$

11. In the reaction $CH_3OH \xrightarrow{H^+}$ the product is:

   (A)   (B)   (C)   (D)
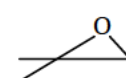
12. Cannizaro reaction is given by
   (A) Trimethylacetaldehyde
   (B) Acetaldehyde
   (C) Propanaldehyde
   (D) Acetone

13. In the given series of reaction, the products C and D are

(A)   (B)

(C)   (D)
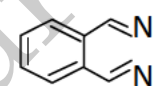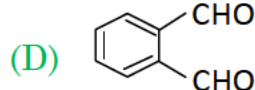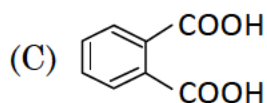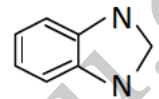
14. The compound, which on reaction with aq. Nitrous acid at low temperature produces oily nitrosamine, is
   (A) Methylamine
   (B) ethylamine
   (C) Diethyl amine
   (D) triethylamine

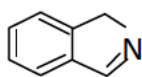15. Na_2SO_4 (0·004 M) is isotonic with 0·010 M Glucose. The % dissociation of Na_2SO_4
   (A) 25   (B) 50   (C) 75   (D) 85

16. In Down's process of extract Na metal from molten NaCl, some amount of anhydrous $CaCl_2$ is used because
   (A) It increases the Cl_2 production.
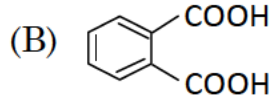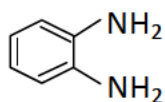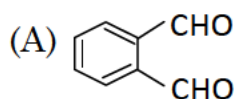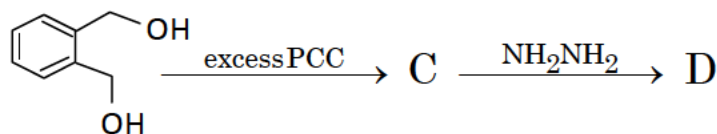   (B) Na is a soft metal. In presence of $CaCl_2$, hardness of Na metal increases.
   (C) In presence of $CaCl_2$, melting point of NaCl decreases
   (D) None of these.

17. $SnCl_2 + HgCl_2 \rightarrow$ A + B (white ppt.) $\xrightarrow{SnCl_2}$ A + C; Here 'C' is
   (A) $SnCl_4$ (B) Hg_2Cl_2 (C) Hg metal   (D) Sn

18. Which of the following complex is square planar?
   (A) $Ni(CO)_4$ (B) $[Ni(CN)_4]^{2-}$ (C) $[Fe(H_2O)_6]^{3+}$ (D) $TiCl_4$

19. The hydrolysis product of PCl_3 and NCl_3 are respectively
   (A) H_3PO_3, NH_3 (B) PH_3, NH_4OH (C) H_3PO_4, NH_3 (D) PH_3, NH_3

20. The products X and Y in the reactions given below are

(A) X is

(B) Y is

(C) Y is

(D) X is
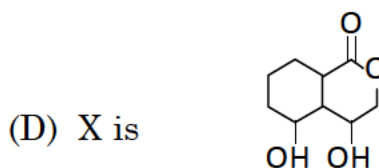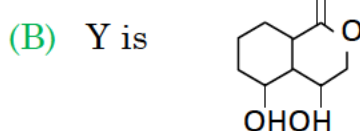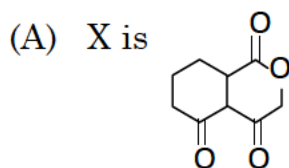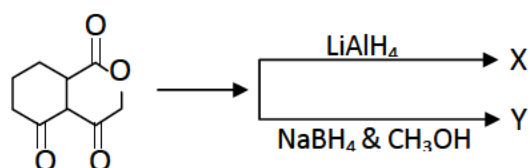
21. Rate of S_N1 reaction will be maximum in which of the following solvents?
   (A) H_2O (B) NH_3 (C) D.M.SO   (D) D.M.F.

22. If the pressure of a given mass of gas is reduced to half and temperature is doubled simultaneously, the volume will be
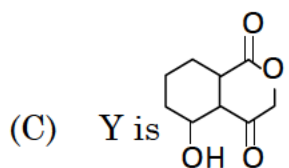   (A) Same as before   (B) Twice as before
   (C) 1/4 as before   (D) Four times

23. Identify the correct order of boiling points of the following compounds:

   $\underset{1}{CH_3CH_2CH_2CH_2OH}$ $\underset{2}{CH_3CH_2CH_2CHO}$ $\underset{3}{CH_3CH_2OCH_2CH_3}$

   (A) 1 > 2 > 3   (B) 3 > 1 > 2
   (C) 1 > 3 > 2   (D) 3 > 2 > 1

24. A solid is formed and it has three types of atoms X, Y, Z. X forms a FCC lattice with Y atoms occupying all the the tetrahedral voids and Z atoms occupying half the octahedral voids. The formula of the solid is :
   (A) X_2Y_4Z (B) XY_2Z_4 (C) X_4Y_2Z (D) X_4YZ_2

25. The instantaneous rate of disappearance of the MnO_4^- ion in the following reaction is
   4.56×10^{-3} M s^{-1}.

   $$2MnO_4^- + 10I^- + 16H^+ \rightarrow 2Mn^{2+} + 5I_2 + 8H_2O$$
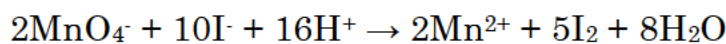
   The rate of appearance of I_2 is
   (a) 1.14×10^{-3} M s^{-1} (b) 5.7×10^{-3} M s^{-1}
   (c) 4.56×10^{-4} M s^{-1} (d) 1.14×10^{-2} M s^{-1}

26. H_2O_2 restores the colour of old lead paintings, blackened by the action of H_2S, by:
    (a) converting PbO_2 by Pb
    (b) oxidizing PbS to $PbSO_4$
    (c) converting $PbCO_3$ to Pb
    (d) oxidizing $PbSO_3$ to $PbSO_4$

27. NH_4NO_3 will be maximum soluble in
    (a) HCOOH + HCOONa[1:1 molar ratio]
    (b) NH_4OH + NH_4Cl [1:1 molar ratio]
    (c) $H_2PO_4^-$ + H_3PO_4[1:1 molar ratio]
    (d) In pure water

28. In the species O_2, O_2^+, O_2^- and O_2^{2-}, the correct decreasing order to bond strength is
    (A) $O_2 > O_2^+ > O_2^- > O_2^{2-}$
    (B) $O_2^+ > O_2 > O_2^- > O_2^{2-}$
    (C) $O_2^{2-} > O_2^- > O_2^+ > O_2$
    (D) $O_2^- > O_2^{2-} > O_2 > O_2^+$

29. Vitamin C is chemically
    (A) Ascorbic acid
    (B) Citric acid
    (C) Aspirin
    (D) Aspartic acid

30. Given
    $E^\circ_{Ag^+/Ag} = +0.80$ V $E^\circ_{Co^{2+}/Co} = -0.28$ V, $E^\circ_{Cu^{2+}/Cu} = +0.34$ V, $E^\circ_{Zn^{2+}/Zn} = -0.76$ V.
    Which metal corrode fastest?
    (A) Ag
    (B) Cu
    (C) Co
    (D) Zn