

Studentpad

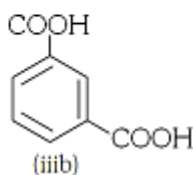
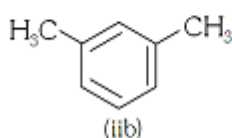
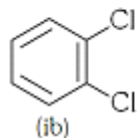
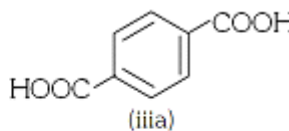
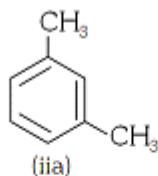
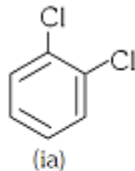
JEE-MAIN 2021-22

Time : 60 Min

Chem : Full Portion Paper

Marks : 120

01) Examine the following three pairs of possible isomers



Now state whether the pairs represent identical compounds or different isomers.

- 1) (ia) and (ib) are isomers; (iia) and (iib) are identical; and (iiia) and (iiib) are isomers.
- 2) (ia) and (ib) are identical; (iia) and (iib) are identical, and (iiia) and (iiib) are isomers.
- 3) (ia) and (ib) are identical; (iia) and (iib) are identical; and (iiia) and (iiib) are identical.
- 4) All three pairs represent different compounds.

02) If at 298 K the bond energies of C-H, C-C, C=C and H-H bonds are respectively 414, 347, 615 and 435 kJ, the value of enthalpy change for the reaction

$\text{H}_2\text{C}=\text{CH}_2(\text{g}) + \text{H}_2(\text{g}) \rightarrow \text{H}_3\text{C}-\text{CH}_3(\text{g})$ at 298 K will be

- 1) - 125 kJ
- 2) + 125 kJ
- 3) - 250 kJ
- 4) + 250 kJ

03) Which has the minimum freezing point?

- 1) One molal urea solution
- 2) One molal CaCl_2 solution
- 3) One molal KCl solution
- 4) One molal NaCl solution

04) For the system $\text{A}(\text{g}) + 2\text{B}(\text{g}) \rightleftharpoons \text{C}(\text{g})$, the equilibrium concentrations are (A) 0.06 mole/litre (B) 0.12 mole/litre (C) 0.216 mole/litre. The K_{eq} for the reaction is

- 1) 125
- 2) 250
- 3) 416
- 4) 4×10^{-3}

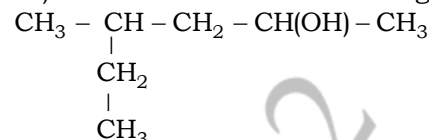
05) What is the magnetic moment of $\text{K}_3[\text{FeF}_6]$?

- 1) 6.92 BM
- 2) 5.91 BM

3) 4.89 BM

4) 3.87 BM

06) IUPAC name of the following compound is



- 1) 3-methyl-2-hexanol
- 2) 2-ethyl-2-pentanol
- 3) 4-methyl-2-hexanol
- 4) 4-ethyl-2-pentanol

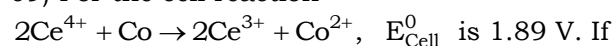
07) Which one of the following groupings represents a collection of isoelectronic species?

- 1) Ca^{2+} , Cs^+ , Br
- 2) Be , Al^{3+} , Cl^-
- 3) N^{3-} , F^- , Na^+
- 4) Na^+ , Ca^{2+} , Mg^{2+}

08) Red phosphorus is less reactive than yellow phosphorus because

- 1) it is highly polymerized.
- 2) its colour is red.
- 3) it is hard.
- 4) it is insoluble in $\text{C}_2\text{H}_5\text{OH}$.

09) For the cell reaction



$$E_{\text{Ce}^{4+}/\text{Ce}^{3+}}^0$$

- 1) - 1.64 V
- 2) - 2.08 V
- 3) + 1.64 V
- 4) + 2.17 V

10) Which of the following statements is wrong?

- 1) Positive catalysts raise the energy of activation of the reaction they catalyze.
- 2) Heterogeneous catalysis involves chemisorption on the surface of the catalyst.
- 3) Homogeneous catalysis generally involves an equilibrium reaction between at least one of the reactants and the catalyst.
- 4) Catalysts can aid a rapid reaching of the equilibrium position, but do not change the position of the equilibrium.

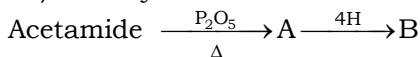
11) Morphine is

- 1) analgesic.
- 2) anaesthetic.
- 3) antiseptic.
- 4) antibiotics.

12) Neutralization of an acid with a base invariably results in the production of

- 1) H^+ and OH^-
- 2) OH^-
- 3) H_3O^+
- 4) H_2O

13) Identify 'B' in the reaction.



- 1) $CH_3CH_2NH_2$
- 2) CH_3NH_2
- 3) CH_3CN
- 4) CH_3COONH_4

14) Pressure of a mixture of 4 g of O_2 and 2 g of H_2 confined in a bulb of 1 litre at $0^\circ C$ is

- 1) 15.210 atm
- 2) 25.215 atm
- 3) 31.205 atm
- 4) 45.215 atm

15) Lithium shows similarities to magnesium in its chemical behaviour because of

- 1) similar size, same electronegativity and similar high polarizing power.
- 2) similar size, same electronegativity and lower polarizing power.
- 3) similar size, greater electronegativity and similar polarizing power.
- 4) none of these.

16) Identify the correct statement.

- 1) Maleic acid is stronger than fumaric acid
- 2) $RCOOH$ is stronger acid than $RCOOH$
- 3) Both (a) and (b)
- 4) None of the above

17) When a sample was weighted using two different balances, the results were 3.929 g and 4.0 g. How would the weight of the sample be reported?

- 1) 3 g
- 2) 3.9 g
- 3) 3.93 g
- 4) 3.929 g

18) Which of the following is correct?

- 1) Solder : $Pb+Al$
- 2) German silver : $Cu+Zn+C$
- 3) Duralumin : $Al+Cu+Mg+Ag$
- 4) Gun metal : $Cu+Zn+Sn$

19) Which halide will be least reactive in respect to hydrolysis?

- 1) t-Butyl chloride
- 2) Ethyl chloride
- 3) Allyl chloride
- 4) Vinyl chloride

20) Corundum is an ore of

- 1) sodium.
- 2) aluminium.

3) boron.

4) copper.

21) Glyptals are chiefly employed in

- 1) toy making
- 2) photofilm making
- 3) surface coating
- 4) electrical insulators

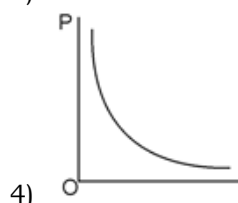
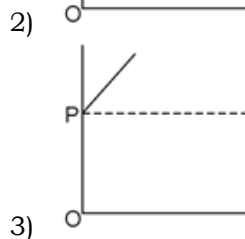
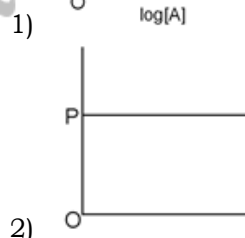
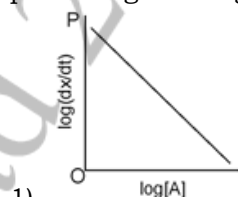
22) Which of the following does not form phenol or phenoxide?

- 1) $C_6H_5SO_3Na$
- 2) $C_6H_5N_2Cl$
- 3) C_6H_5COOH
- 4) C_6H_5Cl

23) The compounds of alkaline earth metals have the following magnetic nature

- 1) ferromagnetic.
- 2) diferromagnetic.
- 3) paramagnetic.
- 4) diamagnetic.

24) $A \rightarrow \text{Product}$ and $\frac{dx}{dt} = k[A]^2$. If $\log \left(\frac{dx}{dt} \right)$ is plotted against $\log [A]$, then find the type of graph.



25) Which of the following can adsorb largest volume of hydrogen gas?

- 1) Colloidal platinum
- 2) Colloidal palladium
- 3) Finely divided nickel
- 4) Finely divided platinum

26) Phosphate of a metal M has the formula

$M_3(PO_4)_2$. The formula for its sulphate would be

- 1) $M_3(SO_4)_2$
- 2) $M_2(SO_4)_3$
- 3) $M(SO_4)_2$
- 4) MSO_4

27) The oxidation number of Mn in $KMnO_4$ is

- 1) - 1
- 2) + 1
- 3) - 7
- 4) + 7

28) Ribose is an example of

- 1) aldohexose.
- 2) disaccharide.
- 3) aldopentose.
- 4) ketohexose.

29) What is the product when acetylene reacts with hypochlorous acid?

- 1) $ClCHCOOH$
- 2) Cl_2CHCHO
- 3) $ClCH_2CHO$
- 4) CH_3COCl

30) What is the business benefits of green chemistry?

- 1) Innovating 'greener' products to customers
- 2) Reduced costs associated with waste treatment and disposal
- 3) Greater complinace with environmental legislation
- 4) All of the above