RAMAKRISHNA MISSION VIDYAMANDIRA
Belur Math, Howrah – 711 202
ADMISSION TEST – 2013
## INDUSTRIAL CHEMISTRY (Honours)

Date : 15-06-2013 **Full Marks : 50**

Time : 1.30 p.m – 2.30 p.m

Each question carrying 2 marks. Candidates have to select the correct choice by **black/ blue pen** only in the Optical Mark Recognition **(OMR)** to be provided during the written test. Marking should be dark and should completely fill one blank box against the corresponding question number. Incomplete filling or multiple filling of boxes will reject the answer to that question. Once an answer is marked in OMR, there is no scope to alter the choice. Doing rough work or using erasers, blades, whiteners etc. on the Optical Mark Recognition (OMR) is strictly prohibited.

1. In which of the following compounds does Hydrogen exhibit a negative Oxidation state?

   a) LiH b) H_2O c) H_2SO_4 d) None of these

2. $X \xrightarrow{KOH(alc)} Y \xrightarrow{NaNH_2} HC \equiv CNa$
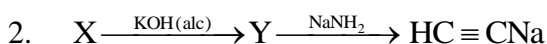
   The compound (X) in the above sequence may be

   a) C_2H_5OH b) 1, 2 dibromoethane   c) Chloroform   d) $C_2H_5NH_2$

3. $^{30}_{14}Si$ and $^{31}_{15}P$ are
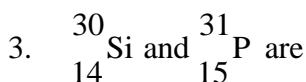
   a) Isotopes   b) Isobars   c) Isomorphs   d) Isotones

4. Which of the following is isomorphous with $MgSO_4.7H_2O$?

   a) Zinc Sulphate Heptahydrate   b) Blue vitreol

   c) Glauber Salt   d) None of these

5. The IUPAC name of the compound $CH_2(OH) CHNH_2 \ COOH$ is

   a) 2-Amine-3-Hydroxy Propanoic acid   b) 1-Hydroxy-2 Amino Propan-3-oic acid

   c) 2-Amino-3 Hydroxy Propanoic acid   d) 1-Amino-2 Hydroxy Propanoic acid

6. Which oxide is used in producing metal carbonyls?

   a) Both CO_2 and CO b) CO c) CO_2 only   d) CO_2 and C_3O_2

7. Which of the following is known as vinegar?

   a) A dil. solution of Acetic acid   b) Grape juice

   c) Orange juice   d) None of these

8. Which of the following reactions is possible at Anode?

   a) $2Cr^{+3} + 7H_2O \rightarrow Cr_2O_7^{-2} + 14H^+$ b) $F_2 \rightarrow 2F^-$

   c) $\frac{1}{2}O_2 + 2H^+ \rightarrow H_2O$ d) None of these

9. In the reaction $SO_2 + 2H_2S \rightarrow 3S + 2H_2O$. The element oxidized is

   a) H_2S b) SO_2 c) S d) H_2O

10. Pure water is a bad conductor of electricity because
    a) It has high boiling point   b) It is almost unionized
    c) Its molelcules are associated due to H-bonds   d) Its pH is 7 at 25°C

11. The catalyst used in Friedel Craft alkylation process is
    a) Anhyd. $AlCl_3$ b) Ferric Chloride   c) Nickel   d) Copper

12. Which of the following are isoelectronic and isostructural?
    a) NO_3^-, CO_3^{-2} b) SO_3^{-2}, NO_3^- c) CO_3^{-2}, SO_3^{-2} d) ClO_3^-, CO_3^{-2}

13. Which oxide cannot be reduced by Hydrogen?
    a) Al_2O_3 b) CuO c) ZnO d) All of these

14. The percentage of Se in peroxidase anhydrous enzyme is 0·5% by mass (at. mass = 78·4). The minimum molecular mass of peroxidase anhydrous enzyme is
    a) $1·568 \times 10^4$ b) $1·568 \times 10^3$ c) 1568   d) $2·136 \times 10^4$

15. The volume of oxygen gas measured at 0°C and 1 atm pressure is needed to burn completely 1L of Propane at same condition is
    a) 5L   b) 10L   c) 7L   d) 6L

16. Water from Municipal supply contains 40mg $CaCO_3$ in a Liter (40ppm). The equivalent amount of $MgSO_4$ and $CaCl_2$ will be respectively (Ca = 40, Mg = 24, Cl = 35·5)
    a) 48,44   b) 100,110   c) 50,55   d) None of these

17. $CH \equiv CH \xrightarrow[HgSO_4]{dil\,H_2SO_4} (A) \xrightarrow{(O)} (B) \xrightarrow{NaOH} (C) \xrightarrow[\Delta]{Soda\,Lime} (D)$. The compound (D) is
    a) CH_4 b) C_2H_6 c) $CaCO_3$ d) None of these

18. A solid compound (X) on heating gives CO_2 gas and leaves a residue. The residue on mixing with water forms (Y). (Y) is alkaline to litmus. On Passing an excess of CO_2 through (Y) in water, a clear solution (Z) results. on boiling (Z), original compound (X) is reformed. The compound (X) is
    a) $Ca(HCO_3)_2$ b) $CaCO_3$ c) Na_2CO_3 d) None of these

19. A cylinder of 10L capacity at 300K containing Hydrogen gas is used to fill balloons till finally the cylinder recorded a pressure of 10m bar. The number of Hydrogen atoms still left in the cylinder is
    a) $4·82 \times 10^{21}$ b) $2·41 \times 10^{23}$ c) $2·41 \times 10^{21}$ d) $4·82 \times 10^{23}$

20. An unsaturated Hydrocarbon (A) containing 92·3% C when passed through red hot copper tubings trimeizes to form a compound (B) which on reaction with CH_3Cl in presence of anhydrous $AlCl_3$ forms compound (C). The compound (C) on oxidation with $KMnO_4$ gives compound (D). Compound (D) on decarboxylaton with sodalime gives compound (E). The compound (E) is,
    a) Cyclohexene   b) 2-Ethyl Butene   c) Benzene   d) None of these

21. The percentage of P_2O_5 in diammonium Hydrogen Phosphate $[(NH_4)_2HPO_4]$ is
    a) 23·48   b) 46·96   c) 53·78   d) 71

22. PCl_5 dissociates as follows, in a closed reaction vessel

$$PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$$

If the total pressure at equilibrium of the reaction mixture is P and degree of dissociation of PCl_5 is x, the partial pressure of PCl_3 will be

a) $\left(\dfrac{x}{x+1}\right)P$ b) $\left(\dfrac{2x}{1-x}\right)P$ c) $\left(\dfrac{x}{x-1}\right)P$ d) $\left(\dfrac{x}{1-x}\right)P$

23. Aniline is synthesised from Benzene in a Plant. via Nitrobenzene route
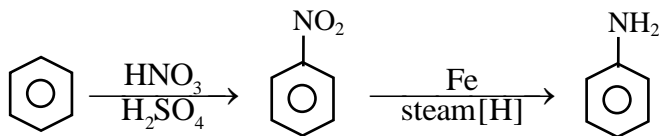
Assuming the overall yield of Aniline is 90% calculated on benzene, what quantity of Benzene is required fro production of 100Kg Aniline?

a) 78·2 Kg   b) 93·2 Kg   c) 112 Kg   d) 103 Kg

24. A perfect gas at 340 K is heated at constant pressure until its volume has increased by 18 percent. The final temperature of the gas is

a) 401·2 K   b) 204 K   c) 340 K   d) None of these

25. 0·64 g calcium oxalate was dissolved in dil. and hot H_2SO_4 required 100 ml $\dfrac{N}{10}$ $KMnO_4$ solution for appearance of pink colour stable for 1 minute. Calculate percentage purity of the sample of Calcium Oxalate.

a) 96   b) 100   c) 84   d) None of these

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