RAMAKRISHNA MISSION VIDYAMANDIRA

Belur Math, Howrah – 711 202

ADMISSION TEST – 2016

INDUSTRIAL CHEMISTRY (Honours)

Date : 14-06-2016 **Full Marks : 50** Time: 02·00 p.m – 03·00 p.m

Instructions for the candidate

Answer all the questions given below. Each question carries 2 marks. Tick (✓) the correct option. For every wrong answer 1 mark will be deducted. The tick must be very clear — if it is smudgy or not clear, no marks will be awarded.

Name of the student : _____

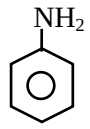
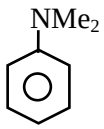
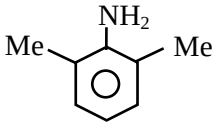
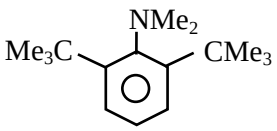
Application No. : _____

Signature of the student : _____ Signature of the Invigilator : _____

1. The equivalent weight of $K_2Cr_2O_7$ in acidic medium is expressed in terms of its molecular weight (M) as
   a) $\frac{M}{3}$ b) $\frac{M}{4}$ c) $\frac{M}{6}$ d) $\frac{M}{7}$
2. How much CO_2 will be released by reaction of 10 g $CaCO_3$ with excess of dil. HCl?
   a) 44 g b) 4·4 g c) 88 g d) 0·4 g
3. The work function of a metal is 4·0 eV. The longest wave length of light that can cause photoelectron emission from metal is approximately:
   a) 540 nm b) 400 nm c) 300 nm d) 220 nm
4. The principle that is based on electrons attempting to be as apart as possible is
   a) Bohr's theory b) Heisenberg principle c) Exclusion principle d) Hund's rule
5. The correct sequence which shows the decreasing order of ionic radii of the elements is
   a) $O_2^- > F^- > Na^+ > Al^{3+}$ b) $Al^{3+} > Mg^{2+} > Na^+ > F^- > O^{2-}$
   c) $Na^+ > Mg^{2+} > Al^{3+} > O^{2-} > F^-$ d) $Na^+ > F^- > Mg^{2+} > O^{2-} > Al^{3+}$
6. Which of the following molecules/ions does not contain unpaired electrons?
   a) O_2^{2-} b) B_2 c) N_2^+ d) O_2
7. Position deviation of real gases from ideal behaviour takes place because of
   a) molecular interactions and $\frac{PV}{nRT} > 1$ b) molecular interaction and $\frac{PV}{nRT} < 1$
   c) finite size of molecules and $\frac{PV}{nRT} < 1$ d) finite size of molecules and $\frac{PV}{nRT} > 1$
8. Workout the heat change (cal) when 40 gm of He gas at 27°C undergoes isothermal and reversible compression from initial pressure of 1 atm to 10 atm ($R = 2$ cal $K^{-1}mol^{-1}$)
   a) 13·818 Kcal b) –13·818 Kcal c) 55·272 Kcal d) –55·272 Kcal
9. The second law of thermodynamics says that in a cyclic process
   a) work cannot be converted into heat b) heat cannot be converted into work
   c) work cannot be completely converted into heat d) heat cannot be completely converted into work
10. According to Le Chatelier principle, adding heat to a solid and a liquid in equilibrium will cause the
    a) amount of solid to decrease b) amount of liquid to decrease
    c) temperature to rise d) temperature to fall
11. The dissociation constant of benzoic acid at 25°C is 1×10^{-4}. The pH of 0·01(M) solution of its sodium salt is
    a) 7·5 b) 8 c) 8·2 d) 6

12. Amongst the following, the strongest oxidising agent is
a) $KMnO_4$ b) $K_2Cr_2O_7$ c) H_2O_2 d) O_3

13. In photography, sodium thiosulphate is used for
a) softening very dark images
b) making the latent image visible
c) intensifying faint images
d) dissolving residual silver bromide

14. Which of the following is the strongest base?
a) 
b) 
c) 
d) 

15. Which of the following crystal lattice has the minimum unoccupied space?
a) Simple cubic b) Body-centred cubic c) Face-centred cubic d) Simple tetragonal

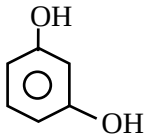
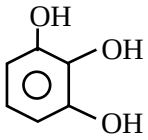
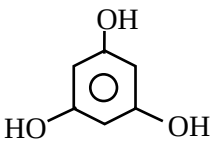
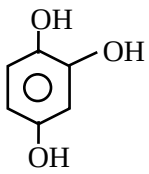
16. Ferromagnetism arises because of the spontaneous alignment of the magnetic moments due to unpaired electrons as
a) ↑↑↑↑↑ b) ↑↑↑↓↓ c) ↑↓↑↓ d) ↑↑↓↓↓

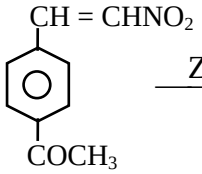
17. Which of the following represents increasing order of ionic conductance?
a) $F^- < Cl^- < Br < I^-$ b) $I^- < Br^- < Cl^- < F^-$ c) $F^- < Cl^- < I^- < Br^-$ d) $F^- < I^- < Cl^- < Br^-$

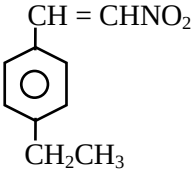
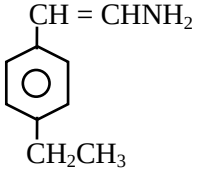
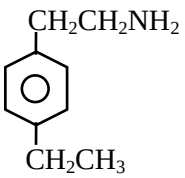
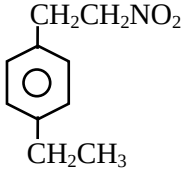
18. We know that farmers used CaO to reduce the acidity of soil and they use ammonium sulphate $[(NH_4)_2SO_4]$ as a nitrogenous fertilizer. Why is it not possible to use a mixture of CaO and ammonium sulphate?
a) The dry mixture is quite explosive in nature
b) $CaSO_4$ formed on mixing may cause hardness in water
c) $NH_3(g)$ may be given out when the mixture is dampened
d) The constituents of mixture may react to form H_2SO_4

19. Which of the following compounds is most sensitive to light?
a) AgCl b) $AgNO_3$ c) AgI d) AgBr

20. Octahedral complex of Cr(III) will be
a) sp^3d^2 in case of weak field ligand
b) d^2sp^3 in case of strong field ligand
c) d^2sp^3 always
d) sp^3d^2 always

21. Which of the following compound can react with hydroxylamine?
a) 
b) 
c) 
d) 

22.  $\xrightarrow[HCl]{Zn/Hg}$ Product. Here the product is

a) 
b) 
c) 
d) 

23. Which polymer can produce HCl gas upon degradation above 200°C?
a) PVC b) Polyethylene c) Styrene d) Dacron

24. Natural rubber is an example of
a) Copolymer b) Condensation polymer c) Addition polymer d) Thermosetting polymer

25. Which of the following polymer is most likely to suffer chemical degradation on exposure to atmospheric ozone?
a) Propylene b) Natural rubber c) Polyvinyl chloride d) Teflon

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