# RAMAKRISHNA MISSION VIDYAMANDIRA

**Belur Math, Howrah – 711 202**

## ADMISSION TEST – 2019

## INDUSTRIAL CHEMISTRY (Honours)

Date : 18-06-2019 **Full Marks : 50** Time: 03·00 p.m. – 4·00 p.m.

**Instructions for the candidate**

*Answer all the questions given below. Each question carries **2 marks** for correct answer and **–1 mark** for wrong answer. Tick (✓) the correct option on the **OMR SHEET**. The tick must be very clear —— if it is smudgy or not clear, no marks will be awarded. **Calculator is not allowed**.*

1. The molecular formula of a commercial resin used for exchanging ions in water softening is $C_8H_7SO_3Na$ (Molecular weight = 206). What would be the maximum uptake of $Ca^{2+}$ ions by the resin when expressed in mole per gram resin?
   (a) 1/103 (b) 1/206 (c) 2/309 (d)1/412

2. Which of the following does not characterize X-rays?
   (a) The radiation can ionise gases
   (b) It causes ZnS to fluoresce
   (c) Deflected by electric and magnetic fields
   (d) Have wavelengths shorter than ultraviolet rays.

3. 4.215 gm of a metallic carbonate was heated in a hard glass tube, the $CO_2$ evolved was found to measure 1336 mL at 27˚C and 700 mm of Hg pressure. What is the equivalent weight of the metal?
   (a) 10.15 (b) 11.15 (c) 12.15 (d) 13.15

4. 2 moles of an ideal gas expanded isothermally and reversibly from 1L to 10L at 300K. What is the enthalpy change?
   (a) 4.98 KJ (b) 11.47 KJ (c)-11.47 KJ (d) 0 KJ

5. Sodium metal crystallizes in a body centred cubic lattice with a unit cell edge of 4.29 Å. The radius of sodium atom is approximately
   (a) 1.86 Å (b) 3.22 Å (c) 5.72 Å (d) 0.93 Å

6. How many lithium atoms are present in a unit cell with edge length 3.5 A˚ and density 0.53 g $cm^{-3}$? (atomic mass of Li=6.94)
   (a) 2 (b) 1 (c) 4 (d) 6

7. Coordination numbers of $Cs^+$ and $Cl^-$ in CsCl crystal are
   (a) 8,8 (b) 4,4 (c) 6,6 (d) 8,4

8. What kinds of defects are introduced by doping?
   (a) Dislocation defect (b) Schottky defect
   (c) Frenkel defect (d) Electronic defect

9. The coordination number of a metal crystallising in a hexagonal closed packed structure is

(a) 4 (b) 12 (c) 8 (d) 6

10. Saturated solution of $KNO_3$ is used to make "salt-bridge" because

(a) Velocity of $K^+$ is greater than that of $NO_3^-$

(b) Velocity of $NO_3^-$ is greater than that of $K^+$

(c) Velocities of both $K^+$ and $NO_3^-$ are nearly same

(d) $KNO_3$ is highly soluble in water

11. When a lead storage battery is discharge

(a) $SO_2$ is evolved (b) lead is formed

(c) lead sulphate is consumed (d) Sulphuric acid is consumed

12. A 100 watt, 110 V incandescent lamp is connected in series with an electrolyte cell containing cadmium sulphate solution. What weight of cadmium will be deposited by the current flowing for 10 h?

(a) 16.1 (b) 17.1 (c) 18.1 (d) 19.1

13. The rate of reaction doubles when its temperature changes from 300K to 310K. Activation energy of such a reaction will be ($R=8.314JK^{-1}mol^{-1}$ and log2=0.301)

(a) 53.6 KJ $mol^{-1}$ (b) 48.6 KJ $mol^{-1}$ (c) 58.6 KJ $mol^{-1}$ (d) 60.5 KJ $mol^{-1}$

14. Lyophilic sols are

(a) Irreversible sols (b) prepared from inorganic compounds

(c ) coagulated by adding electrolytes (d) self-stabilising

15. The metallic lustre exhibited by sodium metal is explained by

(a) Diffusion of sodium ions (b) Oscillation of loose electron

(c ) excitation of free protons (d) Existence of body centred cubic lattice

16. Name the structure of silicates in which three oxygen atoms of $[SiO_4]^{4-}$ are shared is

(a) Pyrosilicate (b) sheet silicate (c) linear chain silicate (d) three dimensional silicate

17. Chlorine acts as bleaching agent only in the presence of

(a) dry air (b) moisture (c) sunlight (d) pure oxygen

18. The colour of light absorbed by an aqueous solution of CuSO4 is

(a) Orange red (b) blue-green (c) yellow (d) violet

19. The geometry of $Ni(CO)_4$ and $Ni(PPh_3)_2 Cl_2$ are

(a) both square planar

(b) tetrahedral and square planar, respectively

(c ) both tetrahedral

(d) square planar and tetrahedral respectively

20. The colour of $KMnO_4$ is due to

(a) M $\rightarrow$ L charge transfer transition

(b) d $\rightarrow$ d transition

(c ) L $\rightarrow$ M charge transfer transition

(d) $\sigma \rightarrow \sigma^*$ transition

21. The chemical process in the production of steel from haematite ore involve

(a) reduction

(b) oxidation

(c) reduction followed by oxidation

(d) Oxidation followed by reduction

22. When cyclohexane is poured on water, it floats because

(a) cyclohexane is in 'boat' form

(b) cyclohexane is in 'chair' form

(c) cyclohexane is in 'crown' form

(d) cyclohexane is less dense than water

23. Which of the following is not an antacid?

(a) Aluminium hydroxide

(b) Cimetidine

(c) Phenelzine

(d) Ranitidine

24. Among cellulose , poly(vinyl chloride), nylon and natural rubber , the polymer in which the intermolecular force of attraction is weakest is

(a) nylon

(b) poly(vinyl chloride)

(c) cellulose

(d) natural rubber

25. Which of the following polymers does not involve cross linkages?

(a) Vulcanised rubber

(b) Bakelite

(c) Melamine

(d) Teflon

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