

CY104S1_MID SEM EXAM-2021

Please read the questions carefully, there are 30 MCQ type questions having one mark each and only one correct answer. The duration of exam is one hour (11:30 am-12:30 pm). Submit your response before 12:30 pm.

1. Among these which metal form stable metal oxide to resist corrosion
(1 Point)

- ☐ Ca
- ☐ Pt
- ☒ W
- ☐ Mo

2. A wire 2m long and 2 mm in diameter, when stretched by the weight of 8 kg, has its length increased by 0.24 mm. $g = 9.8 \text{ m/s}^2$ Calculate the stress.
(1 Point)

- ☐ $25 \times 10^7 \text{ N/m}^2$
- ☐ $2.5 \times 10^7 \text{ dyne/cm}^2$
- ☒ $2.5 \times 10^7 \text{ N/m}^2$
- ☐ $0.25 \times 10^7 \text{ N/m}^2$

3. A wire 2m long and 2 mm in diameter, when stretched by the weight of 8 kg, has its length increased by 0.24 mm. $g = 9.8 \text{ m/s}^2$. calculate the Young's modulus.
(1 Point)

- ☐ $280 \times 10^{11} \text{ N/m}^2$
- ☐ $3.4208 \times 10^{11} \text{ N/m}^2$
- ☐ $5.06 \times 10^{11} \text{ N/m}^2$
- ☒ $2.08 \times 10^{11} \text{ N/m}^2$

4. When number of chromophores increases in a molecule, its colour bearing capacity____
(1 Point)

- ☐ decreases
- ☐ not affected
- ☒ increases

5. Find out the correct statements,
(1 Point)

- i. The polymer chains are arranged randomly in amorphous polymers.
- ii. Bifunctional and multifunctional monomers are used in step growth polymerization
- iii. Oligomers are formed at the beginning of chain growth polymerization
- iv. The glass transition occurs when the polymer chains convert from a glassy state to a rubbery state
- v. Polymerization of polystyrene is the type of step growth polymerization

- ☐ ii, iii and iv
- ☐ i, ii and iii
- ☒ i, ii and iv
- ☐ iii and v

6. How many grams of MgCO_3 dissolved per litre gives 95 ppm hardness? Given molecular weight of MgCO_3 is 84.3 g/mol.
(1 Point)

- ☒ 80.08 mg/L
- ☐ 66.12 mg/L
- ☐ 48.23 mg/L
- ☐ 70.81 mg/L

7. Find out the molar conductivity of KCl solution containing 0.50 M concentration. Conductivity at 298 K (κ) = 0.023 S cm⁻¹
(1 Point)

- ☒ 46 cm² mol⁻¹
- ☐ 92 cm² mol⁻¹
- ☐ 11.5 cm² mol⁻¹
- ☐ 23 cm² mol⁻¹

8. Chemical corrosion takes place on____
(1 Point)

- ☐ moist surface
- ☐ heterogeneous surface
- ☐ homogeneous surface
- ☒ in both homogeneous and heterogeneous surface

9. Choose the correct allotrope of Iron, generally found in steel.
(1 Point)

- ☐ cementite
- ☐ bauxite
- ☐ Hematite
- ☒ Austenite

10. Inver steel contains____
(1 Point)

- ☒ Nickel
- ☐ Tungsten
- ☐ Vanadium
- ☐ Molybdenum

11. When temporary hard water is boiled, one of the substances formed is ____
(1 Point)

- ☐ calcium sulfate
- ☐ calcium bicarbonate
- ☒ carbon dioxide
- ☐ hydrogen chloride

12. Azo dye contains following chromophore:
(1 Point)

- ☐ $-NO_2$
- ☐ $=C=O$
- ☐ $-NO$
- ☒ $-N=N-$

13. Calculate the temporary and permanent hardness of water sample containing $Mg(HCO_3)_2 = 14.6\text{mg/L}$, $Ca(HCO_3)_2 = 16.2\text{mg/L}$, $MgCl_2 = 9.5\text{mg/L}$, $CaSO_4 = 6.8\text{mg/L}$. Given molecular weight of $Mg(HCO_3)_2 = 146\text{ g/mol}$, $Ca(HCO_3)_2 = 162\text{ g/mol}$, $MgCl_2 = 95\text{ g/mol}$, $CaSO_4 = 136\text{ g/mol}$.
(1 Point)

- ☐ 15 ppm and 15 ppm
- ☐ 20 ppm and 20 ppm
- ☒ 20 ppm and 15 ppm
- ☐ 15 ppm and 20 ppm

14. If, the degree of polymerization (DP) of two particular polymer chains are 100 and 120 respectively, and the mass of a single monomeric unit is 28 g.mol^{-1} , then find out the polydispersity index (PDI) of polymer
(1 Point)

- ☒ 1.2
- ☐ 1.0
- ☐ 1.5
- ☐ 2.0

15. Which statement is suitable for Gutta percha and natural rubber
(1 Point)

- ☒ Gutta percha is trans isomer and natural rubber is cis isomer
- ☐ Both are cis isomers
- ☐ Both are trans isomers
- ☐ Gutta percha is cis isomer and natural rubber is trans isomer

16. Find out the number average molecular weight & weight average molecular weight for the following data:

Numbers of molecules	Molar mass (g. mol ⁻¹)
10	100
20	200
30	400
40	600

(1 Point)

- ☐ 430 & 510 g.mol⁻¹
- ☐ 420 & 500 g.mol⁻¹
- ☒ 410 & 490 g.mol⁻¹
- ☐ 400 & 480 g.mol⁻¹

17. Match the following:

- | | |
|---------------------------|--------------------------|
| i. Nylon 6 | A. Branched polymer |
| ii. Vulcanised rubber | B. Amorphous polymer |
| iii. PS-b-PMMA | C. Homopolymer |
| iv. Atactic polypropylene | D. Semisynthetic polymer |
| v. LDPE | E. Block copolymer |

(1 Point)

- ☐ i-D, ii-C, iii-A, iv-E, v-A
- ☐ i-C, ii-D, iii-A, iv-B, v-E
- ☒ i-C, ii-D, iii-E, iv-B, v-A
- ☐ i-D, ii-C, iii-E, iv-A, v-B

18. On which factor does the conductance of electrolytic solutions depend?

(1 Point)

- ☐ Temperature and mobility of ions
- ☐ Number of charge carriers
- ☐ Dielectric constant of the solvent
- ☒ All of the mentioned

19. According to galvanic series which of the metal will undergo most corrosion among these.

(1 Point)

- ☐ Sn
- ☒ Cd
- ☐ Cu
- ☐ Au

20. The Pilling-Bedworth ratio is defined as___

(1 Point)

- ☐ the molar weight of an oxide divided by the molar weight of the metal consumed in oxide formation
- ☒ the volume of the oxide divided by the volume of the metal consumed in oxide formation.
- ☐ the density of the oxide divided by the density of the metal consumed in oxide formation.
- ☐ the molar Gibbs energy of the oxide divided by the Gibbs energy of the metal consumed in oxide formation

21. Select the incorrect statement from the following option.

(1 Point)

- ☐ Hard water does not form lather with soap and forms white scum
- ☐ In hard water, cleansing quality of soap is depressed
- ☒ Due to the presence of dissolved hardness producing salts, the boiling point of hard water is depressed

☐ Hard water contains dissolved calcium and magnesium salts in it

22. In pitting corrosion pit acts as ____
(1 Point)

- ☐ cathode
- ☒ anode
- ☐ passive cathode
- ☐ protective film

23. Which of the following is not a chromophore?
(1 Point)

- ☐ $-NO$
- ☐ $-NO_2$
- ☒ $-NH_2$
- ☐ $-N = N-$

24. What is the correct proportion of COPPER in white Brass?
(1 Point)

- ☐ >50%
- ☐ 65-55%
- ☒ <50%
- ☐ all of the above

25. Indigo shows cis-trans isomerism. Which is the stable form of Indigo
(1 Point)

- ☐ Cis-
- ☒ Trans-
- ☐ Either cis- or trans-

☐ Both of the above

26. The potential of an electrode measured with respect to silver-silver chloride electrode (Ag/AgCl) is 1.210 V. What would be the electrode potential measured with respect to saturated calomel electrode (SCE)? Given, $E_{\text{Ag/AgCl}} = 0.197 \text{ V}$ and $E_{\text{SCE}} = 0.242 \text{ V}$.

(1 Point)

- ☐ 1.441 V
- ☐ 1.004 V
- ☐ 1.245 V
- ☒ 1.165 V

27. 0.30 gm of CaCO_3 was dissolved in HCl and the solution made up to 1000 ml with distilled water. 100 ml of the solution required 30 ml of EDTA solution for titration. 100 ml of hard water sample required 35 ml of EDTA. After boiling and filtering, 100 mL of this water sample required 12 ml of EDTA solution. Calculate permanent hardness of water.

(1 Point)

- ☒ 120 ppm
- ☐ 350 ppm
- ☐ 420 ppm
- ☐ 230 ppm

28. An azo dye is formed by interaction of an aromatic diazonium chloride with___

(1 Point)

- ☐ Nitrous acid
- ☐ Benzene
- ☐ An aliphatic primary amine
- ☒ Phenol

29. The main advantage of using saturated KCl solution in reference electrode is _____

(1 Point)

- ☐ the ease at which chloride passes through membranes
- ☐ the ease of reaction with analyte
- ☒ the chloride ion concentration does not change if some liquid evaporates from the cell
- ☐ the low cost of KCl

30. Alizarin dye obtained from the root of madder plant is anthraquinone derivative. Its structure corresponds to____
(1 Point)

- ☐ 1-hydroxy anthraquinone
- ☒ 2, 3-dihydroxy anthraquinone
- ☐ 1, 4-dihydroxy anthraquinone
- ☐ 1, 2-dihydroxy anthraquinone

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