



ENGINEERING CHEMISTRY - B.E.1/4

SHORT ANSWER QUESTIONS (PART-A)

UNIT-1(ELECTRO CHEMISTRY)

1. What are the difference between electrolytic cell and galvanic cell?
2. Define EMF of galvanic cell and derive expression for E_{cell} with explanation?
3. What is the relationship between ΔG and EMF of the cell and calculate ΔG if EMF of the cell is 1.10V and 2 moles of electrons are involved?
4. Discuss the origin of electrode potential and define electrode potential and half cell EMF?
5. Why is it necessary to represent half cell reactions as reduction reaction?
6. What is the relationship between oxidation electrode potential and reduction electrode potential?
7. On what basis the sign to electrode potential is given and why are electrode potential of Zinc and Copper are negative and positive respectively
8. Discuss the significance of electrode potential and explain how electrode potential is used to decide the electrode as negative and positive?
9. What is the importance of salt bridge?
10. Derive the Nernst Equation?
11. Discuss the importance of Nernst Equation and calculate the value of $RT/F \times 2.303$ at 25o C
12. and show how it represent volt?
13. Calculate electrode potential of Zinc electrode at 25o C if $E_{oZn^{+2}/Zn}$ is -0.76 Volts and $[Zn^{+2}]$ is $1 \times 10^{-4} M$?
14. Electrode potential of Copper electrode $E_{Cu^{+2}/Cu}$ is 0.4542 volt and $E_{oCu^{+2}/Cu}$ is 0.34 Volt,
15. Calculate the copper ion concentration?
16. Discuss the importance of Hydrogen Electrode?
17. Why are the electrode potentials relative and do not have absolute values?
18. Calculate EMF for the Cell $Zn/Zn^{+2} (0.01M) // Cu^{+2} (0.1M)/Cu$, if $E_{oZn^{+2}/Zn}$ is -0.76 Volts and $E_{oCu^{+2}/Cu}$ is 0.34 Volt
19. If the electrode potential of half cell reaction of $Zn^{+2} + 2e \rightleftharpoons Zn$ is -0.76V and $Ag^{+} + e \rightleftharpoons Ag$ is +0.799 V, is the cell reaction spontaneous or nonspontaneous?
20. If one ampere current is in the external circuit how many electrons per second will flow if charge of electron is 1.6×10^{-19} coulombs?
21. Will the following reaction be spontaneous $\frac{1}{2} Pb + Ag^{+} (a=1) = \frac{1}{2} Pb^{+2} + Ag$

- if $E_{\text{Pb}^{2+}/\text{Pb}} = -0.126$ and $E_{\text{Ag}^+/\text{Ag}} = 0.799$ Volt?
22. Will chlorine gas liberate Iodine from a solution of Iodide ions if $E_{\text{I}^-/\text{I}_2} = -0.5335$ Volt and $E_{\text{Cl}_2/\text{Cl}^-} = 1.3595$ Volt?
 23. For $\text{Ag}^+ + e \rightleftharpoons \text{Ag}$ half reaction the electrode potential is 0.799 V if the reaction is written as $4\text{Ag}^+ + 4e \rightleftharpoons 4\text{Ag}$, what is the electrode potential and give the conclusion that can be drawn about the electrode potential?
 24. From the electrochemical series choosing the two half reactions for 3m the battery that has the maximum voltage?
 25. Will Ce^{4+} react with I^- when $E_{\text{I}^-/\text{I}_2} = -0.535\text{V}$ and $E_{\text{Ce}^{4+}/\text{Ce}^{3+}} = 1.44$ V
 26. Can silver spoon be used for stirring CuSO_4 solution if $E_{\text{Ag}^+/\text{Ag}} = -0.799$ Volt and $E_{\text{Cu}^{2+}/\text{Cu}} = 0.34$ Volt?
 27. Distinguish primary battery from secondary battery?
 28. Differentiate reversible cell from irreversible cell?

UNIT – 2 (CORROSION CHEMISTRY)

1. What is corrosion of metals? What are its causes.(3M)
2. In a structure, two dissimilar metals should not be allowed to come in contact with each other, why? (2M)
3. Why does corrosion occur in steel pipe connected to copper tank?(2M)
4. Why should nickel plated steel articles be free from pores and pin holes(2M)
5. Write a note on Galvanic Corrosion? (3M)
6. What is waterline corrosion? Explain.(2M)
7. Write a short note on differential aeration corrosion? (3M)
8. Write a note on Pitting Corrosion?(2M)
9. Explain the effect of PH on rate of corrosion with help of Pour Baux diagram?(3M)
10. Distinguish between galvanizing and tinning? (3M)
11. What is paint? What are its Constituents.(2M)
12. Give the basis for classification of electrochemical corrosion?(3M)
13. What is galvanic series? Give its importance. (3M)
14. Give differences between electroplating and electroless plating?(3M) . Define hardness of water. Why do we express hardness of water in terms of CaCO_3 Equivalents? (3M)
15. . What are the salts responsible for the temporary and permanent hardness of water ?(2M)
16. What are the specifications of potable water? (3M)
17. What is reverse osmosis? How is this process help in softening of water ? (3M)
18. What is disinfection of drinking water? Name three chemicals used for sterilization of water(3M)
19. Explain Ozonolysis of Water? (2M)
20. Give the significance of Break Point Chlorination?(3M)

UNIT – 3 (POLYMER CHEMISTRY)

1. Define the term functionality of monomers. Explain its significance with a suitable example.(2M)
2. Explain Homo and Copolymers with an example. (2M)
3. What is Copolymerization? Explain with an example.(3M)
4. What are the advantages of vulcanized rubber.(2M)
5. Write chemical equation for preparation of polyurethanes.(2M)
6. What is conducting polymer? Give two examples.(2M)
7. Explain the mechanism of conduction in conducting polymers. (2M)
8. Explain the types of composite materials.(2M)
9. Write any two advantages of composite materials. (2M)
10. Distinguish between Thermoplastics and Thermosetting with examples?(3M)
11. Name the monomers of Bakelite.(2M)
12. Give applications of conducting polymers.(3M)
13. Define degree of polymerization?
14. Define homochain and heterochain polymers with suitable example?
15. Differentiate plastics, fibers and elastomers with suitable examples?

UNIT – 4(CHEMICAL FUELS)

1. What are chemical fuels? Give their classification with examples?
2. Write the requirements of good fuel?
3. Define calorific value, give units of calorific value of solid, liquid and gaseous fuel?
4. Give the relationship between HCV and LCV?
5. Differentiate between higher and lower calorific value?
6. What is knocking? Define octane number and cetane number?
7. What are antiknocking agents? Give examples and their significance?
8. Explain importance of catalytic converters used in automobile exhaust?
9. Explain the principle of Rocket propulsion?
10. What is Rocket Propellant? Give requirements of a good propellant?
11. Write a note on LPG and CNG?
12. What is cracking of petroleum? Mention its importance?
13. What is CNG, what are its advantages over Gasoline?

UNIT – 5 (PHASE RULE, LUBRICANTS, LIQUID CRYSTALS, GREEN CHEMISTRY)

1. Define the terms Phase, Component and Degree of Freedom with suitable examples? (
2. Explain Pattinson's process of desilverisation of lead?
3. Define the term lubrication and mention the important functions of Lubricants
4. Classify lubricants and give one example of each?
5. Explain Saponification of lubricant?
6. Define Acid Value of Lubricant?