

**MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)**

**B.Tech I YEAR II SEMESTER (MR15)**

**APPLIED CHEMISTRY- Question Bank**

**(Common for CSE, ECE and EEE)**

**Module-1: Water**

1. The purification of brackish water by reverse osmosis is also called as \_\_\_\_\_ [    ]  
a. Electro-dialysis.    b. Reverse osmosis.    c. Zeolite.    d. Ion exchange.
2. One part of  $\text{CaCO}_3$  equivalent hardness per  $10^5$  parts of water is also called as \_\_\_\_\_ [    ]  
a. Degree Clarke    b. ppm.    c. Degree French    d. Mg/L.
3. Boiler corrosion caused by using highly alkaline water in boiler is called \_\_\_\_\_ [    ]  
a. Corrosion    b. boiler corrosion    c. caustic embrittlement    d. erosion.
4. Caustic embrittlement can be avoided by using \_\_\_\_\_ [    ]  
a. Sodium phosphate    b. hydrogen    c. ammonium hydroxide    d. sodium sulphate.
5. Caustic embrittlement is a type of \_\_\_\_\_ [    ]  
a. Boiler corrosion    b. conditioning    c. scale formation    d. sludge formation.
6. The soft loose and slimy precipitate formed within the boiler is called \_\_\_\_\_ [    ]  
a. Scale    b. sludge.    c. embrittlement    d. coagulation.
7. Sodium meta aluminate used in internal treatment of boiler water produces flocculent precipitates of \_\_\_\_\_ [    ]  
a.  $\text{Mg}(\text{OH})_2$  &  $\text{Al}(\text{OH})_3$     b.  $\text{NaOH}$  &  $\text{Al}(\text{OH})_3$   
c.  $\text{Ca}(\text{OH})_2$  &  $\text{Al}(\text{OH})_3$     d.  $\text{Ca}(\text{OH})_2$  &  $\text{Mg}(\text{OH})_2$
8. In low pressure boilers carbonate conditioning of boiler feed water carries out to remove \_\_\_\_\_ [    ]  
a. Calcium bicarbonate    b. calcium sulphate    c. calcium chloride    d. calcium nitrate.
9. The Alkalinity of water is due to \_\_\_\_\_ [    ]  
a.  $\text{OH}^-$  &  $\text{CO}_3^{2-}$  ions    b.  $\text{Cl}^-$  &  $\text{SO}_4^{2-}$  ions    c.  $\text{NO}_3^-$  &  $\text{Br}^-$  ions    d. none.
10. The Alkalinity of water sample is a measure of its capacity to neutralise----- [    ]  
a. Acid    b. Base    c. Buffer    d. None.
11. Temporary hardness in water is removed by \_\_\_\_\_ [    ]  
a. Filtration    b. sedimentation    c. Boiling    d. coagulation
12. Blow-down operation causes the removal of \_\_\_\_\_ [    ]  
a. Scales    b. Sludges    c. Acidity    d. Sodium chloride

13. Solubility of calcium sulphate in water \_\_\_\_\_ [ ]  
a. Increases with rise of temperature.  
b. Decreases with rise of temperature.  
c. Remains unaltered with rise of temp.  
d. doesn't adopt any definite pattern with rise of temperature.
14. Permanent hardness of water can't be removed by Treatment with \_\_\_\_\_ [ ]  
a. lime soda. b. By permutite process. c. By boiling. d. By ion-exchange process.
15. Hard water is unfit for use in boilers for generating steam because \_\_\_\_\_ [ ]  
a. Its boiling point is higher b. steam is generated at high temperature.  
c. Water decomposes into  $O_2$  and  $H_2$ . d. It produces scales inside the boiler.
16. Estimation of hardness of water by EDTA method is used to determine \_\_\_\_\_ [ ]  
a. Total hardness b. temporary hardness only.  
c. Permanent hardness only. d. All the above.
17. Hard water can be softened by passing it through \_\_\_\_\_ [ ]  
a. Lime stone. b. Sodium hexa Meta phosphate. c. Ion-exchange resin. d. Sodium silicate.
18. Calgon is a trade name given to \_\_\_\_\_ [ ]  
a. Sodium silicate b. Sodium hexa meta phosphate.  
c. Sodium meta phosphate. d. Calcium phosphate.
19. Brackish water mostly contains dissolved \_\_\_\_\_ [ ]  
a. Calcium salts b. Magnesium salts. C. Turbidity d. Sodium chloride.
20. The method by which the ions are pulled out of salt water by direct current employed thin, rigid membrane air is called \_\_\_\_\_ [ ]  
a. Electro dialysis b. Reverse osmosis. c. Zeolite. d. Ion exchange.
21. Tannins and agar-agar are used for \_\_\_\_\_ [ ]  
a. phosphate conditioning. b. carbonate conditioning c. colloidal conditioning d. calgon conditioning.
22. The external treatment of boiler water feed done by \_\_\_\_\_ [ ]  
a. Lime-soda process b. sodium sulphate treatment  
c. calgon process d. sodium aluminate treatment.
23. The process of wet-steam formation is called \_\_\_\_\_ [ ]  
a. Foaming b. priming c. corrosion d. caustic embrittlement.
24. Mechanical steam purifiers avoid \_\_\_\_\_ [ ]  
a. Corrosion b. priming c. Scale formation d. sludge formation.
25. Castor oil is a \_\_\_\_\_ [ ]  
a. Anti-skinning agent b. antifoaming agent  
c. anti-ageing agent d. anti-corrosive agent
26. Liquid chlorine is most effective \_\_\_\_\_ [ ]  
a. Disinfectant b. coagulant c. flocculent d. sterilizing agent

27. Disinfection by ozone is due to liberation of \_\_\_\_\_ [     ]  
 a. Oxygen    b. nascent oxygen    c. molecular oxygen    d. none.
28. The formula of chloramine is \_\_\_\_\_ [     ]  
 a.  $\text{ClNH}_2$     b.  $\text{NHCl}_2$     c.  $\text{NCl}_3$     d.  $\text{NH}_2\text{Cl}_2$
29. Phosphate conditioning of boiler feed is carried out by \_\_\_\_\_ [     ]  
 a.  $\text{Na}_3\text{PO}_4$     b.  $\text{Ca}(\text{PO}_4)_2$     c.  $\text{Mg}(\text{PO}_3)_2$     d.  $\text{H}_3\text{PO}_4$
30. Hardness of water is caused by \_\_\_\_\_ [     ]  
 a.  $\text{CaCl}_2$     b.  $\text{NaCl}$     c.  $\text{Na}_2\text{CO}_3$     d.  $\text{K}_2\text{S}$
31. Hard water contains \_\_\_\_\_ [     ]  
 a.  $\text{Na}^\oplus$     b.  $\text{Mg}^{2+}$     c.  $\text{Ca}^{2+}$     d. both (b) and (c)
32. Permanent hardness of water is due to \_\_\_\_\_ [     ]  
 a.  $\text{HCO}_3^-$     b.  $\text{CO}_3^-$     c.  $\text{Cl}^-$     d.  $\text{Na}^\oplus$
33. Temporary hardness can be removed by \_\_\_\_\_ [     ]  
 a. Zeolite process    b. ion exchange    c. boiling    d. none
34. The demineralisation of water is called \_\_\_\_\_ [     ]  
 a. Zeolite process    b. ion-exchange process    c. lime-soda process    d. none
35. Which is not the unit of hardness of water? [     ]  
 a. ppm    b. epm    c. degree Clark    d. mg/L
36. The relation between mg/L and ppm is \_\_\_\_\_ [     ]  
 a.  $1 \text{ mg/L} = 1 \text{ ppm}$     b.  $10 \text{ mg/L} = 1 \text{ ppm}$     c.  $1 \text{ mg/L} = 10 \text{ ppm}$     d.  $1 \text{ mg}$
37. In EDTA titration, the colour of the end point is \_\_\_\_\_ [     ]  
 a. red    b. blue    c. yellow    d. no change
38. Blow down operation causes the removal of \_\_\_\_\_ [     ]  
 a. sludges    b. scales    c.  $\text{NaCl}$     d. acidity
39. Temporary hardness of water can be removed by \_\_\_\_\_ [     ]  
 a. filtration    b. screening    c. boiling    d. sedimentation
40. Purest form of natural water is \_\_\_\_\_ [     ]  
 a. sea water    b. river water    c. rain water    d. lake water
41. Calgon is a trade name given to \_\_\_\_\_ [     ]  
 a. sodium hexametaphosphate    b. magnesium phosphate  
 c. calcium silicate    d. sodium sulphate
42. The phenomenon of carrying of water along with impurities by steam is \_\_\_\_\_ [     ]  
 a. priming    b. carry over    c. foaming    d. embrittlement
43. Brakish water mostly contains dissolved \_\_\_\_\_ [     ]  
 a.  $\text{MgCO}_3$     b.  $\text{MgCl}_2$     c.  $\text{CaCl}_2$     d.  $\text{NaCl}$
44. Water can be sterilized by using \_\_\_\_\_ [     ]  
 (a)  $\text{Cl}_2$  (b)  $\text{CCl}_4$  (c)  $\text{CaCO}_3$  (d)  $\text{NaOH}$
45. Brakish water can be purified by using \_\_\_\_\_ [     ]  
 a. lime-soda process    b. permutit process    c. filtration    d. reverse osmosis method
46. Best method of removing hardness of water is \_\_\_\_\_ [     ]  
 a. ion exchange    b. permutit    c. lime-soda    d. boiling
47. Hardness of water is expressed in terms of equivalents of \_\_\_\_\_ [     ]  
 a.  $\text{MgCO}_3$     b.  $\text{CaCO}_3$     c.  $\text{Na}_2\text{CO}_3$     d.  $\text{K}_2\text{CO}_3$

48. Caustic embrittlement is caused due to the presence of \_\_\_\_\_ [     ]  
 a. NaCl                      b. NaOH                      c. MgCO<sub>3</sub>                      d. KNO<sub>3</sub>
49. Priming and foaming in boilers produce \_\_\_\_\_ [     ]  
 a. wet steam              b. dry steam              c. soft steam              d. hard steam
50. The exhausted cation exchange resin can be regenerated by treating with \_\_\_\_\_ [     ]  
 a. dil. NaOH              b. dil. HCl                      c. distilled water              d. dil. NaCl

### ANSWERS

1	2	3	4	5	6	7	8	9	10
a	c	c	d	a	b	a	b	a	a

11	12	13	14	15	16	17	18	19	20
c	b	b	c	d	d	c	b	d	a

21	22	23	24	25	26	27	28	29	30
c	a	b	b	b	a	b	a	a	a

31	32	33	34	35	36	37	38	39	40
d	c	c	b	b	a	b	a	c	c

41	42	43	44	45	46	47	48	49	50
a	a	d	a	b	a	b	b	a	b

### Module-2 Electrochemistry and corrosion

1. Which of the following does not conduct electricity? [     ]  
 a. Molten NaCl    b. solution of NaCl in H<sub>2</sub>O    c. NaCl crystals    d. none.
2. The unit of specific conductance is \_\_\_\_\_ [     ]  
 a) Ohm Cm<sup>-1</sup>    b) Ohm<sup>-1</sup> cm    c) Ohm Cm    d) Ohm<sup>-1</sup> Cm<sup>-1</sup>
3. The relationship between specific conductivity and equivalent conductance is \_\_\_\_\_ [     ]  
 a)  $\lambda_{eq} = C \times 100 / K$     b)  $\lambda_{eq} = K.C / 1000$     c)  $\lambda_{eq} = C \times 1000 / K$     d)  $\lambda_{eq} = K \times 1000 / C$
4. The resistance of a conductor is  $5 \times 10^{-2}$  ohms conductance is \_\_\_\_\_ [     ]  
 a) 200    b) 20 mhos    c) 500 mhos    d) 50 mhos
5. Which of the following is a weak electrolyte? [     ]  
 a. NH<sub>4</sub>OH                      b. NaOH                      c. HCl                      d. NaCl
6. The unit of equivalent conductivity is \_\_\_\_\_ [     ]  
 a. Ohm<sup>-1</sup> cm<sup>2</sup> eq<sup>-1</sup>    b. Ohm<sup>-2</sup> cm<sup>-2</sup> eq<sup>-1</sup>    c. Ohm<sup>-2</sup> cm<sup>2</sup> eq<sup>-1</sup>    d. Ohm<sup>-2</sup> cm<sup>-2</sup> eq<sup>-1</sup>
7. In the standard notation for a voltaic cell, the double vertical line "||" represents: \_\_\_\_\_ [     ]

(a) a phase boundary (b) gas electrode (c) a wire (metal) connection (d) a salt bridge

8. Which of the following is an oxidation? [     ]  
a.  $\text{Fe}^{+3} + \text{e}^- = \text{Fe}^{+2}$                       c.  $\text{Fe} = \text{Fe}^{+2} + 2\text{e}^-$   
b.  $\text{Fe}^{+3} + 3\text{e}^- = \text{Fe}$                       d.  $\text{Cl} + \text{e}^- = \text{Cl}^-$
9. In an electrochemical cell, electrons travel in which direction? [     ]  
a. from the anode to the cathode through the external circuit  
b. from the anode to the cathode through the porous cup  
c. from the cathode to the anode through the external circuit  
d. from the cathode to the anode through the porous cup.
10. A certain galvanic cell has for its spontaneous cell reaction:  $\text{Zn} + \text{HgO} \rightarrow \text{ZnO} + \text{Hg}$   
Which is the half-reaction occurring at the *cathode*? [     ]  
a)  $\text{HgO} + 2 \text{e}^- \rightarrow \text{Hg} + \text{O}^{2-}$       b)  $\text{Hg} \rightarrow \text{Hg}^{2+} + 2 \text{e}^-$   
c)  $\text{Zn} \rightarrow \text{Zn}^{2+} + 2\text{e}^-$                       d)  $\text{ZnO} + 2\text{e}^- \rightarrow \text{Zn}$
11. The reciprocal of the resistance is called \_\_\_\_\_ [     ]  
(a)Equivalent conductance      (b) Specific conductance  
(c) Conductance                      (d) None of these
12. Primary battery is such a battery \_\_\_\_\_ [     ]  
a) Which can be recharged                      b) Which cannot be recharged  
c) In which cell reaction reversible                      d) which cannot be reconditioned by replacing chemical.
13. The secondary battery is such a battery \_\_\_\_\_ [     ]  
a) which cannot be recharged.                      b) Which can be recharged.  
c) In which cell reaction irreversible d) which is charged by primary cells.
14. An example of secondary battery cell is \_\_\_\_\_ [     ]  
a) Nickle-Cadmium cell.      b) Daniel cell. c) Lechlanche cell.      d) Bunsen cell.
15. A storage cell is a device that can operate \_\_\_\_\_ [     ]  
a. both as voltage cell & electrical cell                      b. as voltaic cell  
c. as electrical cell                      d. none
16. Calomel electrode potential is dependent of \_\_\_\_\_ [     ]  
(a)  $\text{Cl}^-$  concentration      b)  $\text{Hg}_2\text{-Cl}_2$       c) Temperature                      d) None
17. Galvanic cell converts \_\_\_\_\_ [     ]  
(a)Electrical energy into chemical energy (b) Chemical energy into Electrical Energy  
(c)Electrical energy into heat energy (d) Chemical energy into heat energy
18. Daniel cell is a combination of standard electrodes of \_\_\_\_\_ [     ]  
(a)Cu & Ag      b) Zn & Cd      c) Zn & Cu      d) Cu & Cd
19. When storage cell is operating as voltaic cell it is said to be \_\_\_\_\_ [     ]  
a. charging b. discharging c. neutral d. none

20. A fuel cell converts \_\_\_\_\_ [      ]  
 a. chemical energy of fuels directly to electricity    b. chemical energy of fuels directly to heat  
 c. chemical energy of fuels directly to pressure    d. none
21. Nernst equation is \_\_\_\_\_ [      ]  
 a.  $E = E_0 - 0.0591/n \log [\text{Red}]/[\text{Oxd}]$                       b.  $E = E_0 + 0.0591/n \log [\text{Oxd}]/[\text{Red}]$   
 c.  $E = E_0 - 0.0591/n \log [\text{Red}]/[\text{Oxd}]$                       d.  $E = E_0 - 0.0591/n \log [\text{Oxd}]/[\text{Red}]$
22. Several electrochemical cells connected in series, that can be used as a source or direct electric current at a constant voltage is called \_\_\_\_\_ [      ]  
 a. battery            b. voltaic cell            c. electrolytic cell            d. metal conductor
23. in lead-acid storage cell during discharging operation the concentration of  $\text{H}_2\text{SO}_4$  \_\_\_\_\_ [      ]  
 a. increases                      b. decreases                      c. increase-decrease                      d. none
24. The standard reduction potential of Zn and Fe are  $-0.76\text{V}$  and  $-0.41\text{V}$  respectively. The emf for the cell reaction;  $\text{Fe}^{+2} + \text{Zn} \rightarrow \text{Zn}^{+2} + \text{Fe}$  is \_\_\_\_\_ [      ]  
 a)  $-0.35\text{V}$                       b)  $+ 0.35 \text{V}$                       c)  $+ 1.17\text{V}$                       d)  $-1.17 \text{V}$
25. Calomel electrode is constructed using a solution of \_\_\_\_\_ [      ]  
 a. saturated KCl            b. saturated  $\text{CaCl}_2$             c. saturated  $\text{NH}_4\text{Cl}$             d. saturated NaCl
26. When storage cell is operating as voltaic cell it is said to be \_\_\_\_\_ [      ]  
 a. charging            b. discharging            c. neutral            d. none
27. The electrode potential is the tendency of a metal \_\_\_\_\_ [      ]  
 a. to gain electrons            b. to lose electrons            c. either to lose or gain electrons            d. none.
28. The cell whose reaction is reversible is called \_\_\_\_\_ [      ]  
 a. Fuel cell            b. primary cell            c. secondary cell            d. none.
29. In the cell  $\text{Zn}/\text{Zn}^{++} // \text{Cu}^{++}/\text{Cu}$ , \_\_\_\_\_ [      ]  
 a. copper gets reduced                      b. Zinc gets oxidized  
 c. Zinc gets oxidized and copper gets reduced                      d. copper gets oxidized
30. The EMF of a Galvanic cell can be calculated from \_\_\_\_\_ [      ]  
 a. the size if the electrode                      b. the pH of the solution  
 c. the amount of metal in the anode                      d. The  $E_0$  values of the half cells
31. Corrosion is a process of \_\_\_\_\_ [      ]  
 a. oxidation            b. reduction            c. electrolysis            d. erosion
32. For the corrosion of iron one of the following factors is essential \_\_\_\_\_ [      ]  
 a. presence of moisture            b. presence of both moisture and oxygen  
 c. presence of hydrogen            d. presence of strong acid



46. Galvanization is done by \_\_\_\_\_ [     ]  
 a. electroplating      b. spraying      c. hot dipping      d. cementing
47. During wet corrosion \_\_\_\_\_ [     ]  
 a) Anodic part undergoes oxidation      b) cathodic part undergoes oxidation  
 c) Anodic part undergoes reduction      d) none of these
48. During the electrochemical corrosion in acidic environment \_\_\_\_\_ [     ]  
 a) O<sub>2</sub> evolution occurs      b) O<sub>2</sub> absorption occurs  
 c) H<sub>2</sub> evolution occurs      d) H<sub>2</sub> absorption occurs
49. During galvanic corrosion more noble metal acts as \_\_\_\_\_ [     ]  
 a) Anode      b) Cathode      c) anode as well as cathode      d) corroding metal
50. The function of ammonium chloride used as flux in galvanization is to \_\_\_\_\_ [     ]  
 a) To prevent oxide formation      b) to prevent deposition of impurities  
 c) Reduce base metal contacts      d) none of the above

### ANSWERS

1	2	3	4	5	6	7	8	9	10
c	d	d	a	a	a	d	c	a	a

11	12	13	14	15	16	17	18	19	20
c	b	b	a	a	a	b	c	b	a

21	22	23	24	25	26	27	28	29	30
d	a	b	b	a	b	c	c	c	d

31	32	33	34	35	36	37	38	39	40
a	b	c	b	a	c	b	c	a	c

41	42	43	44	45	46	47	48	49	50
a	a	c	b	b	c	a	c	b	a

### Module-3 Polymers and Composites

1. The least functionality of a monomer to convert into polymer is \_\_\_\_\_ [     ]  
 a) 1      b) 3      c) 2      d) 6
2. If the arrangement of functional groups on carbon chain is alternating. It is called \_\_\_\_\_ [     ]  
 a) Isotactic      b) Syndiotactic      c) Atactic      d) Tacticity
3. A plastic resin which becomes soft on heating & rigid on cooling is called \_\_\_\_\_ [     ]  
 a) Thermoplastic      b) thermo polymers      c) thermite      d) thermo setting
4. Functionality of trimethylol phenol is \_\_\_\_\_ [     ]  
 a) 1      b) 2      c) 3      d) 6

5. Plasticizers are materials which are added to resins to increase their \_\_\_\_\_ [     ]  
 a) Strength    b) corrosion resistance    c) stability    d) plasticity & flexibility
6. The polymerization in which two or more chemically different monomers take part is called \_\_\_\_\_ [     ]  
 a) Co-polymerization    b) chain polymerization  
 c) Addition polymerization    d) homo polymerization
7. The structural units of polymers are called \_\_\_\_\_ [     ]  
 a) Fibers    b) monomers    c) fabrics    d) thermo units
8. Compression moulding is used for \_\_\_\_\_ [     ]  
 a) Thermoplastic & thermosetting resins    b) only thermoplastic  
 c) Only thermosetting resins    d) neither thermosetting resins nor thermoplastic
9. The common plasticizers used for compounding of plastic resins is \_\_\_\_\_ [     ]  
 a) ZnO    b) acetyl sulphuric acid    c) vegetable oils    d) benzoyl peroxide
10. Which of the following group is needed for addition polymerization? [     ]  
 a) =C=O    b) --CHO    c) >C=C<    d) --CH<sub>3</sub>
11. The polymerization process in which water is produced when the monomers join to make a polymer is \_\_\_\_\_ [     ]  
 a) Condensation polymerization    b) Addition polymerization  
 c) Bonding polymerization    d) Cationic polymerization
12. All plastics are made up of long chains of atoms that are held together by \_\_\_\_\_ [     ]  
 a) Ionic bonds    b) Singlet linkage    c) Hydrogen bond    d) Covalent bonds.
13. The polymers in which two chemically equivalent monomers take place part called \_\_\_\_\_ [     ]  
 a) co-polymers    b) chain polymers    c) homo    d) hetero
14. High polymers are \_\_\_\_\_ [     ]  
 a) liquids polymers    b) gases polymers    c) solids    d) colloids
15. Thermo plastic resins is formed by the phenomenon of 3 \_\_\_\_\_ [     ]  
 a) Chain polymerization    b) condensation    c) nitration    d) chlorination
16. Phenol formaldehyde commercially called as \_\_\_\_\_ [     ]  
 a) PVC    b) bakelite    c) nylon-66    d) Teflon
17. Which polymer commercially used in textile \_\_\_\_\_ [     ]  
 a) PVC    b) bakelite    c) nylon 66    d) teflon
18. The polymer following is a high M.W material that can be moulded to any desired structure \_\_\_\_\_ [     ]  
 a) graphite    b) jelly c) resins    d) grease
19. The monomer in PVC is \_\_\_\_\_ [     ]  
 a) vinyl chloride    b) ethylene    c) Iso prene    d) chain polymer
20. The most commonly used polymer used in non-sticky cookware \_\_\_\_\_ [     ]  
 a) PVC    b) Teflon    c) Nylon-66    d) Bakelite

21. One of the important use of Bakelite \_\_\_\_\_ [    ]  
 a) Cables    b) cloth    c) electrical switches    d) conveyer belt
22. The fiber obtained by step polymerisation of hexamethylene di amine and adipic acid \_\_\_\_\_ [    ]  
 a) decran    b) nylon 66    c) teflon    d) bakelite
23. Which one of the following is not a macro molecule \_\_\_\_\_ [    ]  
 a) cellulose    b) rubber    c) protein    d) wood
24. The following is the monomer of Teflon \_\_\_\_\_ [    ]  
 ]  
 a) tetraflouro ethelene    b) tri flouro ethelene  
 c) di flouro ethelene    d) mono flouro ethane
25. The following polymer has amide links in structure \_\_\_\_\_ [    ]  
 a) nylon-66    b) Bakelite    c) PVC    d) terelene

**ANSWERS**

1	2	3	4	5	6	7	8	9	10	11	12
c	b	a	c	d	a	b	a	c	c	a	d

13	14	15	16	17	18	19	20	21	22
b	c	d	b	b	c	a	b	c	b

23	24	25							
d	a	a							

**Signature of Faculty**

**Signature of HOD**