

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI 600 086
(For candidates admitted from the academic year 2015-16)

SUBJECT CODE: 15CH/MC/PC64

B.Sc. DEGREE EXAMINATION, APRIL 2018
BRANCH IV - CHEMISTRY
SIXTH SEMESTER

COURSE : MAJOR-CORE
PAPER : PHYSICAL CHEMISTRY - III
TIME : 3 HOURS

MAX. MARKS : 100

SECTION – A
ANSWER ALL THE QUESTIONS

(30x1=30)

I. Choose the correct answer:

- An acid HA ionizes as $HA \leftrightarrow H^+ + A^-$. The pH of 1.0 M solution is 5. Its dissociation constant would be _____.
(a) 1×10^{-5} (b) 1×10^{-10} (c) 5 (d) 5×10^{-8}
- Strength of an acid depends on _____.
(a) hydrolysis (b) concentration of OH^- ions
(c) concentration of H^+ ions (d) no. of moles of base used for neutralization
- Ostwald dilution law is applicable for _____.
(a) weak electrolytes (b) strong electrolytes (c) basic (d) acids
- The charge required to liberate one gram equivalent of any substance is known as _____ constant.
(a) Time (b) Faraday's (c) Boltzmann (d) Einstein's
- During the charging of a lead-acid cell _____.
(a) its voltage increases (b) its cathode becomes dark chocolate brown in colour
(c) it gives out energy (d) specific gravity of H_2SO_4 decreases
- The role of catalyst is to change _____.
(a) Gibbs energy of reaction (b) enthalpy of reaction
(c) activation energy of reaction (d) equilibrium constant
- Half life of first order reaction is _____.
(a) greater (b) lesser (c) high (d) constant
- “It is only the absorbed light radiations that are effective in producing a chemical reaction”. This is the statement of _____.
(a) Lambert Law (b) Lambert – Beer Law
(c) Grothus – Draper Law (d) Stark – Einstein Law
- The number of molecules reacted or formed per photon of light absorbed is called _____.
(a) yield of the reaction (b) quantum efficiency
(c) quantum yield (d) quantum
- Electrolyte used for tin plating is _____.
(a) sulphide ore (b) stannous sulphate
(c) hydrogen sulphate (d) sodium chloride

II. Fill in the blanks:

11. When a salt is added to a solution of another salt having a common ion, the degree of dissociation, α , _____.
12. Molar solubility is the number of _____ of the substance per litre of the solution.
13. The pH of a solution of a salt of weak base and strong acid is _____.
14. The site of oxidation in an electrochemical cell is _____.
15. Reaction rates can change with _____.
16. The half life of radioactive sodium is 15.0 hours. _____ hours would it take for a 64 g sample to decay to one-eighth of its original concentration.
17. _____ stops as soon as the incident radiation is cut off.
18. The reactions which are caused by heat and in absence of light are called _____.
19. DME is _____.
20. The metal used as a coating on steel to limit corrosion is _____.

III. Match the following:

- | | |
|-----------------------|----------------------|
| 21. Solubility | (a) Half – life time |
| 22. ΔG | (b) Fire Fly |
| 23. $t_{1/2}$ | (c) DME |
| 24. Chemiluminescence | (d) E |
| 25. polarography | (e) S |

IV. Answer in a line or two:

26. Define the term ionic mobility.
27. Give the significance of salt bridge.
28. Write an example for a fractional order reaction.
29. What is photosynthesis?
30. What is the significance of Polarographic maxima?

SECTION – B**ANSWER ANY FIVE QUESTIONS:****(5x6=30)**

31. Explain Bronsted Lowry theory.
32. Explain the terms solubility and solubility product.
33. Derive Nernst electrochemical equation.
34. Explain concentration cells without transference.
35. Derive the rate constant for first order reaction.
36. Discuss Lindemann theory of unimolecular reactions.
37. (a) Write the applications of amperometry.
(b) In a first-order reaction, $A \rightarrow \text{products}$, $[A] = .0620 \text{ M}$ initially and $.520 \text{ M}$ after 15.0 min. What is the half-life, $t_{1/2}$, of this reaction?

SECTION – C

ANSWER ANY TWO QUESTIONS:

(2x20=40)

38. (a) Explain the variation of conductance with dilution. (5)
(b) Derive Henderson-Hasselbalch equation. (5)
(c) Write the applications of EMF measurements. (5)
(d) Discuss collision theory of bimolecular reactions. (5)
39. Explain the following :
(a) Transport number
(b) Calomel electrode
(c) Arrhenius parameters
(d) Chemiluminescence
(e) Ilkovic equation (5 x 4 =20)
40. (a) Explain the Potentiometric titrations. (5)
(b) Explain any one method for the determination of order of reaction. (5)
(c) Derive the kinetics of hydrogen – chlorine photochemical reaction. (5)
(d) Explain the quantitative analysis of polarography. (5)
