PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2022
(Fifth Semester)

Branch – CHEMISTRY

PHYSICAL CHEMISTRY - I

Time: Three Hours   Maximum: 75 Marks

SECTION-A (10 Marks)
Answer ALL questions
ALL questions carry EQUAL marks   (10 x 1 = 10)

1. The aqueous solution of which of the following compounds is the best conductor of electric current?
   (i)   Acetic acid   (ii) Hydrochloric acid
   (iii) Ammonia   (iv) Fructose

2. An increase in the conductivity equivalent of a solid electrolyte with dilution is primarily due to
   (i)   increased ionic mobility of ions
   (ii) 100 percent electrolyte ionisation with natural dilution
   (iii) increase in both ion numbers and ionic mobility
   (iv) a rise in ion counts

3. Electrophoretic effect is mainly due to
   (i)   Viscos resistance of the solvent   (ii) Size of the ion hv
   (iii) Charge of the ion   (iv) Radius of ion

4. The variation o conductance with frequency of alternative current (high frequencies) is called
   (i)   Debye – Falkenhagen effect   (ii) Wein effect
   (iii) Asymmetric effect   (iv) Electrophoretic effect.

5. What is the pH of a 0.10 M solution of barium hydroxide, $Ba(OH)_2$?
   (i)   11.31   (ii) 11.7
   (iii) 13.30   (iv) 44.1

6. Among the following the weakest Bronsted base is
   (i) F^- (ii) Cl^-
   (iii) Br^- (iv) I^-

7. Calomel electrode is reversible with respect to
   (i) Cl^- ions   (ii) H^+ ions
   (iii) Hg^+ ions   (iv) K^+ ions

8. Units of Kw are
   (i) $mole^2\ dm^{-3}$ (ii) $mole^2\ dm^{-6}$
   (iii) $mole^2\ dm^{-2}$ (iv) $mole\ dm^{-3}$

9. What is the main principle of electroplating?
   (i)   Hydrolysis   (ii) Neutralization
   (iii) Esterification   (iv) Saturation

10. Which of the following is not an application of electroplating?
    (i)   Decorative purposes   (ii) Coating of metal
    (iii) Metal protection   (iv) Corrosion prevention

SECTION - B (25 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** Marks   (5 x 5 = 25)

11. a   State the terms: i) Conductance ii) Molar conductance iii) Ohm's law.
OR
   b   Outline the Faraday's law of electrolysis.

12. a   Outline the limitations of Arrhenius theory of strong electrolytic dissociation.
OR
   b   How is dissociation constant determined by Ostwald dilution law?

13. a   Explain the following acids and bases: i) Lowry and Bronsted concept ii) Lewis concept.
OR
   b   Summarize the following, i) Levelling effect ii) Common ion effect.

14. a   Explain the metal-metal insoluble salt electrodes with examples.
OR
   b   State and explain the electrochemical series.

15. a   Summarize the role of copper coating before Ni and Cr plating.
OR
   b   Explain about the coating processes.

SECTION -C (40 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** Marks   (5 x 8 = 40)

16. a   Enumerate the determination of transport number by moving boundary method.
OR
   b   Discuss the principle and applications of Kohlrausch law.

17. a   Discuss the types of conductometric titrations.
OR
   b   Derive the Debye-Huckel theory of strong electrolytes.

18. a   i) Discuss the relationship between the pH and buffer.
       ii) Highlight the applications of buffer solutions.
OR
   b   Derive the hydrolysis constant and degree of hydrolysis of salt of weak acid and strong base.

19. a   Discover the different types of concentration cells.
OR
   b   Elucidate the potentiometric titrations.

20. a   Enumerate the different kinds of plating.
OR
   b   Discuss the types of corrosion and corrosion monitoring techniques.

Z-Z-Z   END