

10. (a) (i) What is quantum yield? How is it determined? (5)
(ii) Mention the reasons for high and low quantum yields. (5)

Or

- (b) (i) What are photovoltaic cells? Explain its applications. (5)
(ii) Give an account on photo assisted electrolysis of water. (5)

S.No. 347

12PCHZ03

(For the candidates admitted from 2012-2013 onwards)

M.Sc. DEGREE EXAMINATION, APRIL/MAY 2018.

Third Semester

Chemistry

ELECTROCHEMISTRY AND PHOTOCHEMISTRY

Time : Three hours

Maximum : 75 marks

SECTION A — (5 × 5 = 25 marks)

Answer ALL questions.

1. (a) What are electro kinetic phenomena? How do they depend on the electrification of interface between two phases?

Or

- (b) Derive the Debye-Huckel-Onsager equation. Give its significance.

2. (a) Describe the working principle and applications of cyclic voltametry.

Or

- (b) What is over potential? How is it affected by various factors? Explain.

3. (a) What are fuel cells? How are they classified? Mention their superiorities.

Or

- (b) Distinguish between corrosion and passivation of metals with suitable examples for each.

4. (a) Using Jablonski's diagram, explain the term internal conversion and intersystem crossing.

Or

- (b) Give an account on exciplex formation and its decay.

5. (a) What is excimer? How is it formed? Explain.

Or

- (b) Describe the kinetics of photosynthesis of HBr from hydrogen and bromine.

SECTION B — (5 × 10 = 50 marks)

Answer ALL questions.

6. (a) Describe the Gouy-Chapman theory of electrical double layer. Give its limitations. How is it overcome? (10)

Or

- (b) Derive the Lippmann capillary equation. Mention its applications. (10)

7. (a) Derive the Butler-Volmer equation for one step electron transfer reactions. Give its importance. (10)

Or

- (b) (i) What is transfer coefficient? Give its significance. (5)

- (ii) Explain the principle of Polarography. (5)

8. (a) Explain the working principle, applications, merits and demerits of lead-acid batteries. (10)

Or

- (b) Construct the Evans diagram and explain its importance. (10)

9. (a) (i) State and explain Franck-Condon principle. (5)

- (ii) What is fluorescence? How is it affected by various factors? Explain. (5)

Or

- (b) Derive the Stern-Volmer equation. Give its uses. (10)