

OCTOBER 2012

P/ID 40132/PCHM

Time : Three hours

Maximum : 100 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

All questions carry equal marks.

1. Define : Corrosion.
2. What is called the Ohm?
3. What do you mean by standard potential?
4. Define : Thermodynamic probability.
5. State the Stirling's approximation.
6. What do you mean by canonical ensemble?
7. State the Debye T^3 law.
8. What is called a triplet?
9. What is known as concentration quenching?
10. What is known as the natural radiative lifetime of an atom?

PART B — (4 × 20 = 80 marks)

Answer ALL questions.

All questions carry equal marks.

11. (a) (i) Derive the Butler Volmer equation. (10)
- (ii) Explain the principle and operation of a hydrogen/oxygen fuel cell. (10)

Or

- (b) (i) Sketch Evan's diagram and explain. (10)
- (ii) Write notes on over potential and polarization. (10)
12. (a) (i) Derive MB statistics. (10)
- (ii) Give a comparative account of Einstein and Debye theories of specific heats of solids. (10)

Or

- (b) (i) What is called partition function? Derive an expression for vibrational partition function. (10)
- (ii) Prove $S = k \ln w$. (5)
- (iii) Derive the Sackur-Tetrode equation. (5)

2 P/ID 40132/PCHM

13. (a) (i) Distinguish between fluorescence and phosphoresence. (5)
(ii) Describe the Stern-Volmer analysis.(10)
(iii) Explain the Franck-Condon principle. (5)

Or

- (b) (i) What are called excimers and exciplexes? Explain. (5)
(ii) Write note on intersystem crossing. (5)
(iii) Explain the theory of radiation less transition. (10)
14. (a) (i) How will you determine the quantum yield? (10)
(ii) Write notes on solar energy conversion. (10)

Or

- (b) (i) Discuss the kinetics of photochemical reactions. (10)
(ii) Write note on actinometry and steady state principle. (10)
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