B.Tech. (C.S.E./C.E./I.T./C.T./C.S.E. (DATA SCIENCE)/C.S.E. (AI & ML)/C.S.E. (CYBER SECURITY/AI/AIML/AIDS/IOT/ROBOTICS AI) (NEP) Semester–I (2024-2025) Examination

ESSENTIALS OF CHEMISTRY

Time : Three Hours] [Maximum Marks : 70

Note :— (1) Each question carries marks as indicated.

(2) Assume suitable data wherever necessary.

(3) Illustrate your answers wherever necessary with the help of neat sketches.

1. (a) Discuss the lithium cobalt oxide batteries with cell reaction working and application. 7

(b) What are super capacitors ? Write different types of super capacitors and explain any one. 7

OR

2. (a) Write note on quantum dot sensitized solar cell. 4

(b) Describe H_2O_2 fuel cell with construction, working, chemical reaction, advantages and applications. 10

3. (a) Discuss the properties of Lanthanides and its applications in electronics. 7

(b) What is e-waste ? Discuss the types of e-waste. 7

OR

4. What is green chemistry ? Discuss & explain various principles of Green Chemistry. 14

5. (a) What is nanomaterials ? Discuss classification of nanomaterials. 7

(b) Differentiate between single wall & multiwalled CNT. 7

OR

6. What is top down and bottom up technique for nanomaterial synthesis ? Explain the Physical vapor deposition technique with advantages and disadvantages. 14

7. (a) A cell has thickness of 1.5 cm containing 7×10^{-4}M solution of certain salt. If the transmitted light is 35% of the incident light of the wavelength 545nm. Calculate the molar extinction coefficient. 4

(b) Discuss the working of High performance Liquid Chromatography with well labelled diagram. State its application, advantages & disadvantages. 10

OR

8. (a) What is DTA ? Differentiate Thermal Analysis & how does it work ? 7

(b) What is XRD ? Explain the basic concept of XRD with the well labelled Bragg's law diagram. 7

(Compulsory)

9. Solve any **seven** :

(a) Differentiate between Supercapacitor and Battery.

(b) Write a short note on application of Graphene.

(c) Write a short note on application of nanoparticles.

(d) Discuss the Extraction of Rare Earth element—any one.

(e) Write a short note on TGA.

(f) Discuss green servers.

(g) Explain green computing. Define galvanic series giving suitable example. 2×7=14

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