carefully and answer.

(Non-anonymous question ⓘ) *

(30 Points)

1. Explain the extrusion molding technique for polymer processing with application. **[3 marks]**
2. In a Beer-lambert law cell, the aqueous solution of a substance of known concentration absorbs 10 percent of the light. What fraction of the incident light will be absorbed by a five times as long? **[3 marks]**
3. The molar absorption coefficient of a substance dissolved in cyclohexane is 1710 L mol^{-1} cm^{-1} at 500 nm. The reduction in intensity of light of the same wavelength that passes through a cell of 1 mm path length containing a 2 mmol L^{-1} solution is _____%.? **[2 marks]**
4. Classify nanoparticles very briefly with one examples. **[3 Marks]**
5. Describe the electrochemical (anodic and cathodic) reactions for galvanic corrosion. Give one example of passivation and sacrificial anodic protection. **[3+1 marks]**
6. A sample of water on analysis gave the following results: **[3 marks]**

   Ca^{2+} = 30 mg/L; Mg^{2+} = 24 mg/L; CO_2 = 24 mg/L; HCl = 50 mg/L; K^+ = 10 mg/L

   (i) Calculate the total hardness of water sample

   (ii) Also calculate the quantities of lime and soda needed for softening one litre of this water sample

7. Explain the effect of the following in boiler feed water : (i) silica (ii) CO_2 **[2 marks]**
8. Why can caustic embrittlement be controlled by adding sodium sulphate to boiler feed water? **[1 marks]**
9. Write down the Nernst's equation and calculate the reduction potential for the reduction of O_2 at pH=7. Given partial pressure of O_2 [pO_2] = 0.20 bar and E° = 1.229 V at 25°C.

   The reduction reaction involved is given: $2H^+ + \frac{1}{2}O_2(g) + 2e^- \rightleftharpoons H_2O(l)$ **[2 marks]**
10. Give the example of following dyes with structures

    a) Indigo dye and

    b) anthraquinone dye **[2 marks]**
11. What is the Pharmaceutical phase and Pharmacodynamics phase? **[1 mark]**
12. What is antagonist? **[1 mark]**
13. What is bioavailability? **[1 mark]**
14. What are the requirements of ideal drug? (write four criteria) **[2 marks]**

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