D 41995 (Pages : 2) Name.....

Reg. No.....

FOURTH SEMESTER B.Sc. DEGREE EXAMINATION, APRIL 2018

(CUCBCSS–UG)

Complementary Course

CHE 4C 04—PHYSICAL AND APPLIED CHEMISTRY

Time : Three Hours Maximum : 64 Marks

Section A (one word)

Answer **all** *questions.*
Each question carries 1 *mark.*

1. ——— is used for quantifying the protective power of a lyophilic colloid.
2. A positive catalyst will ——— the activation energy of a reaction.
3. In paper chromatography the solvent rises through the column by ———.
4. The spacing between spectral lines in rotational spectra is equal to ———.
5. The total number of degrees of freedom for a polyatomic linear molecule containing 'n' atoms is ———.
6. The monomer of nylon 6 is ———.
7. Burning of chlorine containing plastics are dangerous, due to the formation of ———.
8. A primary pollutant which will be a causative agent of photochemical smog is ———.
9. The presence of chromophores like NO_2 causes ——— shift in absorption spectrum, due to n-π^* transition.
10. ——— is the most common preservative used in food.

(10 × 1 = 10 marks)

Section B (Short Answer)

Answer any **seven** *questions.*
Each question carries 2 *marks.*

11. Among Na^+, Al^{3+}, Mg^{2+} which ion is having highest coagulating power ? Why ?
12. What are associated colloids ? Give examples.
13. Prove that the half life period of first order reaction is independent of initial concentration of reactant.
14. Write the principle of partition chromatography.
15. What is the importance of retention value in gas chromatography ?
16. How will you prepare Buna S rubber ?

Turn over

17. What do you mean by biological accumulation ?
18. What is green house effect ?
19. Detergents are preferred to soaps in washing of clothes in hard water. Why ?
20. What is talc ?

(7 × 2 = 14 marks)

Section C (Paragraph)

Answer any **four** *questions.*
Each question carries 5 *marks.*

21. What are the causes and consequences of ozone depletion ?
22. How are the vibrational frequencies related to vibrational energy ? From this relation drive the value of zero point energy.
23. Briefly explain the principle and applications of thin layer chromatography.
24. Give a brief account of the applications of colloids.
25. Write any two methods of find the order of a reaction.
26. Write a short note on the source and the importance of Neera.

(4 × 5= 20 marks)

Section D (Essays)

Answer any **two** *questions.*
Each question carries 10 *marks.*

27. (a) Derive the integrated rate expression for a second order reaction of the type $2A \rightarrow$ products.
    (b) The rate constant of second order reaction is 5.70×10^{-5} dm^3 $mole^{-1}$ s^{-1} at 25° C. and 1.64×10^{-4} dm^3 $mole^{-1}$ s^{-1} at 40° C. Calculate the Arrehenius parameters.
28. Write short notes on (i) Spin-spin coupling ; (ii) Beer-Lambert's law ; (iii) Finger print region ; (iv) Chemical shift.
29. What are biodegradable polymers ? Write the preparation and applications of PHBV, PGA and PLA.
30. What are dyes ? How they are classified ? Describe the theory of dyes.

(2 × 10= 20 marks)