C 21263 (Pages : 2) Name.....

Reg. No.....

FOURTH SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION
APRIL 2022

Chemistry

CHE 4C 04—PHYSICAL AND APPLIED CHEMISTRY

(2014—2018 Admissions)

Time : Three Hours Maximum : 64 Marks

Section A (One Word/Sentence)

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

1. The size range of colloidal particle is ————————.
2. Colloidal solution containing solid as dispersed phase and gas as dispersed medium is called
3. The unit of rate constant for a first order reaction is ————————.
4. In adsorption chromatography, the stationary phase is ————————.
5. The ratio of distance travelled by a component to the distance travelled by the solvent front thin layer chromatography is ————————.
6. Chemical substance used to reduce anxiety and tension is called ————————.
7. Paracetamol is an example for ———————— drug.
8. The minimum energy required for an effective collision which results in a chemical reaction is ————————.
9. Compound responsible for greenhouse effect is ————————.
10. The characteristic stretching frequency of free O--H bond is ————————.

(10 × 1 = 10 marks)

Section B (Short Answer)

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

11. Define gold number and write the importance of gold number
12. The first order reaction is completed by 20 % in 10 minutes. Calculate the time taken for the reaction in minutes for 75 % completion.
13. Write the selection rule for vibrational spectroscopy.
14. Draw the low resolution and high resolution ^{1}H NMR spectra of ethanol.

Turn over

15. What is Soap ? Mention the difference between hard and soft soap.
16. Differentiate between thermo plastic and thermosetting plastic.
17. Write the advantages and disadvantages of detergents over soap.
18. Briefly discuss the composition of talcum powder.
19. What do you mean by green house effect ?
20. Derive the integrated rate expression for first order reaction.

(7 × 2 = 14 marks)

Section C (Paragraph)

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

21. Discuss the origin of charge on colloidal particle.
22. Write the Arrhenius equation and explain the terms. The rate constant of a reaction at two temperatures 273 K and 303 K are $2.46 \times 10^{-5}\ S^{-1}$ and $1.63 \times 10^{-4}\ S^{-1}$. Calculate the activation energy of the reaction.
23. Explain the different types of electronic transitions.
24. Outline the structure and applications of Dacron polymer.
25. Give the sources and effects of the pollutant CO.
26. Write the composition and health effects of hair dye.

(4 × 5 = 20 marks)

Section D (Essay)

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

27. (a) Write any *five* applications of colloids.
    (b) What is the principle of TLC ? How does it work ?
28. (a) Describe the collision theory of reaction rate.
    (b) Explain how the temperature can affect the rate of a chemical reaction.
29. (a) Write the different steps involved in the manufacture of glass.
    (b) Explain the different type of glasses and mention their uses.
30. Write the source, effect and control measures of thermal pollution.

(2 × 10 = 20 marks)