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Sl.No.

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V Semester III B.Sc. Examination, March/April - 2021 (Scheme Semester (CBCS)) (2018-19 Batch and Onwards) CHEMISTRY (DSE) (Paper - V)

Time : 3 Hours   **Max. Marks : 80**

Instruction: Write equations and draw neat diagrams wherever necessary.

PART-A

Answer all the questions: [8 × 1 = 8]

1. a) What are sedatives?

    b) Write the structure of pyrimidine.

    c) Give a biological importance of vit-K.

    d) Write the constituents of borosilicate glass.

    e) Mention an application of carbon-nanotubes.

    f) What is radiolysis?

    g) Define "Ionic yield'.

    h) Write the selection rule for vibrational transition.

PART-B

(Inorganic Chemistry)

Answer any three questions: [3 × 8 = 24]

2. a) Mention raw materials and their role, used in the production of ceramics.   [3]

    b) Write a note on mixed and compound fertilizers.   [3]

    c) What is anodising? How is it carried out?   [2]

3. a) Discuss the composition and use of the following: [4]

        i) Sodalime glass

        ii) Lead glass.

    b) What are water paints and oil paints?   [2]

    c) Write a note on quick setting cement.   [2]

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4. a) Explain the function of the following: [4]

   i)   Thinners   ii) Pigments

   iii) Vehicle   iv) Fillers

   b) Explain annealing of glass. [2]

   c) Write a note on semiconducting oxides. [2]

5. a) Discuss the manufacture of urea. [3]

   b) What are heat resistant and fireretardant paints? [3]

   c) Give industrial applications of carbon fibres. [2]

PART-C

(Organic Chemistry)

Answer any <u>three</u> questions: [3 × 8 = 24]

6. a) How do you convert uric acid to Caffeine? [3]

   b) What are alkaloids? How are they classified based on heterocyclic ring. [3]

   c) Write the structure of morphine. [2]

7. a) Give the mechanism of Skrup's synthesis of quinoline. [4]

   b) Write the synthesis of sulphaguanidine. [2]

   c) Explain the aromaticity of pyrrole. [2]

8. a) Discuss the electrophilic substitution reaction of pyridine with an example. [3]

   b) Give the importance of estradiol and progesterone. [2]

   c) Outline the synthesis of citral. [3]

9. a) How is Adrenaline synthesized? [3]

   b) What are antibiotics? Give an example. [2]

   c) How do you prove the presence of following in vitamin-A [3]

   i)   Carbon -carbon double bonds.

   ii) Primary alcoholic group.

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PART-D

(Physical Chemistry)

Answer any <u>three</u> questions: $[3 \times 8 = 24]$

10. a) State and derive the mathematical form of Lambert -Beer's Law. [4]

 b) Mention any two applications of IR spectroscopy. [2]

 c) What is fluorescence? Give an example. [2]

11. a) How are stoke's lines and Anti stoke's lines formed in Raman spectrum? [3]

 b) A system absorbs 2×10^{16} quanta per second. When it is irradiated for 15 minutes, it is found that 3×10^{-4} moles of reactant have reacted. Calculate the quantum yield (ϕ). https://www.uomonline.com [3]

 c) Write a note on photosensitization. [2]

12. a) Derive the expression, $I = \mu r^2$ for a diatomic molecule as a rigid rotor. [4]

 b) Sketch the vibrational modes of H_2O. [2]

 c) Mention the types of electronic transitions that take place during the absorption of electromagnetic radiation in uv-visible region. [2]

13. a) Explain the radiolysis of benzene. [3]

 b) The fundamental vibrational frequency of HCl is $2890 cm^{-1}$. Calculate the force constant: ($\mu = 1.626 \times 10^{-27}$ kg) [3]

 c) Give any two reasons for Low quantum yield. [2]

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