Manimekalai

Avinashilingam Institute for Home Science and Higher Education for Women

(Deemed to be University under Category 'A' by MHRD, Estd. u/s 3 of UGC Act 1956)
Re-accredited with 'A+' Grade by NAAC. Recognised by UGC Under Section 12B
Coimbatore - 641 043, Tamil Nadu, India

Bachelor's Degree Examination – June / July 2021
II Semester

Class : I UG **Time : 3 Hours**
Major : Chemistry **Max. Marks : 100**

18BCHC04 Basic Concepts of Chemistry-I

Part A **10 x 1 = 10**
Choose the Correct Answer

1. The well behaved function ψ is CO3 K2
   a. single valued b. continuous
   c. finite d. all of the above

2. de Broglie wave equation is CO3 K1
   a. E = hu b. $E = mc^2$
   c. $\lambda = h/p$ d. none of the above

3. Direct nitration of phenol with conc. HNO_3 gives poor yield of picric acid due to its CO2 K3
   a. reduction b. oxidation
   c. hydrolysis d. ring destruction

4. Name the reagent that will not convert 1-butanol to 1-chlorobutane. CO2 K3
   a. $SOCl_2$ b. PCl_3
   c. HCl d. CCL_4

5. Aldol condensation provides a suitable route for the preparation of CO2 K4
   a. α, β –unsaturated compounds b. β, γ unsaturated compounds
   c. acid derivatives d. amines

6. Benzoin condensation is catalysed by CO2 K4
   a. chloride ion b. sulphate ion
   c. cyanide ion d. carbonate ion

7. The best method of separation of a sulphide ore from its impurities is CO1 K1
   a. magnetic separation b. froth flotation
   c. gravity method d. van-Arkel refining

8. The role of $CaSO_4$ in chromatography is CO1 K4
   a. eluent b. binder
   c. adsorbate d. ion exchange resin

9. A hole in a semiconductor differs from an electron in that CO5 K2
   a. it has same mass as that of proton b. it is positively charged vacancy
   c. it has same mass as that of positron d. it has zero mass

10. In a FCC lattice, the number of nearest neighbours around each atom is CO5 K4
   a. 8 b. 12
   c. 4 d. 6

Part B **5 x 6 = 30**

Answer ALL questions

Each answer should not exceed 400 words or two pages

11.a. State Heisenberg's uncertainty principle and discuss on it. CO3 K2

(or)

11.b. Calculate the wavelength of an α particle having mass of 6.6×10^{-27} kg moving with a speed of 10^5 m sec^{-1}. CO3 K4

12.a. Discuss the preparation of glycerol from propene. CO2 K2

(or)

12.b. i. Predict the product and give the mechanism of the following.

$C_6H_5OH + CHCl_3 + 3NaOH \xrightarrow{333\text{-}343K}$

ii. How does phenol react with a) Br_2/H_2O b) Con.HNO_3 c) Zn/Δ. CO2 K3

13.a. Illustrate i. Knoevenagel reaction

ii. Wolff-Kishner reduction with suitable mechanisms. CO2 K2

(or)

13.b. $2C_6H_5CHO \xrightarrow{NaOH} ? + ?$ Explain the mechanism behind this reaction. CO2 K4

14.a. Discuss on i. Electrolytic reduction ii. Froth flotation CO4 K2

(or)

14.b. Write explanatory notes on i. Calcination ii. Roasting CO4 K3

15.a. Examine the arrangement of atoms in both HCP and CCP crystal systems. CO5 K3

(or)

15.b. Generalize on the metal excess defect in crystals. CO5 K5

Part C **5 x 12 = 60**

Answer ALL questions

Each answer should not exceed 800 words or four pages

16.a. i. What are the observations of photoelectric effect experiment? Adapt photoelectric effect on the basis of quantum theory?

ii. Write a short note on Compton effect. CO3 K5

(or)

16.b. i. What is Schrodinger wave equation? Explain the terms involved in it.

ii. Elaborate on the significance of ψ and ψ^2 . CO3 K4

17.a. An alcohol, 'A' reacts with $SOCl_2$ to produce 'B' , which further reacts with magnesium metal to form Grignard reagent, 'C' . The compound 'C' on reaction with acetone and upon hydrolysis in acidic medium gives a product 'D'. Identify the compounds A, B, C, D and write the structural formula and suggest mechanism of these reactions. CO2 K4

(or)

17.b. i. Discuss Williamson synthesis of preparation of ethers. Give its mechanism.

ii. Predict the products from the reaction of ethylene oxide with (a) HI (b) excess HI (c) H_2SO_4/ H_2O (d) acidic CH_3OH CO2 K4

18.a. Propose with mechanism of the following:

i. Perkin Condensation ii. MPV Reduction. CO2 K4

(or)

18.b. How does CH_3CH_2MgI react with i. an ester ii. a ketone iii. an aldehyde iv. an acid chloride v. carbondioxide. CO2 K4

19.a. Narrate the refining of minerals by

i. vapor phase and ii. electrolytic method. CO4 K3

(or)

19.b. Confine to a detailed script of

i. chromatography and ii. ion exchange method. CO4 K3

20.a. Itemize the defects based on

i. schottky & frenkel and ii. non-stoichiometric with neat sketch. CO5 K5

(or)

20.b. Report a note on Cyano monoamine nickel II clathrate. Summarize the properties and application of clathrates. CO5 K5

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