Total number of printed pages: **4** **Programme(D)/1st Semester/DCH102**

2022

CHEMISTRY

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

Answer question no.1 and any four from the rest

1. Choose the correct answer: 20

(a) Which of the following statement is not correct
(i) Cellulose is an example of synthetic polymer (ii) PE is an addition polymer
(iii) PVC is a homopolymer (iv) None

(b) Sulphide ores can be concentrated by
(i) Froth-flotation method (ii) Magnetic separation method
(iii) By smelting process (iv) None

(c) SiO_2 is an example of
(i) Basic flux (ii) Acidic Flux (iii) A slag (iv) None

(d) Which one of the following statement is correct
(i) Silver can be extracted by amalgamation method (ii) Sulphide ores are concentrated by Calcination (iii) Roasting is a reduction reaction
(iv) None

(e) Which one of the following is semisynthetic polymer
(i) Nitrocellulose (ii) Nylon (iii) Bakelite (iv) None

(f) Saturated acyclic hydrocarbons are called
(i) Alkanes (ii) Alkenes (iii) Alkynes (iv) Alcohol

(g) Lower alkanes C1 to C4 are:
(i) Gases (ii) Liquids (iii) Solid (iv) All the above

(h) Ethyl alcohol is:
(i) Primary Alcohol (ii) Secondary Alcohol
(iii) Tertiary Alcohol (iv) None of the above

(i) When two molecules of alkyl bromides are treated with Na in the presence of dry of dry ether, it produces alkane compounds. The name of the reaction is:
(i) Wurtz Reaction (ii) Dehydration Reaction
(iii) Hydrogenation Reaction (iv) Oxidation Reaction

(j) Portland cement is the example of:

(i) Non-hydraulic (ii) Hydraulic
(iii) Both hydraulic and non-hydraulic (iv) Calcium Oxide

(k) Who discovered electrons?
(i) J J Thomson (ii) Goldstein (iii) Chadwick (iv) Bohr

(l) Atomic mass of Cl is
(i) 33 (ii) 34 (iii) 35 (iv) 36

(m) The shape of *p* orbital is
(i) Trigonal planar (ii) Circular
(iii) Dumbbell shaped (iv) Spherically symmetrical

(n) _____ is an example of nuclear fuel.
(i) ^{233}U (ii) ^{234}U (iii) ^{235}U (iv) ^{236}U

(o) The process of refining crude oil involves separating the hydrocarbons into fractions or batches using a technique called_____.
(i) Filtration (ii) Distillation
(iii) Sublimation (iv) Fractional distillation

(p) . Which of the following is strong electrolyte:
(a) CH_3CH_2COOH (b) KNO_3 (c) CH_3COOH (d) NH_4OH

(q) The reaction: Zn (S) $\rightarrow Zn^{2+} + 2e$ is an example of
(a) Oxidation Reaction (b) Reduction Reaction
(c) Can be both oxidation and reduction reaction (d) None of the above

(r) Dissociation of ionic compounds by passing electricity is known as
(a) Redox reaction (b) Electrochemical reaction
(c) Electrolytic reaction (d) Electro-dynamic reaction.

(s) Temporary hardness of water is because of following pair of metal salts:
(a) $Ca(HCO_3)_2$ and $Mg(HCO_3)_2$ (b) $CaCl_2$ and $MgCl_2$
(c) $CaSO_4$ and $MgSO_4$ (d) $CaCO_3$ and $MgCO_3$

(t) Which of the following metal is responsible for the tragedy of Minamata (Japan)?
(a) Cd (b) Hg (c) As (d) Pb

2. (a) Distinguish between co-polymer and homo-polymer. What are the various classes of co-polymer? Give names. 2+4

(b) What are the three classes of polymer based on Source? Define each classes 3+2

with example.

(c) " All ores are minerals but all minerals are not ore." Explain the statement. 3

(d) Distinguish between calcination and leaching 3

(e) Give a schematic representation for metal extraction methods from concentration of ores to refining of metal. 3

3. (a) State the modern periodic law 2

(b) Define the terms orbit and orbital. 2

(c) Define flash point and fire point of a liquid fuel. 2

(d) Explain why an odoriser is generally used in gas fuels. 2

(e) Define atomic number and atomic mass giving examples. 4

(f) Define the term lubricant and give two examples. Mention two functions of lubricants. 4

(g) Write short notes on producer gas and power alcohol. 4

4. (a) Draw the following structure 2

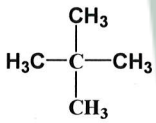
(i) 2,3,6-Trimethylheptane

(ii) Butene-2

(iii) Propyne-1

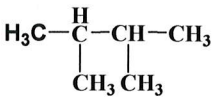
(iv) Propanol-1

(b) Give IUPAC names of the following compounds 2

(i) 

(ii) $CH_3\ CH{=}CH\text{-}CH_3$

(iii) $CH_3\ CHOH\ CH_3$

(iv) 

(c) What is cement? Give composition of portland cement. 1+2

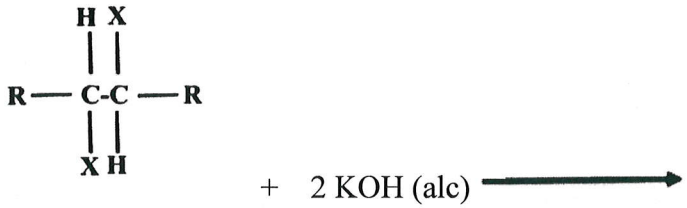
(d) Describe the production process for cement. 3

(e) Complete the following reaction (any three) 6

$R_3C{=}CHR + O_3 \longrightarrow$

$CH_4 + 2O_2 \longrightarrow$

$CH_2 = CH_2 + H_2O$ + cold and dilute $KMnO_4$ [O] $\longrightarrow$



(f) An alkene compound A is treated with HBr, it produces 2-bromoalkane compounds B. Write down the reactions and identify A and B. 2+2

5. (a) What are the differences between strong electrolytes and weak electrolyte? Discuss with examples 2

(b) Discuss Faraday's 1st law of electrolysis. Define electrochemical equivalent. 4

(c) When 3 amperes of electric current are passed for 25 minutes through a $AgNO_3$ solution, 5g of silver is deposited. Calculate electrochemical equivalent of Ag. 4

(d) What are the major sources of air pollutants? Write down sources, biological effects and control measures about the following air pollutants: (i) SO_2, (ii) CO, and (iii) Particulates 6

(e) Write short note on (any one): (a) Acid rain (b) Photochemical smog 4

6. (a) What are the differences between electrolytic reaction and electrochemical reaction? 3

(b) Define (i) Primary pollutants and (ii) Secondary pollutants with examples 3

(c) Point out the differences between B.O.D. and C.O.D. 4

(d) Explain the use of Aufbau principle, Pauli's exclusion principle and Hund's rule in writing electronic configuration of an element. 4

(e) What is combustion of fuels? Differentiate between gross and net calorific values of fuels. 4

(f) Write down the electronic configuration of Fe (Atomic number 26). 2

7. (a) A compound with molecular formula is C_5H_{12}, draw the possible isomers and give IUPAC names 2+2

(b) A compound with molecular formula is C_2H_6O, draw the possible functional compounds. 1+1

(c) Write short notes on (any two): 2+2
(i) Positional isomerism (ii) Halogenation of alkanes (iii) Hydraulic cement
(iv) Applications of alkanes and akynes

(d) Write short notes on (any two): (i) Nylon 6,6 (ii) Bakelite (iii) PVC (iv) PP 2+2
(v) Teflon

(e) Define flux. Give examples of acidic and basic flux with proper example. 2+2

(f) What is self- reduction process? 2