QP CODE: 24900053

Reg No:.....

Name:.....

MAHATMA GANDHI UNIVERSITY, KOTTAYAM

FIRST SEMESTER MGU-UGP (HONOURS) REGULAR EXAMINATION NOVEMBER 2024

First Semester

Discipline Specific Core Course - MG1DSCCHE100 - FUNDAMENTALS OF CHEMISTRY-I

(2024 ADMISSION ONWARDS)

Duration: 1.5 Hours Maximum Marks: 50

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Interest (I), Appreciation (Ap), and Skill (S)

Students should attempt atleast one question from each course outcome to enhance their overall outcome attainability.

[Learning Domain][CO No(s)]

Part A
Multiple Choice Questions
Answer all questions.
Each question carries 1 mark.

1 Which of the following is not a spectral series in the line spectrum of hydrogen? [K] [1]

a) Lyman b) Balmer

c) Hund's d) Paschen

2 The uncertainty principle was developed by [K] [1]

a) Sommerfield b) Bohr

c) Heisenberg d) Schrodinger

3 Which series of lines in the line spectra of hydrogen atoms lies in the visible region of electromagnetic radiation? [K] [1]

a) Lyman b) Balmer

c) Paschen d) Bracket

4 Homolytic fission of chlorine molecule in presence of UV light gives [A] [3, 4]

a) electrons b) chloronium ion

c) chlorine free radical d) chloride ion

5 Organic ions which contain positively charged carbon atom are called [K] [3, 4]

a) Carbocations b) Carbanions

c) Free radicals d) None of these

6 Which scientist proposed the concept of matter waves? [K] [1]

a) Max Planck b) Albert Einstein

c) Louis de Broglie d) Neils Bohr

7 Which of the following is an organic compound commonly used as a fertilizer to help plants grow? [K] [2]

a) Urea b) Ammonium nitrate

c) Potassium sulphate d) Calcium phosphate

8 Which of the following is not the characteristic property of metalloids? [K] [5]

a) They are highly malleable and ductile b) Semi-conductive behavior depending on conditions

c) They form acidic oxides like non-metals d) They are brittle like non-metals.

9 While moving down in a group, the metallic character: [K] [5]

a) Increases b) Decreases

c) Remains constant d) First decreases then increases.

10 What is the primary characteristic of a covalent bond? [K] [5]

a) Complete transfer of electrons b) Sharing of electron pairs

c) Formation of charged ions d) Attraction of metallic ions

(10 × 1 = 10)

Part B

Short Answer Type Questions
Answer four questions.
Each question carries three marks

11	Explain any three limitations of Bohr theory.	[U]	[1]
12	Using Heisenberg's uncertainty principle, calculate the uncertainty in velocity of an electron if uncertainty in its position is 10^{-11} m. Given h = 6.626 x 10^{-34} kg m^2/s and mass of electron is 9.1 x 10^{-31} kg	[A]	[1]
13	Using curved arrow notation, illustrate the formation of reactive intermediates through heterolytic bond cleavage with a suitable example.	[A]	[3, 4]
14	Why is chloroacetic acid more acidic than acetic acid	[U]	[3, 4]
15	List the merits and demerits of Mendeleev's periodic table.	[U]	[5]
16	Interpret why hydrogen occupies a unique position in the Modern Periodic Table.	[A]	[5]

(4 × 3 = 12)

Part C

Short Essay Type Questions
Answer four questions.
Each question carries 7 marks.

17	Define carbocations and describe two methods of preparing them. Discuss the factors that contribute to the stability of a tertiary carbocation compared to primary and secondary carbocations.	[A]	[3, 4]
18	Examine the common properties and trends of metals, non-metals, and metalloids in the periodic table.	[A]	[5]
19	Discuss the atomic line spectrum of hydrogen.	[U]	[1]
20	Explain the different types of hybridisations with examples	[U]	[2]
21	What are quantum numbers? Discuss the significance of quantum numbers.	[U]	[1]
22	Write short notes on covalent and coordinate bonds.	[U]	[5]

(4 × 7 = 28)

END OF THE QUESTION PAPER

***