

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

First Semester B.Sc Chemistry Degree Examination, November 2020

BCH1B01– Theoretical &amp; Inorganic Chemistry – I

(2020 Admission onwards)

Time: 2 hours

Max. Marks: 60

**Section A (Short answers)****(Answer questions up to 20 marks. Each question carries 2 marks)**

1. Identify two major publishers in chemical science and two of the journals published by each of them.
2. Explain the importance of abstract and keywords in a research paper.
3. Why we are using dil.  $\text{H}_2\text{SO}_4$  in permanganometry? Why not  $\text{HCl}$  or  $\text{HNO}_3$ ?
4. 500ml of 0.2N  $\text{NaOH}$  is mixed with 300ml of 0.5N oxalic acid. Calculate normality of resulting solution.
5. Distinguish between electron affinity and electronegativity.
6. *d*-block elements exhibit variable valency. Give reasonable explanation.
7. Give reason for flame colors of alkali and alkaline earth metals.
8. Give Born-Landé equation and explain the terms.
9. With the help of dipole moment geometrical isomers can be distinguished. Justify
10. Explain the structure and tribasic nature of *ortho* phosphoric acid.
11. Age of archaeological samples can be determined from C-14 content. Give justification.
12. Briefly outline the bonding in diborane. **[Ceiling of marks: 20]**

**Section B (Paragraph)****(Answer questions up to 30 marks. Each question carries 5 marks)**

13. Identify the major components of a research project.
14. Write a note on the use of personal protection equipments in chemical laboratories.
15. Explain the use of chelating agents in the estimation of metal ions.
16. Elucidate the use of adsorption indicators in argentometric titrations.

17. Explain different methods for reducing determinate errors.
18. According to Aufbau order 4s is filled before 3d. Give justification using Slater's rule.
19. U-238 and Pb-206 are in the mass ratio 5:3 in a rock. If the half life of  $U^{238}$  is  $4.5 \times 10^9$  years, calculate the age of rock.

[Ceiling of marks: 30]

**Section C (Essay)**

**(Answer any one. Each question carries 10 marks)**

20. Explain the theories and various concepts for the justification of acid and base nature.
21. a) Explain the major components and working of a nuclear reactor.  
b) Describe Haber process for the manufacture of ammonia.

(6+4)

[1 x 10 = 10]

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE  
First Semester B.Sc Degree Examination, November 2020

**BCH1C01– General Chemistry**

(2020 Admission onwards)

Time: 2 hours

Max. Marks: 60

**Section A (Short answers)**

(Answer questions up to 20 marks. Each question carries 2 marks)

1. Explain with example the necessary qualities of a 1<sup>o</sup> standard substance.
2. Calculate the amount of Mohr's salt required to prepare 0.3 N of 150ml solution.
3. Give example for two redox indicators used in dichrometry.
4. 6.3g of oxalic acid is dissolved and made up to 100 ml in a standard flask. 20 ml is pipetted and diluted to 150 ml. Calculate normality of resultant solution.
5. Explain the term binding energy.
6. Give Schrodinger wave equation and explain the terms.
7. Give reasonable explanation for the extra stability of half filled and fully filled orbitals.
8. Write note on group displacement law in nuclear chemistry.
9. An archaeological wooden sample shows a C-14 activity which is 45% of the activity found in fresh wood. Calculate the age of wood if  $t_{1/2}$  of C-14 is 5760 years.
10. Give two examples for Zn containing enzymes.
11. Describe the structure of macrocyclic ring *porphine*.
12. Write a note on the role of Chlorophyll in photosynthesis. **[Ceiling of marks: 20]**

**Section B (Paragraph)**

(Answer questions up to 30 marks. Each question carries 5 marks)

13. Explain the theory of complexometric indicators.
14. Describe the main postulates of Bohr atom model.
15. Describe the molecular orbital electronic configuration of CO.
16. Explain the hybridization and shape of  $\text{PCl}_5$  and  $\text{SF}_6$ .
17. Explain the working of nuclear reactors.
18. Write a note on the applications of radioactive isotopes in medicinal field.
19. Discuss the oxygen transport mechanism in our body.

**[Ceiling of marks: 30]**

Section C (Essay)

(Answer any one. Each question carries 10 marks)

20. Inter group separation of cations is based on two theories. Give a detailed description with examples. (10)
21. a) Elucidate the Born-Haber cycle for the determination of lattice energy of NaCl.  
b) Explain the role of Cobalt in biological systems. (6+4)

[1 x 10 = 10 Marks]