|  |  |  |
| --- | --- | --- |
| **University of Kerala** | | |
| Discipline: CHEMISTRY |  | Time: 1 Hour 30 Minutes (90 Mins.) |
| Course Code: UK1DSCCHE100 |  | Total Marks: 42 |
| Course Title: INORGANIC CHEMISTRY I |  |  |
| Type of Course: DSC |  |  |
| Semester: 1 |  |  |
| Academic Level: 100-199 |  |  |
| Total Credit: 4, Theory: 3 Credit |  |  |

**Part A.**

**6 Marks. Time: 6 Minutes**

**Objective Type. 1 Mark Each. Answer All Questions**

**(Cognitive Level: Remember/Understand)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Qn. No.** | **Question** | **Cognitive Level** | **Course Outcome (CO)** |
| 1. | Which quantum number defines the shape of an atomic orbital? | Remember | CO-1 |
| 2. | What is the molecular geometry of BF3 molecule? | Remember | CO-2,3 |
| 3. | Name any two harmful gases released from the use of firecrackers. | Understand | CO-4,5 |
| 4. | How many significant figures are there in a) 0.00037 and b) 56000? | Understand | CO-6,7 |
| 5. | What is the shape of d-orbital? | Understand | CO-1 |
| 6. | Boiling point of water is exceptionally high because of ……… | Understand | CO-2,3 |

**Part B.**

**8 Marks. Time: 24 Minutes**

**Short Answer. 2 Marks Each. Answer All Questions**

**(Cognitive Level: Understand/Apply)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Qn.**  **No.** | **Question** | **Cognitive Level** | **Course Outcome (CO)** |
| 7. | What is the de Broglie equation, and what does it signify about the dual nature of electrons? | Understand | CO-1 |
| 8. | The bond angle in H2O molecule is less than the tetrahedral angle. Why? | Understand | CO-2,3 |
| 9. | Explain the application of synthetic resins in water treatment. | Apply | CO-4,5 |
| 10. | How can acid-base titration be used to determine the concentration of an unknown acid in a solution? | Apply | CO-6,7 |

**Part C.**

**28 Marks. Time: 60 Minutes**

**Long Answer. 7 marks each.**

**Answer all 4 Questions, choosing among options within each question.**

**(Cognitive Level: Understand/Apply/Analyze)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Qn. No.** | **Question** | **Cognitive Level** | **Course Outcome (CO)** |
| 11. | a. What are quantum numbers and explain how the quantum numbers of an atom influence its position on the periodic table, regarding atomic size and ionization energy.  OR  b. Explain the significance of the Davisson and Germer experiment in verifying the wave nature of electrons. | Understand | CO-1 |
| 12. | a. Which conditions favor covalency according to Fajan’s rule. Apply rule to find whether PbCl2 or PbCl4 is more ionic.  OR  b. Explain how VSEPR theory can be used to predict the shape of ammonia and discuss how this shape influences its polarity. | Apply | CO-2,3 |
| 13. | a. Analyze the effectiveness of various management strategies for controlling air pollution.  OR  b. Analyze the importance of plastic identification codes and plastic recycling as a means to control plastic threat. Explain briefly the use of biodegradable plastics. | Analyze | CO-4,5 |
| 14. | a. Analyze the different acid base titration curves. How do the pKa values of indicators influence their selection?  OR  b. Analyze the selection of phenolphthalein as an indicator for different neutralization titrations. | Analyze | CO-6,7 |