

B.Sc. DEGREE END SEMESTER EXAMINATION OCTOBER/NOVEMBER 2018**SEMESTER – 1: CHEMISTRY (CORE COURSE)****COURSE: 15U1CRCHE1: THEORETICAL AND INORGANIC CHEMISTRY - I**

(Common for Regular 2018 admission and improvement 2017/supplementary 2017/2016/2015/admission)

Time: Three Hours

Max. Marks: 60

SECTION A

Answer **all** questions. Each question carries **1** mark

1. The first organic compound synthesized was
2. One *gram molecular mass* of a compound contains number molecules
3. Accuracy can be expressed in terms of
4. of an apparatus or instrument involves the correlation of its readings with that of the standard
5. Rutherford atom model is based on the findings of
6. The energies of two radiations with wavelengths 6000\AA and 2000\AA are in the ratio
7. The quantum number signifies the orbital angular momentum of an electron in an atom
8. The 1s orbital has radial node(s) (1 x 8 = 8)

SECTION B

Answer **any Six** questions. Each question carries **2** marks

9. What is meant by research design?
10. Define the term *mole fraction*. How is it related to *mass percentage* and *ppm*
11. What metal ion indicators? Give an example and its structure
12. State and explain *Heisenbergs uncertainty principle*
13. What is meant by quantization of angular momentum of an electron in an atom
14. What are well behaved function and normalized wave function
15. Explain the term *Hermitian operator*
16. State Hund's rule of maximum multiplicity (2 x 6 = 12)

SECTION C

Answer **any Four** questions. Each question carries **5** marks

17. Differentiate between the terms *scientific proof* and *scientific evidence*
18. Calculate the molarity and molality of an aqueous solution of HCl containing 37% w/w HCl, if the density is 1.18g/L

19. Write a note on acid-base indicators
20. Calculate the relative mean deviation and coefficient of variation for the following set of analytical data of a sample A: 5.68mg, 5.70mg, 5.55mg, 5.04mg and 5.08mg
21. Draw the radial probability distribution curves of 2s, 2p, and 3s orbitals. Explain
22. What are the postulates of quantum mechanics? (5 x 4 = 20)

SECTION D

Answer **any Two** questions. Each question carries **10** marks

23. a) Explain the term photoelectric effect.
- b) The threshold wavelength of copper is 300nm. Calculate its threshold frequency and work function. Also calculate the kinetic energy of the photoelectron ejected when a light of wavelength 253.6nm falls on the surface of this metal. ($h = 6.626 \times 10^{-34}\text{Js}$)
24. Discuss the theory of *permanganometry* and *dichrometry* titrations. What are redox indicators? Explain
25. Apply *Schrodinger wave equation* to particle in a one dimensional box. Obtain *eigen* value and *eigen* function
26. Derive the expressions for Bohr orbit radius, Energy and velocity of electron in an atom (10 x 2 = 20)
