Reg. No…………………………….. Name…………………………………………………………

B.Sc. DEGREE END SEMESTER EXAMINATION OCTOBER/NOVEMBER 2017

SEMESTER –1: CHEMISTRY (CORE COURSE)

COURSE: **15U1CRCHE1: THEORETICAL AND INORGANIC CHEMISTRY - I**

(Common for Regular 2017 admission and Supplementary/Improvement 2016 & 2015 admission)

Time: Three Hours   Max. Marks: 60

SECTION A

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

1. Those who were on an attempt to convert base metals into precious metals like gold, during the medieval period, were known as ……………………

2. The mass of 6.02×10^{23} nitrogen atoms is ………………kg

3. Oxidation number of chromium in dichromate ion is ………………

4. Errors which can be minimized or avoided are called …………………. errors

5. The phenomenon of photoelectric effect establishes the ………………nature of light

6. The wavelength of a light with wave number $10 \times 10^8 m^{-1}$ is ………….. nm

7. In the expression $\hat{A} f(x) = c\, f(x)$, c is called ………………

8. The radial electron probability for 1s orbital is ………………symmetrical   (1 x 8 = 8)

SECTION B

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

9. What are the main objectives of scientific research?

10. Define the term molar volume. What is the value of the molar volume of a gas behaving ideally at 273.15 K and 1 atm.

11. What is meant by significant figures?

12. State and explain de Broglie relation

13. Write the time dependent *Schrodinger* equation

14. What are the values of n, l and m of an electron in the 4s orbital

15. Explain the term *linear operator*

16. State the *aufbau principle.* Give the *aufbau order* of energy levels in atoms   (2 x 6 = 12)

SECTION C

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

17. Logically differentiate between the terms *science* and *pseudoscience*

18. Distinguish between the terms *normality, molarity* and *molality*

19. Explain complexometric titrations with reference to EDTA titrations

20. Write a note on *accuracy* and *precision*

21. Calculate the uncertainty in momentum of an electron whose uncertainty in postion is 0.5Å

22. Discuss the atomic spectrum of hydrogen   (5 x 4 = 20)

SECTION D

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

23. Describe the failure of classical physics in explaining black body radiation. Discuss the salient features of Planck's quantum theory

24. Explain the classification and minimization of errors

25. Derive the wave equation for a particle in a three dimensional box, applying the *separation of variables method*

26. a) Calculate the ground state energy of an electron confined in a one dimensional box of length 0.2nm. Also calculate its energy when it is in the n = 4 level. (Mass of electron = 9.1 x 10^{-31}kg, h = 6.626 x 10^{-34} Js)

    b) Give the angular distribution plots for s- , p- and d- orbitals   (10 x 2 = 20)

****