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

B. Sc. DEGREE END SEMESTER EXAMINATION MARCH 2017
SEMESTER – 2: CHEMISTRY (CORE COURSE)
COURSE: **14U2CRCHE2: THEORETICAL AND INORGANIC CHEMISTRY**
(Supplementary for 2014 admission)

Time: Three Hours   Max. Marks: 60

SECTION A
Answer **all** questions, each question carries 1 mark
1. What is the dipole moment of CCl_4?
2. What is the hybridization of the central atom in SF_6?
3. Isotones contains same number of ---------
4. Which of the following cannot exist on the basis of MO theory? H_2^+ , He_2^+, He_2, O_2
5. What change occurs in the atomic number of the element when nuclide emits a β particle?
6. The de Broglie relation is ....
7. What are positrons?
8. Which of the following is not possible – 1s, 2p, 3f, 4d

$(1 \times 8 = 8)$

SECTION B
Answer **any six** questions, each question carries 2 marks
9. Explain why cations are smaller than their parent atoms.
10.   What is Fermi level?
11.   Hydrogen atom has only one electron yet it has many spectral lines. Why?
12.   Distinguish between σ and π bonds.
13.   What is resonance energy?
14.   Explain band theory of metals.
15.   What is packing fraction?
16.   Explain Geiger – Nuttal rule and explain the terms.

$(2 \times 6 = 12)$

SECTION C
Answer **any four** questions, each question carries 5 marks
17.   Explain Slators rule for calculating shielding constant
18.   Discuss Pauling's scale of electronegativity
19.   Explain Born-Haber cycle and show how it is useful in determining lattice energy of ionic crystals.
20.   What is induced radioactivity? Explain.

21. State and explain Fajan's rule
22. Explain two important nuclear models.

$$(5 \times 4 = 20)$$

SECTION D

Answer **any two** questions, Each question carries 10 marks

23. Write the postulates of Bohr's atomic model. How will you proceed to calculate the energy of

an electron in hydrogen atom and multi-electron ion?

24. (a) Draw the MO energy level diagram of CO molecule and explain its properties.

(b) He_2 molecule does not exist. Why?

25. (a) What is meant by VSEPR theory? List its various postulates.

(b) Explain the shape of PCl_5 molecule. Do you expect all P-Cl bond lengths to be equal?

26. Discuss how the physical properties of metals are explained by various theories of metallic bond.

$$(10 \times 2 = 20)$$

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