

K17U 2530

Reg. No. : .....

Name : .....

I Semester B.Sc. Degree (CBCSS-Reg./Supple./Improv.) Examination,  
November 2017

(2014 Admn. Onwards)

Core Course in Chemistry

1B01 CHE : THEORETICAL AND INORGANIC CHEMISTRY

Time : 3 Hours

Max. Marks : 40

SECTION – A

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

1. Differentiate between accuracy and precision.
2. State Heisenberg's uncertainty principle.
3. What are synthetic elements ?
4. Give the hybridization and geometry of  $\text{BCl}_3$ . (1×4=4)

SECTION – B

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

5. What is meant by confidence limit ? What is its significance ?
6. What are the methods to minimize the systematic errors ?
7. Draw the radial probability distribution curve for 3S and 3P.
8. Write Born Lande equation and explain the terms.
9. What is meant by packing fraction ?
10. Given the masses of He nucleus, proton and neutron are 4.00820, 1.00758, 1.00897. Calculate the binding energy in MeV and in Joules.

P.T.O.



11. Explain LCAO method.
12. Calculate the wavelength of radiation emitted when an electron in hydrogen excited to 5<sup>th</sup> energy level returns to 2<sup>nd</sup> level  $R = 1.097 \times 10^7 \text{ m}^{-1}$ .
13. What are the limitations of free electron theory ?
14. What are cyclotrons ? (2×7=14)

### SECTION – C

Answer **any 4** questions. **Each** question carries **3** marks.

15. Write a note on breeder reactor.
16. Explain the term standard deviation, relative standard deviation and coefficient of variance.
17. State Fajans rules.
18. Describe the radiocarbondating technique.
19. Explain the significance of quantum numbers.
20. Explain the Born Haber cycle for  $\text{MgCl}_2$ . (4×3=12)

### SECTION – D

Answer **any 2** questions. **Each** question carries **5** marks.

21. Discuss the band theory of metals.
22. Explain Davisson and Germer experiment.
23. What are the methods for detection and measurement of radioactivity ? Explain.
24. a) Explain f-test and t-test.  
b) A standard method for the determination of CO shows a standard deviation 11 ppm. A new method shows a standard deviation 14 ppm. The critical value of F for new method is 0.60. Determine whether the new method is more precise than the standard method. (5×2=10)