K21U 6546

Reg. No. : .....

Name : .....

I Semester B.Sc. Degree (CBCSS – Supplementary) Examination, November 2021
(2015 – 2018 Admissions)
CORE COURSE IN CHEMISTRY
1B01CHE : Theoretical and Inorganic Chemistry

Time : 3 Hours

Max. Marks : 40

SECTION – A

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

1. State Hunds rule.
2. What is meant by mass defect ?
3. What are constant errors ?
4. What is the shape of ClF_3 ? **(1×4=4)**

SECTION – B

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

5. State and explain Paulis exclusion principle.
6. Write Born Lande equation and explain the terms.
7. Distinguish between accuracy and precision.
8. Explain standard deviation and relative standard deviation.

12. Correlate N/p ratio and nuclear stability.

13. What are the limitations of free electron theory ?

14. Write deBroglie relation and establish a relation between wave length and kinetic energy by using this. **(2×7=14)**

SECTION – C

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

15. What are the methods to minimize systematic errors ?

16. What are nuclear reactors ? Explain the working of fast breeder reactor.

17. Explain the hybridization of methane and acetylene.

18. Write a note on quantum numbers.

19. What are the postulates of quantum mechanics ?

20. Explain rock dating. **(4×3=12)**

SECTION – D

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

21. a) What are the postulate of Bohr theory ?
    b) Explain the hydrogen spectrum.

22. Discuss the detection and measurement of radioactivity by Wilson cloud chamber.

23. Explain the band theory of metals.

24. a) Explain f-test and t-test.
    b) Calculate the standard deviation of the following sets of analytical results. 15, 67, 15, 69, 16, 03. **(5×2=10)**

K21U 6786

Reg. No. : .....

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I Semester B.Sc. Degree (CBCSS – OBE – Regular/Supplementary/ Improvement) Examination, November 2021
(2019 Admission Onwards)
Core Course in Chemistry
1B01 CHE : THEORETICAL AND INORGANIC CHEMISTRY

Time : 3 Hours

Max. Marks : 40

Instruction *: Answers can be written only in* ***English.***

SECTION – A

Very short answer type. **Each** carries **1** mark. Answer **all 4** questions.

1. Give mathematical expression for Bohr radius and explain the terms.
2. Write electronic configuration of fluorine and silicon.
3. Give hybridisation and shape of SF_6.
4. Define lattice energy.

(4×1=4)

SECTION – B

Short answer type. **Each** carries **2** marks. Answer **7** questions out of 10.

5. Define Heisenberg's uncertainty principle.
6. Calculate the de Broglie wavelength of a body of mass 500 g moving with a velocity of 400 m/s.
7. Explain Hund's rule with example.
8. Give electronic configuration and bond order in N_2 molecule.
9. How electron affinity influence the formation of ionic compound ?
10. Give Pauling's and Mulliken scale of electronegativity.

P.T.O.

11. Define ionisation potential.

12. Define packing fraction.

13. What is meant by induced radioactivity ?

14. What is nuclear fission ? Give an example. **(7×2=14)**

SECTION – C

Short essay/Problem type. **Each** carries **3** marks. Answer **4** questions out of 6.

15. Explain limitations of Bohr theory.

16. Briefly explain principle quantum number and azimuthal quantum number.

17. Differentiate intermolecular and intramolecular hydrogen bonding with an example.

18. Give Born-Haber cycle. How can you explain the solubility of ionic compound in various solvents based on lattice energy ?

19. Write a note on diagonal relationship.

20. Explain periodicity in electronegativity. **(4×3=12)**

SECTION – D

Long essay type. **Each** carries **5** marks. Answer **2** questions out of 4.

21. Explain the origin of atomic hydrogen spectrum.

22. Explain the structure and bonding in PCl_3 and SF_6.

23. Explain the instruments used for the detection of radioactivity.

24. Write a note on :
    i) Carbon dating
    ii) Radioactive tracers. **(2×5=10)**

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I Semester B.Sc. Degree (C.B.C.S.S.– O.B.E. – Regular/ Supplementary/ Improvement) Examination, November 2021

(2019 Admission Onwards)

COMPLEMENTARY ELECTIVE COURSE IN CHEMISTRY/POLYMER CHEMISTRY

1C01CHE/PCH – Chemistry For Physical and Biological Sciences

Time : 3 Hours Total Marks : 32

***Instruction** : Answers can be written only in **English**.*

SECTION – A

(Very short answer type. **Each** carries **1** mark. Answer **all 5** questions)

1. What is meant by diagonal relationship ?
2. What is de Broglie wavelength for an electron travelling with a speed equal to 1% of the speed of light ?
3. Which p orbital is involved in sp^2 hybridization ?
4. What is Green house effect ?
5. What are the different segments of environment ?

SECTION – B

(Short answer type. **Each** carries **2** marks. Answer **4** questions out of 6)

6. State and explain modern periodic law.
7. Define Ionisation enthalpy.
8. How will you explain the bond angle of H_2O using VSEPR theory ?
9. How detergents cause water pollution ?
10. Write the effect of chlorofluorocarbon on ozone layer.
11. Explain Arrhenius and Lowry-Bronsted concepts of acids and base.

SECTION – C

(Short essay type. **Each** carries **3** marks. Answer **3** questions out of 5)

12. Write Schrodinger wave equation and explain the terms.

13. Discuss hydrolysis between a strong base and a weak acid.

14. Discuss the environmental effect of pesticides.

15. Write the MO electronic configuration of N_2, O_2 and calculate the bond order.

16. What is the type of hybridization in the formation of BF_3 ? Discuss.

SECTION – D

(Long essay type. **Each** carries **5** marks. Answer **2** questions out of 4)

17. Define atomic radii, ionic radii and covalent radii. State how they vary down a group of periodic table.

18. Explain solubility product and common ion effect. Discuss the hydrolysis of strong acid and strong base.

19. How to determine water quality parametes ? Explain its effects.

20. a) Explain H-Bonding, types of hydrogen bonding using examples.

    b) Discuss the hydrogen bonding in water.