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D – 5049

Reg. No. : .....

Name : .....

**First Semester B.Sc. Degree Examination, February 2018**  
**First Degree Programme Under CBCSS**  
**Chemistry**  
**CH 1131.1/CH 1131.2 : THEORETICAL CHEMISTRY**  
**(For Physics and Geology)**  
**(2017 Admission)**

Time : 3 Hours

Max. Marks : 80

**SECTION – A**

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

1. Write the electronic configuration of Calcium.
2. Different Quantum number values for 2p sub shell are
3. What is meant by common ion effect ?
4. Why completely and half filled orbitals are stable ?
5. Why the dipole moment of carbon dioxide is zero ?
6. In general, electro negativity \_\_\_\_\_ going left to right across a row in the periodic table.
7. What is the molecular geometry for ammonia (NH<sub>3</sub>) ?
8. Define one curie.
9. Explain the term artificial transmutation.
10. What is meant by solubility product ?

P.T.O.



## SECTION - B

(Answer any eight questions. Each question carries 2 marks)

11. Explain Hund's rule with an example.
12. Derive the expression for spectral frequency from Bohr equation.
13. For an electron with angular quantum number  $l = 2$ , write the magnetic quantum number  $m$  values.
14. Define Soddy's displacement law.
15. Explain why Alcohol is soluble in water.
16. Explain the hybridization in  $IF_7$ .
17. Explain the term bond order. What is its significance ?
18. Explain neutron activation analysis.
19. What is  $n/p$  ratio ? What is its significance ?
20. What is dichrometric titration ?
21. What are redox indicators ? Give an example.
22. Explain radio carbon dating.

## SECTION - C

(Answer any six questions. Each question carries 4 marks)

23. Explain principal quantum number and subsidiary quantum number. What is its significance ?
24. Explain the theory of acid-base titration.
25. Explain inter molecular hydrogen bonds and intramolecular hydrogen bonds with examples.
26. Discuss MO diagram of  $HF$ .
27.  $Pd-100$  has a half-life of 3.6 days. If one had  $6.02 \times 10^{23}$  atoms at the start, how many atoms would be present after 10.8 days ?





28. Write a note on :
- a) Geiger-Muller counter
  - b) Wilson cloud chamber.
29. Give an example of :
- i) Proton
  - ii) Neutron induced reactions.
30. Explain why acidic medium used in second group and alkaline medium is used in IV<sup>th</sup> group while in both groups ions are precipitated as sulphides ?
31. Explain paper chromatography.

SECTION - D

(Answer any two questions. Each question carries 15 marks)

32. i) Explain hydrogen spectrum. 5  
ii) Discuss the merits and demerits of Bohr atomic model. 5  
iii) Explain Pauli's exclusion principle with an example. 5
33. i) Compare the bond length and bond order of CO, CO<sup>+</sup>, CO<sup>-</sup> on the basis of MO diagrams. 10  
ii) Briefly explain Paulings and Mullikan's scales of electronegativity. 5
34. i) Explain the term Fricke dosimeter and Ceric sulphate dosimeter. 5  
ii) What is nuclear fission and nuclear fusion ? 5  
iii) Explain dsp<sup>2</sup> hybridization with an example. 5
35. i) Explain n/p ratio and it's significance. 5  
ii) Discuss the titration curve for the titration of strong acid-weak base and weak acid-strong base. 5  
iii) Explain the shape of SF<sub>6</sub> on the basis of hybridization theory. 5