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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

All Saints' College Trivandrum

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_3) ?
8. Define one curie.
9. Explain the term artificial transmutation.
10. What is meant by solubility product ?

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SECTION – B

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

11. Explain Hunds 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.

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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 6.02×10^{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^{th} 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^+, CO^- 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^2 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_6 on the basis of hybridization theory. **5**

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