STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI-86
(For candidates admitted during the academic year 2011 – 12 & thereafter)

SUBJECT CODE: 11CH/PC/RM14

M.Sc. DEGREE EXAMINATION, NOVEMBER 2014
BRANCH IV- CHEMISTRY
FIRST SEMESTER

COURSE : CORE
PAPER : RESEARCH METHODOLOGY (THEORY)
TIME : 1½ HOURS **MAX.MARKS : 50**

SECTION A

Answer any TEN questions: **(10x 2 = 20)**

1. Mention any two primary sources used in chemical literature.
2. What is meant by monograph?
3. Give any two uses of tables in thesis writing.
4. Define the term patent .Give any one use of patent.
5. What is the purpose of bibliography in thesis writing?
6. Give any two polynomials used in chemistry.
7. Give the steps involved in determining sine of a number in radiance.
8. Give any two advantages of energy minimization technique.
9. Explain cluster graphs.
10. Give any two advantages of charts in thesis writing.
11. What is meant by Sci factor and Sci index?
12. Name the developer of the following force fields.
    a. AMBER b. NEMO

SECTION B

Answer any FIVE questions: **(5x 6 = 30)**

13. Describe briefly the use of chemical abstracts for research.

14. Explain secondary sources with two examples.

15. Give any three parts of the table in scientific writing. The given table shows fractional data. Give the correct format.

16. Describe styles of citations used in thesis writing.

17. Explain Sci finder and Impact factor? Give any two journals with high impact factor.

18. Give any three parts of the table in scientific writing. The given table shows fractional data. Give the correct format.

.14567
.61

19. Explain any two types of charts with one example each.

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SECTION A

1. The following results were obtained for the analysis of Nickel in a sample.
   33.3, 38.4, 36.3, 27.4, 32.4, 39.2, 35.4 **(5X2=10)**

   1. Answer any five of the following:
      i. Mean
      ii. Deviation
      iii. Absolute error
      iv. Standard deviation
      v. Variance
      vi. Relative deviation in %
      vii. Median

SECTION B

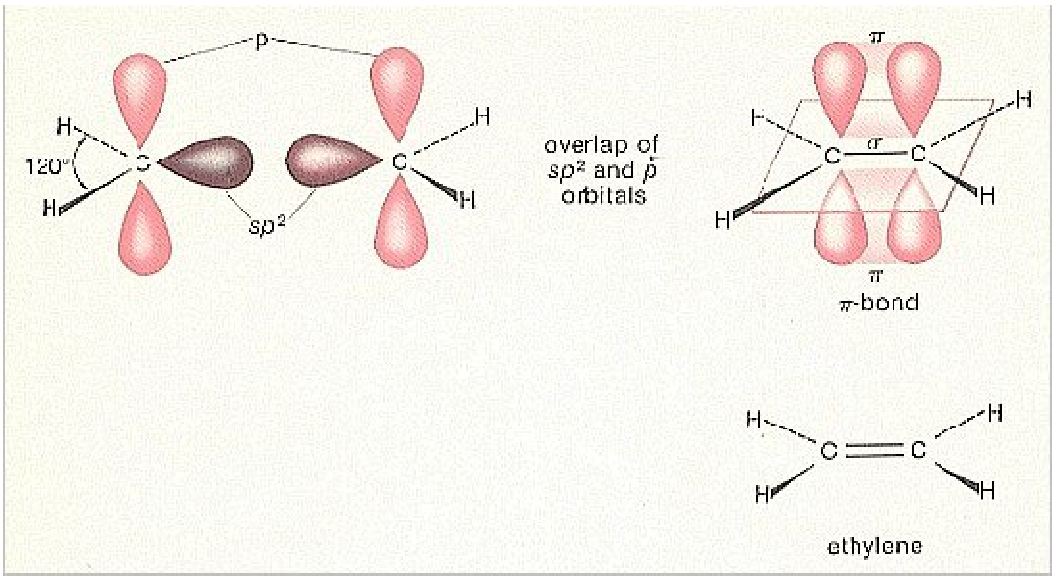
Answer any Five Questions: **(5X 8 = 40)**

2. a) Draw the structure of the given compound in Chem draw, convert to 3D and analyze important bond lengths and dihedral angles?
   b) Compare the bond distances of (i) N-H (ii) C-O in Acetanilide and Benzamide. (4+4)

3. a) Calculate the amount of work done by 3 moles of an ideal gas at 323K in reversible isothermal expansion from V1= 2.0 L to V2=20 L ?
   Use W= -2.303 nRT log (V2 /V1)
   b) If $K = 20$, calculate ΔG^o at STP. $\Delta G^o = -2.303\ RT \log\ K$ (4+4)

4. Draw the following using Chemdraw.

..2



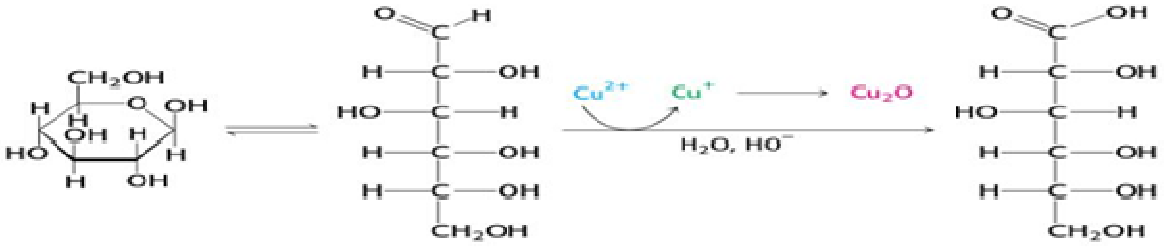
5. a) Draw the 3D structure of p –amino phenol. Find the bond length of N-H and O-H. [4]

b) Draw a histogram of the following data using EXCEL. [4]

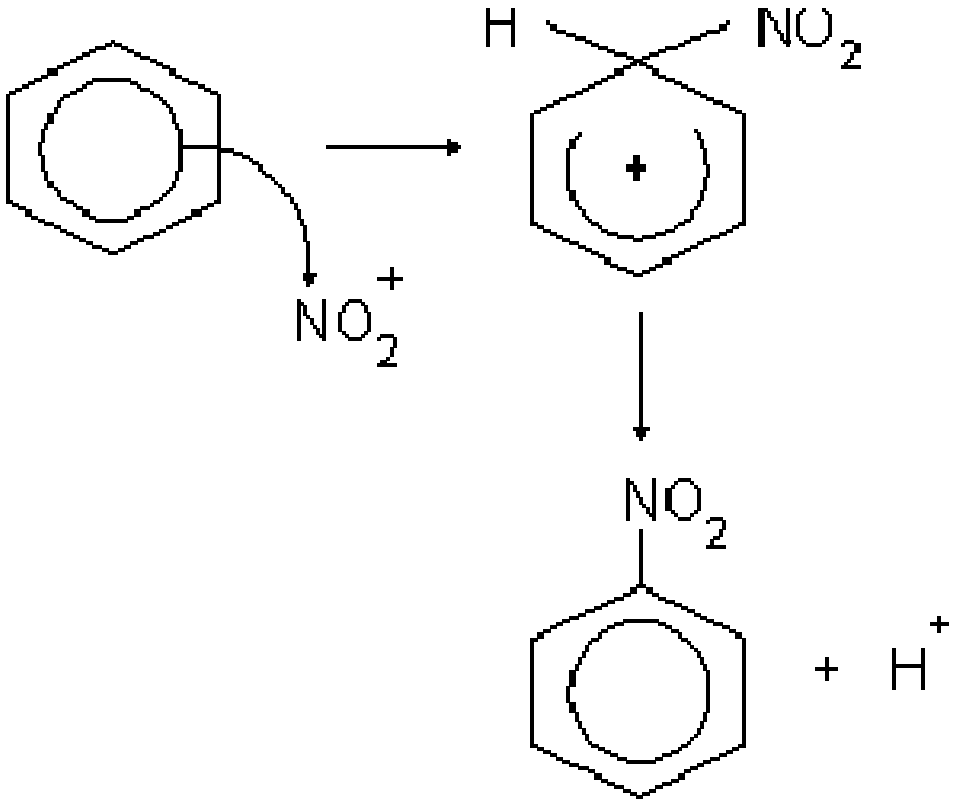
Data	% Mn in an alloy
1	45
2	55
3	61.5
4	53
5	68.5

6. Draw the following mechanism using Chemdraw:

(i)



(ii)



(4+4)

7. a) In the alkaline hydrolysis of ethyl nitro-benzoate the following data are obtained.

Time (s)	60	120	240	530	600
Extent of reaction(x)	0.260	0.3295	0.488	0.690	0.7035

Calculate the second order rate constant by using the formula k=1/t [x/a(a-x)]. Where a=0.05. Plot a graph x/(a-x) Vs t and determine the slope 1/a from the graph.

(b) Plot the graph for pH Vs volume of NaOH.

Volume V	pH
1	1.24
2	1.34
3	1.41
4	1.49
5	1.51
6	1.55
7	1.67
8	3.54
9	5.60
10	7.00
11	8.21
12	9.10
13	9.19
14	9.29
15	9.35

(4+4)

8. a) A particle moves in a one dimension box of length a = 14nm. Plot a graph of a. $\psi = \sqrt{2}/a \sin n\pi x/a$ vs different values of x. for n = 1, 2 b. $\psi 2$ vs different values of x for n = 1.

b) Determine and Compare the spectral data (H-NMR and C13 NMR) for the following compounds.
i. Benzaldehyde
ii. Benzoic acid [4+4]