BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: IMSC   SEMESTER : I
BRANCH: PHYSICS/MATHEMATICS   SESSION : MO/19

SUBJECT: CH111 CHEMISTRY-I

TIME: 3.00Hrs.   FULL MARKS: 50

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.


Q.1(a)   State and explain Heisenberg Uncertainty Principle.   [5]
Q.1(b)   Draw the radial distribution function and probability distribution function for an electron in principal   [5]
          Quantum number, n= 3

Q.2(a)   Discuss the structure and bonding of diborane.   [3+2]
Q.2(b)   Give examples of Crown ethers. How this type of molecules are applied for selective removal of alkali   [5]
          metals from a misture?

Q.3(a)   Write down the IUPAC name for the following compounds: [5]
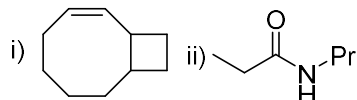

Q.3(b)   i) Arrange the following alkenes as per stability order and Explain the major reason behind stability   [5]
          order.
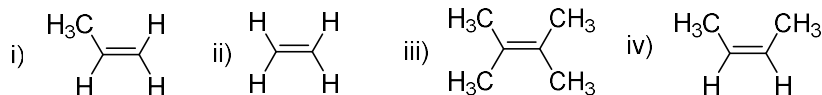
Q.4(a)   Construct a Born Haber cycle for the formation of $NaCl_{solid}$. From the following data calculate the   [5]
          heat of formation of NaCl; $\Delta H_{sub(Na)}$ = 108.8 kJ/mol, $\Delta H_{diss(Cl2)}$ = 242.7 kJ/mol   , IE_{Na} = 493.8 kJ/mol,
          U_{NaCl} = - 757.3 kJ/mol , EA_{Cl} = - 348.5 kJ/mol
Q.4(b)   From VSEPR Theory, determine the exact structure of SF_4.   [5]

Q.5(a)   a) Identify the R/S, D/L and Erythro/Threo Configuration of the following drawn structure. b) Convert   [5]
          the following Fisher Projection Formula to Sawhorse formula and to Newman Projection.
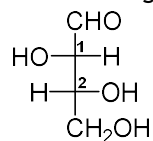
Q.5(b)   Convert the above Fisher Projection Formula to Sawhorse formula and to Newman Projection.   [5]

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