CLASS: IMSC   **SEMESTER: I**
BRANCH: MATHS & COMPUTING / PHYSICS   **SESSION: MO/2018**

SUBJECT: CH111 CHEMISTRY I

TIME: 2 HOURS   **FULL MARKS: 25**

INSTRUCTIONS:
1. The total marks of the questions are 25.
2. Candidates may attempt for all 25 marks.
3. Before attempting the question paper, be sure that you have got the correct question paper.
4. The missing data, if any, may be assumed suitably.

Q1 (a) Explain angular and radial wave function. On what quantum no. do they depend?   [2]
Q1 (b) Give the physical significance of Ψ and $|\Psi|^2$. Derive Schrodinger wave equation.   [3]

Q2 (a) Plot radial probability density curve for 1s and n = 3, l = 1, 2. Give the no. of nodes   [2]
         and no. of regions of high probability.
Q2 (b) Explain effective nuclear charge. What are the limitation and applications of Slater
         rule? Calculate Z_{eff} experienced by
         (i) 4s electrons & (ii) 3d electrons of Fe atom. (At No. 26)   [3]

Q3 (a) Write down the IUPAC nomenclature for the following structure   [2]

Q3 (b) Explain the term "Hyperconjugation" with a molecular orbital drawing using example of   [3]
         prepene stability.

Q4 (a) Draw the equivalent resonance structures of NO_3^- (Nitrate Ion) and demonstrate with   [2]
         arrow movements for electron.
Q4 (b) Define and distinguish between nucleophilicity and basicity. Discuss the major factors   [3]
         associated for above with an examples (OH^-, I^- and F^-, Cl^-, Br^-, I^-)

Q5 (a) Give reasons :   [2]
         (i)   Li being the 1st element of the group, is expected to be least reducing agent
                but it is the strongest reducing agent.
         (ii)   Na fire in the laboratory should not be extinguished by water.
Q5 (b) What is inert pair effect? When a cation and anion are highly polarizing? Which alkali   [3]
         metal has the highest polarizing power?

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