

PC-1733/M

L-7/2050

ADVANCED TOPICS IN INORGANIC CHEMISTRY-412
(Semester-IV)

Time : Two Hours]

[Maximum Marks : 55

Note : Attempt any *four* questions. All questions carry equal marks.

- What are the application of Carbon Nanotubes?
 - Explain the mechanism of growth and transport properties of nanotubes.
- Define Mixed Monolayer and describe the structures and preparation of monolayers on gold.
- What are the statistical aspects of radioactivity?
 - Distinguish between nuclear fission and fusion reaction.
- Write short notes on any *two* of the following :
 - Oppenheimer Phillips process.
 - Photonuclear reactions.
 - Radioactive decay and growth.

5. (a) Discuss the structural pattern and synthesis of metal carbonyl clusters of three atoms $M_3(CO)_{12}$ type (Fe, Ru, Os).
(b) State and explain capping rule in metal clusters.
6. Discuss synthesis and structures of chalcogenide clusters of M_6X_{12} type.
7. Discuss preparation, structure and bonding in transition metal compounds triply bonded to carbon.
8. Explain the mechanism of Ziegler Natta polymerization of ethylene.
9. (i) What are photonuclear reactions?
(ii) Name *two* naturally occurring radioactive substances alongwith their source.
(iii) What are chemical sensors?
(iv) Write any *two* synthetic processes of nano powders.
(v) Explain the principle of isotopic dilution.
(vi) In what way are $Mn(CO)_5$ and CH_3^+ related to each other.
(vii) Write various forms of elementary sulphur.
(viii) What is alkene metathesis?
(ix) Calculate the number of M–C bonds present in $Ir_4(CO)_{12}$.
(x) Distinguish between Fisher and Shrock carbynes.
(xi) Write a general method for the synthesis of M-C bond.
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