

Anjuman Islam Janjira Degree College of Science Murud-Janjira, Raigad-402401 Affiliated to University of Mumbai	
Class: -F.Y.B. Sc G. S	Subject: - Major Chemistry
Semester: - II	Course code: - M3-2
Exam Event: - (FH) Summer 2025	Marks: - 30
Date: - 05/04/2025	Duration: - 01:00 Hours

N.B:

1. **All** questions are compulsory.
2. **Figures** to the right indicate full marks.
3. Use of log-table/non programmable calculator is allowed.
4. Answer for the same question as far as possible should be written together.

Q.1. A) Select the correct option and complete the following sentences. (any four)

04

1. Surface tension of a liquid ----- with increase in temperature.
a) remains same b) decreases c) increases
2. There is a certain velocity for which the fraction of molecules is maximum. This is called the _____.
a) maximum velocity b) minimum velocity c) most probable velocity
3. According to Boyle's law
a) $V/T=K$ b) $PV=K$ c) $PV=nRT$
4. In electrolytic conductors current is due to
a) movement of electrons b) flow of ion c) flow of molecules
5. Study of Thermodynamics helps -----.
a) to study of rate of reaction b) to predict possibility of a process
c) to explain mechanism of reaction
6. The process in which there is no heat exchange between the system and its surroundings called as ----- process.
a) isobaric b) adiabatic c) isothermal

Q.1. B) Attempt the following (Any two).

06

1. At 293K water form 39 drops as it flows through a capillary of stalagmometer and an organic liquid form 45 drops. Calculate the surface tension of the organic liquid.
(Given: Density of water and organic liquid is $0.998 \times 10^3 \text{ kg/m}^3$ and $0.854 \times 10^3 \text{ kg/m}^3$ respectively. Surface tension of water is 0.0728 Nm^{-1} .)
2. Explain any three gas laws.
3. Give objective and limitations of thermodynamics.

Q.2. A) Select the correct option and complete the following sentences. (any four)

04

1. If the amount of sample used for analysis is less than 1 milligram then it is called as
a) micro analysis b) macro analysis c) ultra micro analysis
2. Solubility is expressed in
a) g/cm^3 b) g/cm^2 c) g/cm
3. The metal ion with larger oxidation state will get
a) precipitate last b) precipitate first c) does not precipitate
4. The constituent of ionic compounds are
a) ions b) atoms c) molecules
5. Diamond has----- network.
a) 2 dimensional b) 3 dimensional c) 1 dimensional
6. According to VSEPR theory the shape of IF_7 molecule is
a) tetrahedral b) square pyramidal c) pentagonal bipyramidal

Q.2. B) Attempt the following (Any two).

06

1. Explain different types of qualitative analysis.
2. What is solubility product? Give applications of solubility product in qualitative analysis.
3. Discuss the Fajans rule? Mention its applications.

Q.3. A) Select the correct option and complete the following sentences. (any four)

04

1. The order of stability of carbocations is
 - a) primary > secondary > tertiary
 - b) secondary < primary < tertiary
 - c) tertiary > secondary > primary
2. The negatively charged carbon atom called as
 - a) carbocation
 - b) carbanion
 - c) free radical
3. Heterolytic fission of covalent sigma bond in alkyl halide leads to formation of
 - a) carbocation
 - b) carbanion
 - c) free radical
4. Which of the following hybridizations has the highest percentage of s-characters
 - a) sp-hybridization
 - b) sp^2 hybridization
 - c) sp^3d hybridization
5. Sigma bond formation is the ----- overlap of orbitals.
 - a) co-axial
 - (b) lateral
 - (c) sideways
6. In alcohol oxygen atom is ----- hybridized.
 - a) sp
 - b) sp^2
 - c) sp^3

Q.3. B) Attempt the following (Any two).

06

1. Define carbocation and explain its types with suitable examples.
2. Explain types of organic reactions with suitable examples.
3. Write a note on sp^3 hybridization of carbon with suitable example.