

Anjuman Islam Janjira Degree College of Science
Murud-Janjira, Raigad-402401
Affiliated to University of Mumbai

Class: -S.Y.B.Sc GS	Subject: - Major Chemistry – I
Semester:- III	Course code: - S3MJ3
Exam Event:- Winter 2025(SH)	Marks: 30
Date: - 11/10/2025	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 six)

06

- i. Helmholtz free energy is an ----- property.
a) extensive b) intensive c) colligative
- ii For non-ideal gases, fugacity (f) is related to pressure (p) by the relation
a) $f = p$ b) $f < p$ c) $f > p$
- iii. Which of the following is weak electrolyte
a) NaOH b) KOH c) $\text{Fe}(\text{OH})_2$
- iv. If ΔG has positive value then the reaction is said to be -----.
a) non-spontaneous b) at equilibrium c) spontaneous
- v. Moving Boundary method is used to determine
a) molecular weight b) density c) transport number
- vi. As the number of ions increases in the solution, conductivity
a) increases b) decreases c) remains same
- vii. From the following pairs which one is completely miscible
a) alcohol and water b) phenol and water c) iodobenzene and water
- viii. The solution which deviates from Raoult's law called as
a) real solution b) ideal solution c) perfect solution
- ix. At a certain temp. the two liquid layers become completely miscible, this temp. is known as
a) mixing temp. b) critical solution temp. c) boiling temp.
- x. Liquid pair showing both upper as well as lower critical solution temp. is
a) nicotine -water b) triethylamine-water c) phenol-water

B) Attempt the following. (any three)

09

- A) Show that decrease in Gibbs free energy at constant pressure and temperature gives network.
- B) Derive Gibbs-Duhem equation.
- C) Give the difference between strong electrolyte and weak electrolyte.
- D) What is transport number? Give the neat labelled diagram of moving boundary method apparatus.
- E) Discuss phenol-water system.

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

06

- i) The analysis which involves determination of elemental composition of the sample called as
a) proximate analysis b) partial analysis c) trace analysis
- ii) The classical method which is depend on mass measurement is
a) gravimetric method b) titrimetric method c) optical method
- iii) Error due to wrong judgement of burette reading is
a) instrumental error b) method error c) personal error
- iv) Iodometry is a type of
a) neutralization titration b) redox titration c) complexometric titration
- v) The commonly used indicator in complexometric titration is
a) phenolphthalein b) Eriochrome Black T c) Methyl orange
- vi) NaOH is a
a) primary standard b) secondary standard c) tertiary standard

- vii). Solution in burette is called -----.
- a) indicator b) neutral solution c) titrant
- viii) Light of a single wavelength called as
- a) monochromatic light b) polychromatic light c) white light
- ix) Spectrophotometers use ----- as monochromator.
- a) filters b) gratings c) both filters and gratings
- x) The mostly used filament lamp for obtaining continuous radiation in visible region is
- a) lead b) hydrogen c) tungsten

B) Attempt the following. (any three)

09

- A) Give the objectives of analytical chemistry.
- B) Write a note on any two types of determinate errors.
- C) Define the terms i) titration ii) Equivalence point iii) Indicator
- D) State and explain mathematical expression for Lambert's law.
- E) What is the principle of single beam colorimeter. Draw a schematic diagram of a single beam colorimeter.