

# JAI HIND COLLEGE (AUTONOMOUS)

## Admission to Master of Science (M.Sc.) in Chemistry

### Entrance Examination:

#### **Syllabus:**

The entrance examination will be based on basic undergraduate chemistry syllabus of FY, SY & TY B.Sc. courses of the program. The broad topics included are as follows:

**Physical Chemistry:** Atomic & Molecular Structure, Theory of Gases, Solid State, Chemical Thermodynamics, Chemical & Phase Equilibria, Electrochemistry, Kinetics, Adsorption, Spectroscopy

**Inorganic Chemistry:** Periodic table, Chemical Bonding, Main group elements, Transition & Inner Transition metals, Coordination Chemistry, Bioinorganic Chemistry, Non-aqueous Chemistry

**Organic Chemistry:** Basic concepts in Organic Chemistry including stereoelectronic effects, Stereochemistry, Spectroscopy of Organic compounds, Organic Reaction Mechanism, Synthetic applications, Name reactions, Qualitative Organic Analysis, Natural Products, Aromatic & Heterocyclic Chemistry

**Analytical Chemistry:** Classical methods of analysis, Instrumental methods of analysis, Chemical calculations, Separation techniques

#### **Examination pattern:**

1. The entrance exam will be conducted remotely & will be proctored by the exam committee of the college.
2. Candidates will be sent their login credentials & the URL of the web portal to access the exam to their registered email ids.
3. Candidates must take the test using a device with camera & must give requisite permissions for remote proctoring.

4. Use of unfair means like impersonation, appearance of multiple persons on screen, use of headphones during exam, screen minimizations will lead to outright disqualification of the candidate.
5. All matters concerning examination will be at the sole discretion of the PG exam committee of Jai Hind College Autonomous.
6. The entrance exam will comprise of 60 multiple choice questions of 1 mark each. There will be a negative marking of 0.25 marks for every wrong answer. Candidates will get 60 minutes to complete the exam after which it will be auto submitted.
7. All communication regarding the entrance examination, login credentials, mock tests etc. will be sent to the registered email ids of the candidates only.

### Sample Questions from Previous year papers:

1. For a reaction to be spontaneous, which of the following criteria must be met?
  - a)  $\Delta G = 0$
  - b)  $\Delta G > 0$
  - c)  $\Delta G < 0$
  - d)  $\Delta G = 1$
2. Which of the following metal ions is precipitated as its sulfide in an acidic medium in qualitative analysis?
  - a)  $\text{Cu}^{2+}$
  - b)  $\text{Ni}^{2+}$
  - c)  $\text{Co}^{2+}$
  - d)  $\text{Zn}^{2+}$
3. Which of the following carbocations is the most stable?
  - a)  $\text{CH}_3^+$
  - b)  $\text{CH}_3\text{-CH}_2^+$
  - c)  $(\text{CH}_3)_3\text{C}^+$
  - d)  $(\text{CH}_3)_2\text{CH}^+$
4. In gravimetric analysis, digestion process is also called
  - a) Ostwald's ripening
  - b) Co-precipitation
  - c) Post-precipitation
  - d) Flocculation
5. ABAB... type of arrangement is found in
  - a) Cubic close packing
  - b) Hexagonal close packing

- c) Body centered close packing
  - d) Prismatic close packing
6. In which of the following heterocycles, the lone pair of electrons is not involved in aromatic sextet?
- a) Pyrrole
  - b) Pyridine
  - c) Furan
  - d) Thiophene
7. A plane of symmetry which is perpendicular to the principal axis is called
- a) Vertical plane
  - b) Dihedral plane
  - c) Horizontal plane
  - d) Perpendicular plane
8. The intermediate formed in a Wittig reaction is
- a) Ylide
  - b) Carbocation
  - c) Enamine
  - d) Ketene
9. The value of CFSE for a tetrahedral complex with  $d^3$  configuration is
- a)  $0.6 \Delta_t$
  - b)  $-1.2 \Delta_t$
  - c)  $-0.8 \Delta_t$
  - d)  $0.2 \Delta_t$
10. The typical IR stretching frequency for -OH group is \_\_\_\_\_  $\text{cm}^{-1}$
- a) 1500
  - b) 2300
  - c) 1700
  - d) 3400