

## PRE-BOARD EXAMINATION-I (NOVEMBER– 2019)

CLASS: XII

CHEMISTRY

Time: 3 hours

MAX. MARKS: 70

**General Instructions:**

- (i) All questions are compulsory.
- (ii) Marks are indicated against each question.
- (iii) Section A: Question numbers 1 to 20 are very short answer questions (objective type) and carry 1 mark each.
- (iv) Section B: Question numbers 21 to 27 are short answer questions and carry 2 marks each.
- (v) Section C: Question numbers 28 to 34 are long answer questions and carry 3 marks each.
- (vi) Section D: Question numbers 35 to 37 are also long answer questions and carry 5 marks each.
- (vii) There is no overall choice. However, internal choice has been provided in two questions of 2 marks, two questions of 3 marks and all the three questions of 5 marks weightage. You have to attempt only one of the choices in such questions.
- (viii) Use log tables if necessary, use of calculator is not allowed.
- (ix) Please check that this question paper contains all 37 questions.

**SECTION A**

**From the given cells: Lead storage cell, Mercury cell, Fuel cell and Dry cell  
Answer the following questions from 1 to 5:**

1. Which cell is used in hearing aids? (1)
2. Which cell was used in Apollo Space Programme? (1)
3. Which cell is used in automobiles and inverters? (1)
4. Which cell does not have long life? (1)
5. Which cell is an example for secondary battery? (1)

**Questions 6 to 10 are multiple choice questions:**

6. The term “sorption” stand for (1)
  - (a) absorption
  - (b) adsorption
  - (c) both absorption and adsorption
  - (d) desorption

7. The deficiency of vitamin C causes (1)  
(a) Scurvy  
(b) Rickets  
(c) Pyrohea  
(d) Pernicious anaemia
8. Which of the following is not optically active (1)  
(a) Glycine  
(b) Tyrosine  
(c) Lysine  
(d) Alanine
9. Bakelite is obtained from Phenol by reaction with (1)  
(a) HCHO  
(b)  $(\text{CH}_2\text{OH})_2$   
(c)  $\text{CH}_3\text{CHO}$   
(d)  $\text{CH}_3\text{COCH}_3$
10. Aldol condensation does not occur between (1)  
(a) two different aldehydes  
(b) two different ketones  
(c) an aldehyde and a ketone  
(d) an aldehyde and an ester

Questions 11 to 15 are one word answer type:

11. What is the IUPAC name of  $\text{CH}_2 = \text{CH} - \text{CH}_2 \text{Br}$  (1)
12. What is the IUPAC name of  $\text{K}_4[\text{Mn}(\text{CN})_6]$  (1)
13. What is the name of bonding where, the M-C  $\pi$  -bond is formed by the donation of a pair of electrons from a filled d orbital of metal into the vacant antibonding  $\pi^*$  orbital of carbon monoxide? (1)
14. How many ions are produced from the complex  $\text{Co}(\text{NH}_3)_6\text{Cl}_2$  in solution? (1)
15. Which of the following compound will react faster in  $\text{S}_\text{N}^1$  reaction with the  $\text{OH}^-$  ion? (1)  
 $\text{CH}_3 - \text{CH}_2 - \text{Cl}$  or  $\text{C}_6\text{H}_5 - \text{CH}_2 - \text{Cl}$

Question 16 to 20:

- (a) Both assertion and reason are correct statements, and reason is the correct explanation of the assertion.  
(b) Both assertion and reason are correct statements, but reason is not the correct explanation of the assertion.  
(c) Assertion is correct, but reason is wrong statement.  
(d) Assertion is wrong, but reason is correct statement.
16. Assertion: D (+) – Glucose is dextrorotatory in nature. (1)  
Reason: 'D' represents its dextrorotatory nature.
17. Assertion: Vitamin D can be stored in the body. (1)  
Reason: Vitamin D is fat soluble vitamin.
18. Assertion: Xenon forms fluorides. (1)  
Reason: 5d orbitals are available for valence shell expansion.

19. Assertion: Benzenediazonium chloride on boiling with water gives phenol. (1)  
Reason: C –N bond is polar.
20. Assertion: Alkyl iodide can be prepared by treating alkyl chloride/bromide with NaI in acetone. (1)  
Reason: NaCl/NaBr are soluble in acetone while NaI is not.

### SECTION B

21. Arrange the following in the order of property indicated against each set. (2)  
(a) HF, HCl, HBr, HI (increasing bond dissociation enthalpy)  
(b) H<sub>2</sub>O, H<sub>2</sub>S, H<sub>2</sub>Se, H<sub>2</sub>Te (increasing acidic character)
22. Differentiate between order and molecularity. (2)
23. Determine the osmotic pressure of a solution prepared by dissolving 25 mg of K<sub>2</sub>SO<sub>4</sub> in 2 litre of water at 25°C, assuming that it is completely dissociated. (2)
24. (a) Illustrate the following name reaction giving suitable example: Hell-Volhard-Zelinsky reaction. (2)  
(b) How will you convert benzoic acid to benzaldehyde?
25. Give the name, the stereochemistry and the magnetic behavior of the following complexes. (2)  
(a) [Co(NH<sub>3</sub>)<sub>5</sub>Cl]Cl<sub>2</sub>  
(b) K<sub>2</sub>[Ni(CN)<sub>4</sub>]

**OR**

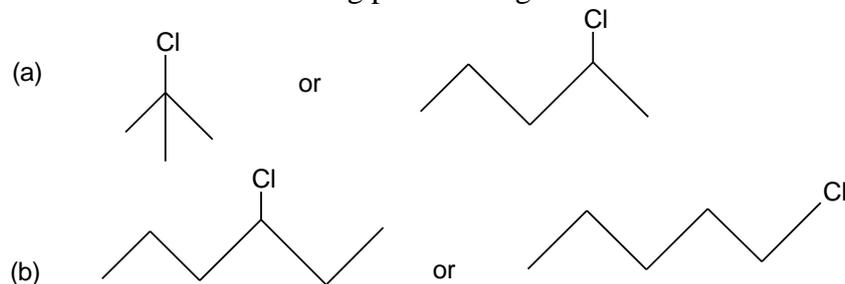
Explain the following terms:

- (a) Crystal field splitting in an octahedral field  
(b) Spectrochemical series
26. Describe the principle involved in each of the following processes: (2)  
(a) Zone refining of metals  
(b) Vapour phase refining of metals

**OR**

Define the following:

- (a) Roasting  
(b) Calcination
27. Which one in the following pairs undergoes S<sub>N</sub><sup>1</sup> substitution reaction faster and why? (2)



### SECTION C

28. (a) Define molality (3)  
(b) State Henry's Law  
(c) Why does a solution of ethanol and cyclohexane show positive deviation from Raoult's law?
29. A reaction has a half-life of 10 minutes (3)  
(a) Define the term half-life.  
(b) Calculate the rate constant for the first order reaction.  
(c) What fraction of the reactant will be left after an hour of the reaction has occurred

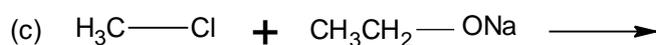
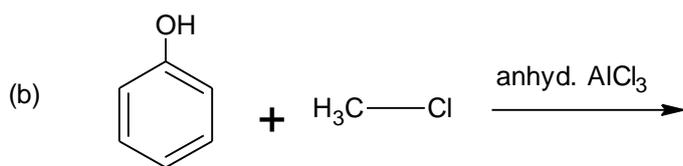
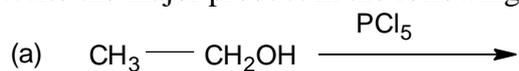
**OR**

The decomposition of A into products has a value of  $k$  as  $4.5 \times 10^3 \text{ s}^{-1}$  at  $10^0 \text{ C}$  and energy of activation  $60 \text{ kJ mol}^{-1}$ . At what temperature would  $k$  be  $1.5 \times 10^4 \text{ s}^{-1}$ ?

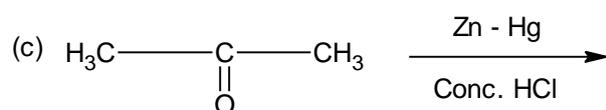
30. Explain the following: (3)
- Electrophoresis
  - Coagulation
  - Tyndall effect

31. Complete the reaction: (3)
- $\text{XeF}_4 + \text{O}_2\text{F}_2 \xrightarrow{143 \text{ K}}$
  - $\text{XeF}_6 + \text{H}_2\text{O} \rightarrow$
  - $\text{XeF}_4 + \text{SbF}_5 \rightarrow$

32. Write the major product in the following equations: (3)

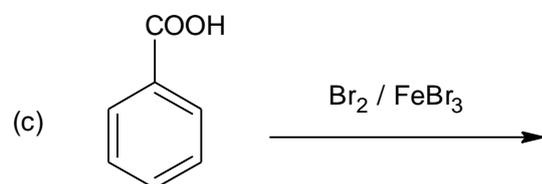
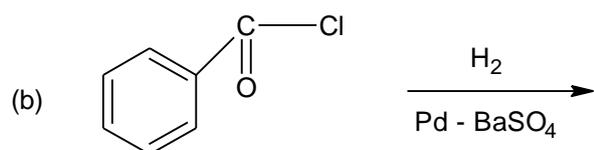
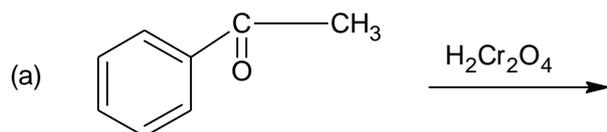


33. Predict the product (s): (3)



**OR**

Predict the product (s):



34. (a) Define antihistamine with an example. (3)  
(b) Which one of the following drugs is an antibiotic? Morphine, equanil, chloramphenicol, aspirin  
(c) Why is use of aspartame limited to cold foods and drinks?

### SECTION D

35. (a) Define the following terms: (5)  
(i) Limiting molar conductivity  
(ii) Fuel cell  
(b) Resistance of a conductivity cell filled with  $0.1 \text{ mol L}^{-1}$  KCl solution is  $100 \Omega$ . If the resistance of the same cell when filled with  $0.02 \text{ mol L}^{-1}$  KCl solution is  $520 \Omega$ . Calculate the conductivity and molar conductivity of  $0.02 \text{ mol L}^{-1}$  KCl solution. The conductivity of  $0.1 \text{ mol L}^{-1}$  KCl solution is  $1.29 \times 10^{-2} \Omega^{-1} \text{ cm}^{-1}$

### OR

- (a) State Faradays first law of electrolysis. How much charge in terms of Faraday's is required for the reduction of 1 mole of  $\text{Cu}^{2+}$  to Cu.  
(b) Calculate emf of the following cell at 298 K.  
 $\text{Mg(s)} \mid \text{Mg}^{2+} (0.1 \text{ M}) \parallel \text{Cu}^{2+} (0.01) \mid \text{Cu (s)}$ ; Given,  $E_{\text{cell}}^{\circ} = +2.71\text{V}$ ,  $1 \text{ F} = 96,500 \text{ C mol}^{-1}$
36. (a) Give reasons for the following: (5)  
(i) Aniline does not undergo Friedel-Crafts reaction  
(ii)  $(\text{CH}_3)_2\text{NH}$  is more basic than  $(\text{CH}_3)_3\text{N}$  in an aqueous solution  
(iii) Primary amines have higher boiling point than tertiary amines.  
(b) Give an example for each describe the following reactions:  
(i) Gattermann's reaction  
(ii) Carbylamine reaction

### OR

- (a) Give reason for the following:  
(i) Diazonium salts of aromatic amines are more stable than those of aliphatic amines.  
(ii) Primary aromatic amines cannot be prepared by Gabriel phthalimide synthesis.  
(iii) Amines are more basic than alcohols of comparable molecular masses.  
(b) Give an example for each describing the following reactions  
(i) Acetylation  
(ii) Sandmeyer's reaction
37. (a) How do you prepare: (5)  
(i)  $\text{K}_2\text{MnO}_4$  from  $\text{MnO}_2$ ?  
(ii)  $\text{Na}_2\text{Cr}_2\text{O}_7$  from  $\text{Na}_2\text{CrO}_4$ ?  
(b) Account for the following:  
(i)  $\text{Mn}^{2+}$  is more stable than  $\text{Fe}^{2+}$  towards oxidation to +3 state.  
(ii) The enthalpy of atomization is lowest for Zn in 3d-series of the transition elements.  
(iii) Actinoids elements show wide range of oxidation states.

### OR

- (a) Name the element of 3d-series which shows maximum number of oxidation states. Why does it show so?  
(b) Which transition metal of 3d-series has positive  $E_{\text{M}^{2+}/\text{M}}^{\circ}$  value and why?  
(c) Out of  $\text{Cr}^{3+}$  and  $\text{Mn}^{3+}$ , which is a stronger oxidizing agent and why?  
(d) Name a member of the lanthanoid series which is well known to exhibit +2 oxidation state.  
(e) Complete the following equation:  $\text{MnO}_4^- + 8\text{H}^+ + 5\text{e}^- \rightarrow$