Reg. No. : .....

Name : .. ..

SY-25

SECOND YEAR HIGHER SECONDARY EXAMINATION, MARCH 2022

Part – III

CHEMISTRY

Maximum : 60 Scores

Time : 2 Hours

Cool-off time : 15 Minutes

General Instructions to Candidates :

- There is a 'Cool-off time' of 15 minutes in addition to the writing time.
- Use the 'Cool-off time' to get familiar with questions and to plan your answers.
- Read questions carefully before answering.
- Read the instructions carefully.
- Calculations, figures and graphs should be shown in the answer sheet itself.
- Malayalam version of the questions is also provided.
- Give equations wherever necessary.
- Electronic devices except non-programmable calculators are not allowed in the Examination Hall.

വിദ്യാർത്ഥികൾക്കുള്ള പൊതുനിർദ്ദേശങ്ങൾ :

- നിർദ്ദിഷ്ട സമയത്തിന് പുറമെ 15 മിനിറ്റ് 'കൂൾ ഓഫ് ടൈം' ഉണ്ടായിരിക്കും.
- 'കൂൾ ഓഫ് ടൈം' ചോദ്യങ്ങൾ പരിചയപ്പെടാനും ഉത്തരങ്ങൾ ആസൂത്രണം ചെയ്യാനും ഉപയോഗിക്കുക.
- ഉത്തരങ്ങൾ എഴുതുന്നതിന് മുമ്പ് ചോദ്യങ്ങൾ ശ്രദ്ധാപൂർവ്വം വായിക്കണം.
- നിർദ്ദേശങ്ങൾ മുഴുവനും ശ്രദ്ധാപൂർവ്വം വായിക്കണം.
- കണക്ക് കൂട്ടലുകൾ, ചിത്രങ്ങൾ, ഗ്രാഫുകൾ, എന്നിവ ഉത്തരപേപ്പറിൽ തന്നെ ഉണ്ടായിരിക്കണം.
- ചോദ്യങ്ങൾ മലയാളത്തിലും നല്കിയിട്ടുണ്ട്.
- ആവശ്യമുള്ള സ്ഥലത്ത് സമവാക്യങ്ങൾ കൊടുക്കണം.
- പ്രോഗ്രാമുകൾ ചെയ്യാനാകാത്ത കാൽക്കുലേറ്ററുകൾ ഒഴികെയുള്ള ഒരു ഇലക്ട്രോണിക് ഉപകരണവും പരീക്ഷാഹാളിൽ ഉപയോഗിക്കുവാൻ പാടില്ല.

PART – I

A. Answer any 5 questions from 1 to 9. Each carries 1 score. **(5 × 1 = 5)**

1 Write an ionic compound which can exhibit both Schottky and Frenkel defect.

2. Two solutions having same osmotic pressure at a given temperature are called _____.

3. The law that can be used to determine the limiting molar conductivity (λm°) of weak electrolytes is ____.

4. The unit of rate constant of a first order chemical reaction is

(a) $mol^{-1}Ls^{-1}$ (b) s^{-1}

(c) $molL^{-1}s^{-1}$ (d) $mol^{-2}L^2s^{-1}$

5 What is the name of the colloidal system in which both the dispersed phase and dispersion medium are liquids ?

(a) Emulsions (b) Gel

(c) Sol (d) Foam

6. The method used for the concentration of sulphide ores is

(a) Hydraulic washing (b) Leaching

(c) Magnetic separation (d) Froth flotation

7. The reaction which converts benzene diazonium chloride to chlorobenzene using CuCl in HCl is known as _____.

(a) Swarts reaction (b) Sandmever reaction

(c) Finkelstein reaction (d) Kolbe's reaction

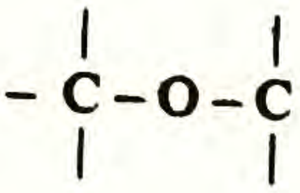
8. Give a reagent which is used to distinguish 1°, 2° and 3° alcohols.

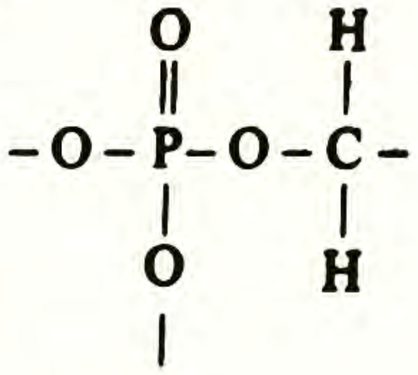
9. The galvanic cells which are used to convert the energy of combustion of fuels like hydrogen, methane etc into electrical energy are generally called as _____.

B. Answer all questions from 10 to 13. Each carries 1 score. **(4 × 1 = 4)**

10. A white precipitate is obtained when aniline reacts with bromine water at room temperature. The chemical name of the precipitate is _____.

11 Identify the peptide bond among the following :

(a) 

(b) 

(c) – CO – NH –

(d) – COO –

12. Name the polymerization product formed by the condensation reaction between phenol and formaldehyde

(a) Bakelite

(b) Melamine formaldehyde

(c) Nylon

(d) Dacron

13. The artificial sweetener which is used in cold foods and soft drinks is

(a) BHT

(b) Aspartase

(c) Sodium benzoate

(d) Ranitidine

PART – II

A Answer any 2 questions from 14 to 17. Each carries 2 scores. **(2 × 2 = 4)**

14. KCl crystals develop violet colour when heated in an atmosphere of potassium vapour. Explain.

15 State Henry's law and mention any one of its application.

16. (i) Write Arrhenius equation. (1)

(ii) How will you obtain the value of activation energy (Ea) from a graphical plot using Arrhenius equation ? (1)

17 What is lanthanoid contraction ? Mention any one of its consequences.

B. Answer any 2 questions from 18 to 20. Each carries 2 scores. **(2 × 2 = 4)**

18. Why is Cr^{2+} reducing and Mn^{3+} oxidizing when both have d^4 configuration ?

19. Explain carbylamine reaction with equation.

20. $CH_3 - NH_2$ is more basic than NH_3 while $C_6H_5 - NH_2$ is less basic than NH_3. Explain.

PART – III

A. Answer any 3 questions from 21 to 24. Each carries 3 scores. **(3 × 3 = 9)**

21 Write any three differences between crystalline and amorphous solids. **(3)**

22 18g of glucose, $C_6H_{12}O_6$, is dissolved in 1 kg of water in a sauce pan. At what temperature will water boil at 1.013 bar ? **(3)**

(K_b for water is 0.52 $Kkgmol^{-1}$, boiling point of water = 373.15 K)

23. (i) Mention any two factors which influence the rate of a chemical reaction. **(1)**

(ii) Derive an expression for half life of a first order reaction from its integrated rate equation. **(2)**

24. (i) Write a suitable method to convert. **(1)**

$CH_3 - CH_2 - Br$ to $CH_3 - CH_2 - I$

(ii) Suggest and explain a suitable mechanism for the nucleophilic substitution of tert – butyl bromide with NaOH. **(2)**

B. Answer any 2 questions from 25 to 27. Each carries 3 scores. **(2 × 3 = 6)**

25.

(i) What are Grignard reagents ? **(1)**

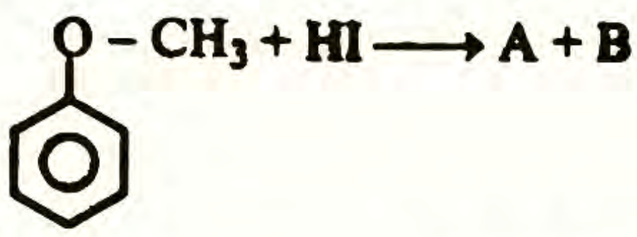
(ii) State Saytzeff rule and illustrate it with an example. **(2)**

26. (i) Alcohols and phenols have higher boiling points. Why ? **(1)**

(ii) What is aspirin ? How is it prepared from salicylic acid ? **(2)**

27.

(i) Identify A and B in the following reaction **(1)**



(ii) What is meant by hydroboration – oxidation reaction ? Illustrate it with an example. **(2)**

PART – IV

A. Answer any 3 questions from 28 to 31. Each carries 4 scores. **(3 × 4 = 12)**

28 (i) What are secondary batteries ? **(1)**

(ii) Write the electrode reactions and the overall cell reaction happening in the lead storage battery when it is in use. **(3)**

29. (i) Distinguish homogeneous and heterogeneous catalysis. **(2)**

(ii) Explain Tyndal effect. Write any one practical application of this effect. **(2)**

30. (i) Write chemical equations involved in the leaching of alumina from bauxite. **(3)**

(ii) What is the purpose of adding cryolite or CaF_2 into purified Al_2O_3 during the extraction of Al ? **(1)**

31 (i) What are oligosaacharides ? Give an example. **(2)**

(ii) What is glycogen ? **(1)**

(iii) Explain the chemical constitution of starch. **(1)**

B. Answer any 1 question from 32 to 33. Carries 4 scores. **(1 × 4 = 4)**

32. (i) Differentiate between thermoplastics and thermosetting plastics. **(2)**

(ii) Write the name and structure of monomer of neoprene. **(2)**

33. (i) Distinguish anionic detergents and cationic detergents with suitable examples. **(3)**

(ii) Name any one antioxidant used in food materials. **(1)**

PART – V

Answer any 2 questions from 34 to 36. Each carries 6 scores. **(2 × 6 = 12)**

34. (i) Write the chemical reaction when PCl_5 is strongly heated. **(1)**

(ii) What are interhalogen compounds ? Give two examples. **(2)**

(iii) Explain the steps involved in the contact process for the manufacture of H_2SO_4. **(3)**

35. (i) Draw the geometrical isomers of $[Co(NH_3)_4Cl_2]^+$ **(2)**

(ii) Describe the four types of structural isomerism exhibited by co-ordination compounds. **(4)**

36. (i) Write the products of the following reaction :

$$2H-CHO \xrightarrow[\Delta]{\text{Con NaOH}} \_\_\_\_ + \_\_\_\_$$ **(2)**

(ii) Explain Hell – Volhard – Zelinsky (HVZ) reaction. **(2)**

(iii) Suggest a suitable method for the following conversion : **(2)**