Reg. No. : .....

Name : .....

SME-25

SECOND YEAR HIGHER SECONDARY MODEL EXAMINATION, FEBRUARY 2020

Part – III

Time : 2 Hours

CHEMISTRY

Cool-off time : 15 Minutes

Maximum : 60 Scores

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.

Answer any 7 questions from 1-9. Each carries 1 score. **(7 × 1 = 7)**

1. The Oxo acid of nitrogen which used as a powerful oxidising agent is

   (a) HNO_3 (b) HNO_2

   (c) N_2O_5 (d) NO

2. Choose the narcotic analgesic from the following :

   (a) Penicillin (b) Heroin

   (c) Ampicillin (d) Ofloxacin

3. The group of strong electrolytes useful for calculating λm° of CH_3COOH is

   (a) CH_3COONa, HCl, NaCl (b) CH_3COOK, HCl, NaCl

   (c) CH_3COOK, KOH, HCl (d) CH_3COONa, NaOH, HCl

4. Which of the following is an example of anti-ferromagnetic substance ?

   (a) CrO_2 (b) Fe_3O_4

   (c) MnO (d) H_2O

5. The polymer used for the manufacture of squeeze bottle :

   (a) Polystyrene (b) Teflon

   (c) PVC (d) Polythene

6. Ammonical silver nitrate solution is known as _____.

7. The electrical disintegration method used for the preparation of metal sol is called _____.

8. The Chlorofluoro carbon compounds for methane and ethane are known as _____.

9. Hinsberg reagent is chemically _____.

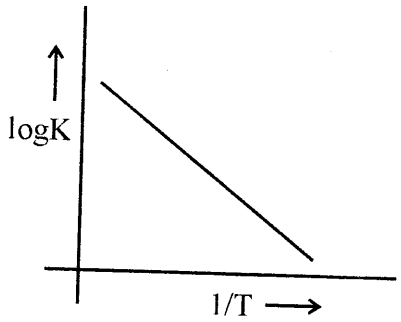
Answer any 10 questions from 10-22. Each carries 2 scores. **(10 × 2 = 20)**

10. Classify the following into molecular, ionic, metallic and covalent solids :
SiC, CaF_2, I_2, Mg. **2**

11. (a) Draw the body centered cubic unit cell. **1**
(b) Calculate the effective number of particles present in body centered cubic unit cell. **1**

12. Account for the following :
(a) 0.9 % saline water is used in intravenous injections. **1**
(b) The technique of osmotic pressure is generally used for the determination of molar mass of biomolecules and polymers. **1**

13. The plot of logarithmic form of Arrhenius equation is given below.



(a) Give the logarithmic form of Arrhenius equation. **1**
(b) What will be slope of the line ? **1**

14. (a) Give two metals that extracted by hydrometallurgy. **1**
(b) Discuss the vapour phase refining process of nickel. **1**

15. Leaching is a chemical process of concentration of ore. Explain the leaching process of bauxite ore. **2**

16. Why Zn, Cd and Hg are not regarded as transition elements ? **2**

17. Identify the central atom, ligands, primary valency and secondary valency of the central atom in the complex ion $[CoCl(NH_3)_5]^{2+}$. **2**

18. (a) Why PCl_3 fumes in moisture ? 1

(b) Draw the structures of any two Oxoacids of sulphur. 1

19. (a) Suggest the best reagent used to convert primary alcohol to pure alkyl chlorides. 1

(b) Represent the functional isomers of a molecule with molecular formula C_2H_6O. 1

20. Identify the following named reactions :

(a) $CH_3COCl \xrightarrow[Pd\text{-}BaSO_4]{H_2} CH_3 - CHO$ 1

(b) $CH_3 - CO - CH_3 \xrightarrow[con.\ HCl]{Zn - Hg} CH_3 - CH_2 - CH_3$ 1

21. Account for the less reactivity of chlorobenzene towards nucleophilic substitution reaction. 2

22. Differentiate between narrow spectrum and broad spectrum antibiotics with examples. 2

Answer any 7 questions from 23-31. Each carries 3 scores. **(7 × 3 = 21)**

23. (a) At room temperature the solubility of CO_2 gas in water decreases with decrease in partial pressure of CO_2. State the law behind this observation. 1

(b) Calculate the mass of urea (NH_2-CO-NH_2) required to prepare 0.25 molal aqueous solution containing 2.5 kg solvent. 2

24. (a) Why it is necessary to remove CO when ammonia is prepared by Haber process ?

(b) List any four points of differences between physisorption and chemisorption. 2

25. Explain on the basis of V.B.T. that $[Ni(CN)_4]^{2-}$ is square planar while $[NiCl_4]^{2-}$ is tetrahedral. 3

26. (a) Find the overall order of a reaction having rate expression $r = K[A]^{1/2}[B]^{3/2}$. 1

(b) The time required to react 80% of the reactant in a first order reaction is 10 minute. Calculate the rate constant of the reaction. 2

27. (a) Arrange the following compounds in the increasing order of their basic strength in aqueous solution :

NH_3, $CH_3 - NH_2$, $(CH_3)_2NH$, $(CH_3)_3N$ 1

(b) How will you convert aniline to benzene diazonium chloride ? 2

28. Match the following :

	A		B
(i)	Polysaccharide	(a)	Night-blindness
(ii)	Zwitter ion	(b)	Maltase
(iii)	Vitamin – A	(c)	Isoelectric pH
(iv)	RNA	(d)	Testosterone
(v)	Maltose	(e)	Ribose
(vi)	Hormone	(f)	Cellulose

29. (a) Arrange the alkyl halides in the increasing order of their reactivity towards S_N1 reaction.

$(CH_3)_3CCl$, $CH_3 - Cl$, $(CH_3)_2CHCl$, $CH_3 - CH_2 - Cl$ 1

(b) List any two points of difference between S_N1 and S_N2 mechanism. 2

30. Polymers are classified into different ways. How polymers are classified on the basis of molecular forces ? Explain. 3

31. Give the steps of preparation of potassium dichromate ($K_2Cr_2O_7$) from chromite ore. 3

Answer any 3 questions from 32-35. Each carries 4 scores. **(3 × 4 = 12)**

32. (a) Represent the galvanic cell having the cell reaction

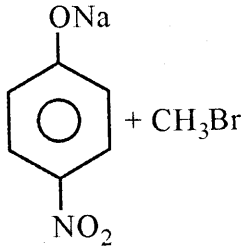
$$Mg_{(s)} + 2Ag^{+}_{(aq)} \rightleftharpoons Mg^{2+}_{(aq)} + 2Ag_{(s)}$$ 1

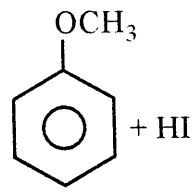
(b) Write the reactions taking place at cathode and anode of the above cell. 2

(c) Give the products obtained at cathode and anode during the electrolysis of aqueous NaCl. 1

33. (a) How will you convert phenol to salicylaldehyde ? 2

(b) Write the product obtained by the reaction of following pairs of reactions :

(i)  1

(ii)  1

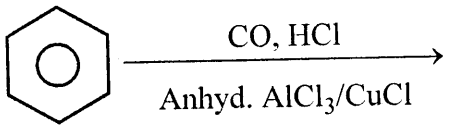
34. (a) Write any two allotropes of phosphorous. 1

(b) What are interhalogen compounds ? Give two examples of interhalogen compounds. 2

(c) Give the reason for low boiling points of noble gases. 1

35. (a) Why aldehydes are more reactive than ketones towards nucleophilic addition reactions ? 1

(b) Complete the following reactions :

(i)  1

(ii) $2H - CHO \xrightarrow{Con \cdot NaOH}$ 1

(iii) $CH_3 - CH_2 - COOH \xrightarrow[(ii)\ H_2O]{(i)\ Cl_2/Red\ phosphorous}$ 1