BOARD QUESTION PAPERS—2011

CLASS—XII (H.P.)
CHEMISTRY (THEORY)

SERIES—A

Time Allowed—3 Hours **Maximum Marks—60**

Candidates are required to give their answers in their own words as far as practicable.
The marks allotted to each question are indicated against it.

Special Instructions :

(i) *You must write Question Paper Series in the circle at the top left side of title page of your Asnwer-book.*

(ii) *While answering your Questions, you must indicate on your Answer-book the same Question No. as appears in your Question Paper.*

(iii) *Do not leave blank page/pages in your Answer-book.*

(iv) ***All questions are compulsory,*** *internal choices have been given in some questions.*

(v) *Question Nos.* **1** *to* **6** *are multiple choice type questions (MCQs) carrying 1 mark each. Choose one correct answer among four options.*

(vi) *Question Nos.* **7** *to* **10** *are very short answer type questions carrying 1 mark each. Answer these in about one word or in one sentence.*

(vii) *Question Nos.* **11** *to* **17** *are short answer type questions carrying 2 marks each. Answer these questions in about 30 words each.*

(viii) *Question Nos.* **18** *to* **25** *are short answer type questions carying 3 marks each. Answer these questions in about 40 words each.*

(ix) *Question Nos.* **26** *to* **28** *are long answer type questions carrying 4 marks each. Answer these questions in about 50 words each.*

(x) *Ask for log table.*

1. Volume occupied by atoms in simple cubic crystal is : 1
(a) 52.4% (b) 74%
(c) 68% (d) None of these.

2. The standard EMF of Daniell Cell is 1.10 V. The maximum electrical work obtained from the cell is ? [If n = 2] 1
(a) 175.4 kJ (b) 212.3 kJ
(c) 106.15 kJ (d) 53.07 kJ.

3. Blood may be purified by : 1
(a) dialysis (b) electro-osmosis
(c) coagulation (d) filtration.

4. The most abundant element in the earth's crust is : 1
(a) Oxygen (b) Aluminium
(c) Silicon (d) None of these.

5. Which of the following is not a *d*-block element : 1
(a) Hg (b) Po
(c) Ni (d) W.

6. Chloramphenical is used as : 1
   (*a*) An analgesic (*b*) A tranquilizer
   (*c*) An antibiotic (*d*) Antiseptic.
7. What is *Leaching* ? 1
8. Give an example of pseudo-chemical reaction. 1
9. Name the central metal ion present in haemoglobin and vitamin-B_{12}. 1
10. What is the name of polymer which is also known as orlon ? 1
11. Give four differences between Lyophilic and Lyophobic colloids. 2
12. Give differences between ideal and non-ideal solutions. 2
13. Discuss the geometry of $[Ni(CN)_4]^{-2}$ ion by using Valence Bond Theory. 2
14. Explain the following terms :
   (*a*) Doping
   (*b*) Unit cell. 2
15. How can you distinguish primary, secondary and tertiary alcohols by Lucas Test ? 1
16. (*a*) What is Lanthanoid Contraction ? 1
   (*b*) Why OF_6 does not exist and SF_6 exists ? 1 + 1
17. Write a short note on the following :
   (*i*) Coupling Reaction
   (*ii*) Nitration of anisole. 1 + 1
18. (*a*) A sugar syrup of weight 214.2 g contains 34.2 g of sugar ($C_{12}H_{22}O_{11}$).
   Calculate :
   (*i*) Molality of solution.
   (*ii*) Mole Fraction of sugar in the syrup. 2, 1
   (*b*) What are antifertility drugs ?

   Or

   (*a*) What is van't-Hoff factor ? What would be the value of van't-Hoff factor for association and dissociation ? 2, 1
   (*b*) What are Broad spectrum antibiotics ?
19. (*a*) Explain Diazotisation Reaction.
   (*b*) Complete the reation

$$C_6H_5COOAg + Br_2 \xrightarrow[\text{reflux}]{CCl_4} ?$$

   (*c*) Wurtz-Fittig reaction. 1 + 1 + 1
20. (*a*) Write the units of rate constant for third order reaction.
   (*b*) The thermal decomposition of a compound is of first oder. If 50% of the compound is decomposed in 120 minutes, how long will it take for 90% of the compound to decompose ? 1, 2
21. (*a*) Give structures of P_4O_6 and P_4O_{10}. 2, 1
   (*b*) Discuss the structure of SF_6.

   Or

   (*a*) Explain manufacturing process of Ammonia. 2, 1
   (*b*) How does Ozone react with Hg ?
22. (*a*) Explain discharging and recharging of lead storage battery. 2, 1
   (*b*) Define Faraday's Second Law of electrolysis.

   Or

   (*a*) What is electrochemical theory of rusting ? Explain.
   (*b*) Why does a dry cell become dead after a long time, even if it has not been used ? 2, 1

(a) Why carboxylic acids are more acidic than phenols ?
(b) Give reaction of CH_3CHO with $NH_2.NH_2$.

24. (a) Explain, why *d*-block elements or their compounds, act as good catalysts. 2, 1
(b) Zn^{+2} salts are white and Cu^{+2} salts are blue. Why ?

25. (a) Give differences between globular and fibrous proteins with examples. 1½, 1½
(b) What is chemical name of vitamin E ?

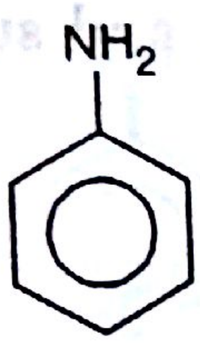
26. How will you convert : 2, 1
(a) nitrobenzene to benzene diazonium chloride ?
(b) Explain ethylamine ($CH_3CH_2NH_2$) is more basic than aniline ($C_6H_5NH_2$).
(c) Convert ethyl cyanide to propylamine. 1, 2, 1

Or

(a) Why $CH_3 - \underset{\displaystyle CH_3}{\overset{|}{NH}}$ is more basic than CH_3NH_2 ?

and $CH_3 - \underset{\displaystyle CH_3}{\overset{|}{\underset{|}{N}}} - CH_3$?

(b) Complete the reaction



+ 3 Br_2 (Aqueous) → ?

(c) Convert ethyl amine to methyl amine. 2, 1, 1

27. (a) Anti-Markownikov rule or peroxide effect applies to the addition of HBr only and not to the addition of HCl or HI. Give reason.
(b) How will you convert methanol to ethanol ?
(c) Write short notes on :
(i) Vulcanisation of rubber.
(ii) Hell-Volhard-Zelinsky reaction (H.V.Z). 1, 1, 2

28. (a) What are fuel cells ?
(b) Give synthesis of Nylon-6.
(c) Give reaction of formaldehyde (HCHO) with ammonia (NH_3).
(d) What is the difference between mineral and ore ? 1, 1, 1, 1

SERIES—B

CHEMISTRY (THEORY)

Time Allowed—3 Hours **Maximum Marks—60**

Note : See Series–A

1. Volume occupied in f.c.c. is : 1
(a) 74% (b) 68%
(c) 52.4% (d) 65%.

2. The conductivity of metals increases with : 1
(a) Increase in temperature (b) Decrease in temperature
(c) No change observed (d) Increases then decreases.

3. Shape selective catalysis is a reaction catalysed by : 1

(a) Zeolites (b) Enzymes
(c) Platinum (d) Zeigler-Natta catalyst.

4. The method which is used for getting metals of high purity is : 1

(a) Zone refining (b) Van Arkel's Method
(c) Liquation (d) Chromatography.

5. Which of the following element has maximum electron gain enthalpy ? (negative) 1

(a) F (b) Cl
(c) Br (d) I.

6. Out of these which compound is not a tranquilizer ? 1

(a) Luminal (b) Seconal
(c) Valium (d) Bithional.

7. What is smelting ? 1

8. Rate of reaction = $K[CH_3CHO]^{3/2}$. Predict the order of reaction. 1

9. Give one example of bidentate ligand. 1

10. What are the monomeric units of Nylon-66 ? 1

11. Differentiate between absorption and adsorption with examples. 2

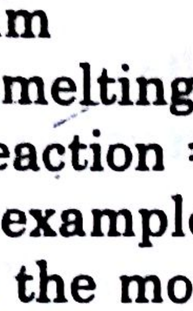
12. What is Osmotic Pressure ? Prove that it is a colligative property. 2

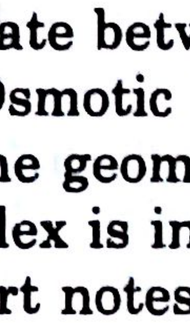
13. Discuss the geometry of $[Cr(NH_3)_6]^{+3}$ ion by using V.B.T. and suggest whether this complex is inner orbital or outer orbital complex. 2

14. Write short notes on : 1, 1

(a) What are disinfectants ?
(b) Radius ratio.

15. Complete the reactions : 1, 1

(a)  + $C_6H_5COCl \xrightarrow{NaOH}$?

(b)  + $CO_2 \xrightarrow[400\,K\ 4\text{-}7\ atm]{NaOH}$?

16. What are the consequences of Lanthanoid contraction ? 2

17. Write short note on Aldol Condensation. 2

18. (a) What are the characteristics of non-ideal solutions showing positive and negative deviations ?
(b) What are imperfections in solids ? 2, 1

Or

(a) The vapour pressure of pure benzene at a certain temperature is 262 atm. At the same temperature the V.P. of a solution containing 2.0 g of non-volatile solid in 100 g benzene is 256 atm. What is the molecular mass of the solid ?
(b) What are F-centres ? 2, 1

19. (a) Why haloarenes are less reactive than haloalkanes ?
(b) Give two uses of Freons. 2, 1

(a) A first order reaction is 20% complete in 10 minutes. Calculate the time period for 75% completion of the reaction.
(b) What is activation energy ?

(a) What are the structures of XeF_2 and XeO_3 ? 2, 1
(b) What are interhalogen compounds ? Why these compounds are more reactive than halogens ?

Or 1½, 1½

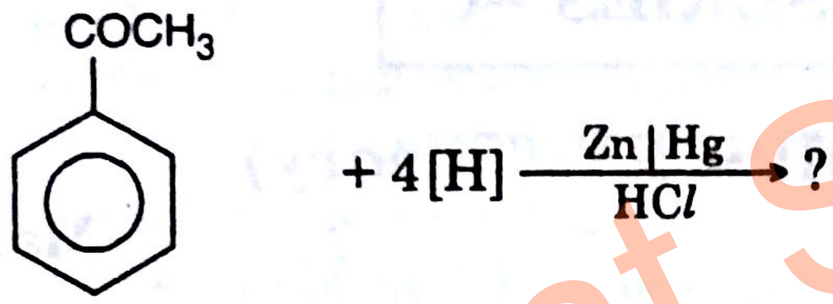
(a) NCl_5 does not exist while PCl_5 exists. Why ?
(b) Give reactions of H_2SO_4 with :
(i) $C_{12}H_{22}O_{11}$

(ii)

1½, 1½

22. (a) Explain Electrochemical series.
(b) Can we store 1M $CuSO_4$ solution in a vessel made up of zinc metal ?
$E^\circ(Zn^{+2}|Zn) = -0.76$ V
$E^\circ(Cu^{+2}|Cu) = +0.34$ V. 1½, 1½

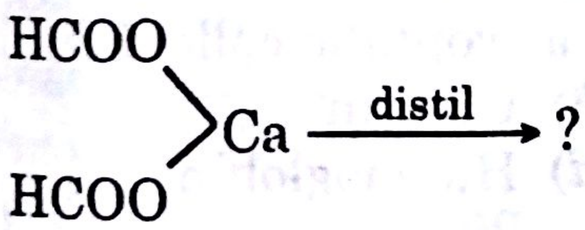
23. (a) What is Wolff kishner reaction ? Explain.
(b) Complete the reaction



(c) $2HCHO \xrightarrow{NaOH} ? + ?$ 1, 1, 1

Or

(a) Why formic acid is more acidic than acetic acid ?
(b) Complete the reaction :



2, 1

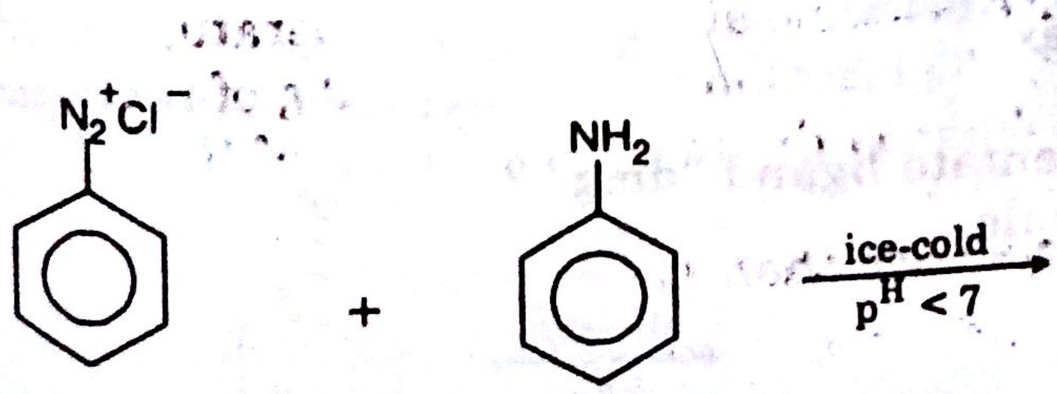
24. (a) Why *d*-block elements have tendency to form interstitial compounds ? Explain. 1½

(b) Out of $[Sc(H_2O)_6]^{+3}$ and $[Ti(H_2O)_6]^{+3}$ ions which is coloured and why ? Give reason. 1½

25. (a) What are carbohydrates ? Explain their important functions. 2, 1
(b) Give chemical name of vitamin C.

26. (a) Ethylamine is soluble in water but aniline is not soluble in water. Why ?
(b) Convert : aniline to acetanilide.
(c) Complete th reaction

2, 1, 1

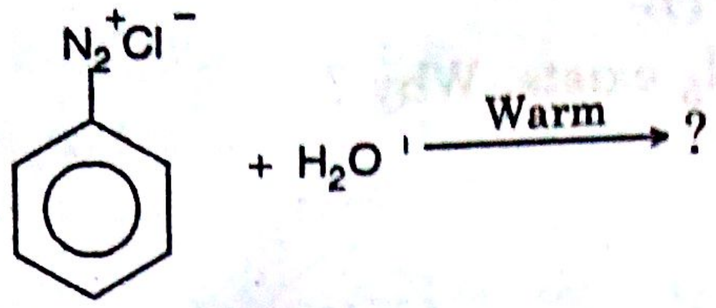


Or

(*a*) Why the protection of amino group (– NH_2 grp.) in aniline is required before nitration ? Explain and give reaction.

(*b*) Methylamine is more basic than Ammonia. Why ?

(*c*) Complete the reaction :



2, 1, 1

27. (*a*) What is Kohlrausch's law ?
(*b*) Give synthesis of Polythene.
(*c*) What is Reimer-Tiemann's reaction ? 1, 1, 2

28. (*a*) Why, iodination of benzene is difficult ?
(*b*) Why nitrogen is less reactive ?
(*c*) (*i*) What are monomers of terylene ?
(*ii*) HF is weaker acid than HI. Give reason. 1, 1, 2

SERIES—C

CHEMISTRY (Theory)

Time Allowed—3 Hours **Maximum Marks—60**

Note : See Series–A

1. What is radius ratio for the co-ordination number 8 ? 1
(*a*) 0.732–1.0 (*b*) 0.414–0.732
(*c*) 0.155–0.225 (*d*) None of these.

2. The electrode potential of SHE is arbitrarily fixed as : 1
(*a*) 0.34V (*b*) – 0.4 V
(*c*) Zero (*d*) – 0.76 V.

3. Out of these which colloidal solution is not a lyophilic colloid ? 1
(*a*) Gold sol. (*b*) Gelatin
(*c*) Starch (*d*) Haemoglobin.

4. Purest form of iron is : 1
(*a*) Cast iron (*b*) Wrought iron
(*c*) Steel (*d*) Pig iron.

5. Phenol upon distillation with zinc dust gives : 1
(*a*) Benzene (*b*) Benzaldehyde
(*c*) Benzoic acid (*d*) Benzophenone.

6. Which of the following is used as artificial sweetner ? 1
(*a*) Saccharin (*b*) Aspirin
(*c*) Omeprazole (*d*) Pheniramine.

7. What is calcination ? 1

8. Explain activated complex. 1

9. What is TEFLON ? 1

10. What is the name of bidentate ligand "dmg" ? 1

11. Explain Hardy-Schulze rule. 2

12. Explain the following :
(*i*) Azeotropes
(*ii*) Antifreeze solutions. 1, 1

13. Give differences between double salts and co-ordination compounds and give examples. 2

14. Write a short note on :
(*a*) Schottky Defect
(*b*) Ferromagnetism. 1, 1

15. Phenols are more acidic than alcohols. Explain. 1, 1

16. Explain the following :
(*i*) Zn, Cd and Hg are not regarded as transition elements.
(*ii*) *d*-block elements show variable oxidation states. 2

17. Write note on :
(*i*) Cannizaro's reaction.
(*b*) Decarboxylation reaction. 1, 1

18. (*a*) A solution is 25% water, 25% ethanol and 50% acetic acid by mass. Calculate the mole fraction of ethanol and acetic acid in the solution.
(*b*) What are antihistamines ? 2, 1

Or

(*a*) What is Henry's law ? Give one limitation of the law.
(*b*) What are synthetic detergents ? 2, 1

19. (*a*) What is Sandmeyer's reaction ? Give chemical reaction.
(*b*) Give preparation of D.D.T. 1½, 1½

20. (*a*) What is Arrhenius Equation ? Explain.
(*b*) One-fourth of a first order reaction is completed in 32 minutes. What is the half life period of the reaction ? 1½, 1½

21. (*a*) Why H_2O is a liquid and H_2S is a gas ?
(*b*) Give structures of XeF_6 and IF_5. 1½, 1½

Or

(*a*) What are allotropes of phosphorus ? Which allotrope is poisonous in nature ?
(*b*) Give reaction of HNO_3 with :
(*i*) Sulphur
(*ii*) Iodine. 1½, 1½

22. (*a*) What is difference between metallic and electrolytic conduction ?
(*b*) What is a dry cell ? 2, 1

23. (*a*) Complete the reaction

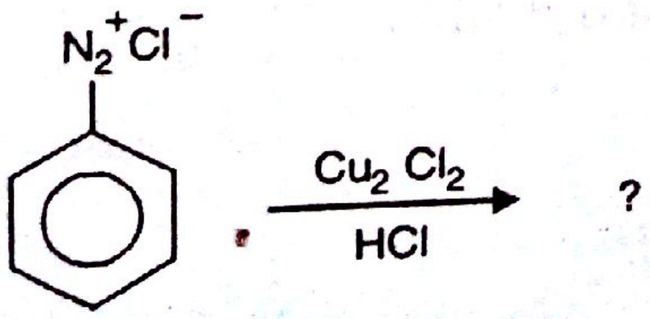
$C_6H_5COOH + SOCl_2 \longrightarrow ?$

(*b*) What is Kolbe's electrolysis reaction ? Explain. 1, 2

24. (*a*) What are transition elements ? How they are different from *f*-block elements ? 1½
(*b*) Give reason, Mn^{+2} ion is more paramagnetic than Fe^{+2} ion. 1½

25. (*a*) Give atleast three differences between DNA and RNA.
(*b*) What is peptide linkage ? 2, 1

26. (*a*) What is carbylamine reaction ? Explain.
(*b*) Why NH_3 is more basic than PH_3 ?
(*c*) Complete the reaction :



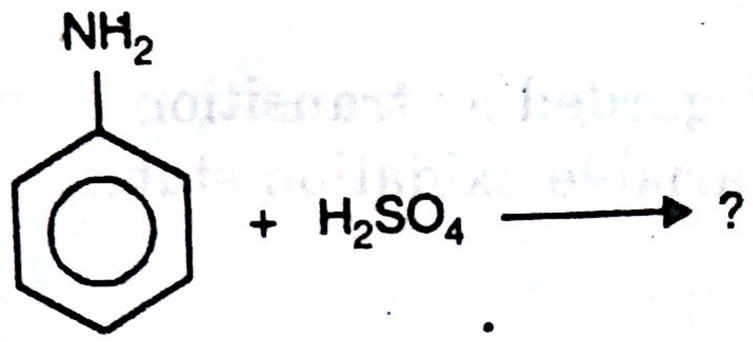
2, 1, 1

Or

(*a*) What is Gattermann reaction ? Explain.

(*b*) Out of these which is more basic in nature : CH_3NH_2 , $(CH_3)_2NH$ and $(CH_3)_3N$

(*c*) Complete the reaction :



2, 1, 1

27. (*a*) What is molar conductivity ?

(*b*) Give synthesis of Buna-S.

(*c*) What are thermosetting polymers ?

(*d*) What is Williamsons synthesis ? 1, 1, 1, 1

28. (*a*) Why Fluorination of benzene not possible directly ?

(*b*) Give reason, why HI is more reducing in nature than other halogen acids ?

(*c*) Explain the manufacturing of ozone (O_3) by Seimen's ozonizer. 1, 1, 2.