

Name D T Class & Section XII-C Roll No. 14

FIRST TERM EXAMINATION—2017-18

CLASS—XII

SUBJECT—CHEMISTRY

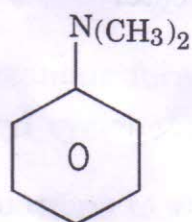
Time : 3 Hours

M.M. : 70

General Instructions :

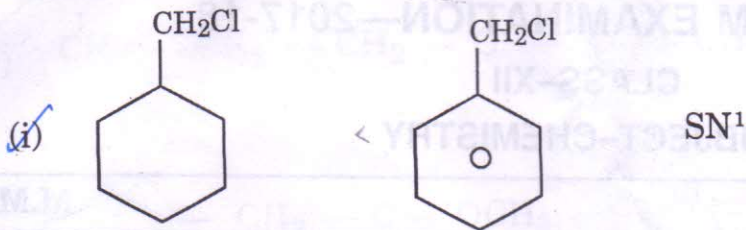
1. All questions are compulsory.
2. Question 1 to 5 are very short answer type questions and carry 1 mark each.
3. Question 6 to 10 are short answer type questions and carry 2 marks each.
4. Question 11 to 22 are also short answer questions and carry 3 marks each.
5. Question 23 is a value based question and carries 4 marks.
6. Question 24 to 26 are long answer questions and carry 5 marks each.
7. Use log table if necessary, use of calculator is not allowed.

1. Atoms of element B form hcp lattice and those of the element A occupy $\frac{2}{3}$ rd of tetrahedral voids. What is the formula of the compound formed by elements A & B ? (1)
2. Give example of a zero order reaction. (1)
3. Give IUPAC name of the following compound : (1)



4. Arrange : (1)
Aniline, p-nitroaniline and p-toluidine in decreasing K_b value.
5. What is inversion of sugar ? (1)

6. Write down the increasing order of the property mentioned : (2)



(ii) $\text{R}_2\text{CHOH} < \text{RCH}_2\text{OH} > \text{R}_3\text{COH}$ Acidic character

7. (i) What is denaturation of proteins ? (1+1)

(ii) Name one essential and one non-essential amino acid.

8. Write down structural differences between :

(i) Starch and cellulose

(ii) Amylose and Amylopectin

9. (i) What are reducing sugars ? (1+1)

(ii) Give two structural differences between RNA and DNA.

10. (i) How can a detergent be made biodegradable ? (1+1)

(ii) Name two broad spectrum antibiotics.

11. Give equations for the preparations of following polymers : (3)

(i) a Polyamide polymer (ii) a polyester

(iii) a Thermosetting polymer

OR

(i) a copolymer

(ii) a condensation polymer

(iii) a synthetic rubber

12. (a) KF has ccp structure. Calculate the radius of the unit cell if cell edge is 400 pm. How many F^- ions and octahedral voids are there in the unit cell? (2+1)

(b) What is Anisotropy ?

13. (i) Arrange the following polymers in increasing order of their intermolecular forces : (3)

Nylon 6,6, Buna-S, Polythene

(ii) Name one biodegradable polymer and mention its use.

(iii) Name the polymer, used for non-stick coating of utensils and give equation for its preparation.

14. Write equations for the following : (1×3=3)

(i) Gabriel phthalimide synthesis

(ii) Rosenmund Reaction

(iii) Aldol condensation

15. How will you carry out the following conversions : (1×3)

(i) Aniline to Benzaldehyde

(ii) Toluene to 1,3,5 Trinitro benzene

(iii) Propanoic acid to Ethanoic acid

16. Give Plausible reasons for the following observations : (1×3)

(i) Aldehydes are more prone to nucleophilic addition reactions than ketones.

(ii) Amino group is o & p directing group yet on nitration, it yields m-nitro aniline.

(iii) Cyclohexanone forms cyanohydrin with HCN in good yield but 2, 2, 6 - Trimethyl cyclohexanone gives poor yield.

17. (i) Give equations to show the presence of 5-OH groups and -CHO group in glucose.

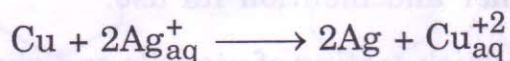
(ii) Give two points in support of cyclic structure of glucose. (2+1)

18. (a) A steady current of 100 A is passed through the cells A (AgNO_3 solution) and cell B (CuSO_4 solution), connected in series. It results in deposition of 0.52 g Ag in cell A. (2+1)

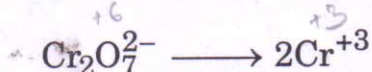
(i) Calculate the time for which the current has been passed.

- (ii) Calculate the mass of copper deposited in cell B (At. mass Ag = 108, Cu = 64)

(b) Depict the galvanic cell in which cell reaction is :



19. (i) Calculate the quantity of electricity in coulombs for : (1+2)



(ii) Write down the equations for the reactions at cathode and anode in a lead storage battery.

20. Calculate the osmotic pressure of 1000 mL solution containing 4.6 mg of CaCl_2 at 27°C (At. mass Ca = 40, Cl = 35.5, $R = 0.082 \text{ L atm. K}^{-1} \text{ mol}^{-1}$) (3)

21. (i) Water cannot be separated completely from ethanol by distillation, why ?

(ii) 200 g of water is mixed with 225 g of ethylene glycol. Calculate the molality of the solution and its freezing point. (M-mass of ethylene glycol = 62 g/mol K_f for $\text{H}_2\text{O} = 1.86 \text{ K kg mol}^{-1}$) (1+2)

22. An organic compound with molecular formula $\text{C}_9\text{H}_{10}\text{O}$ form 2,4-DNP derivative reduces Tollen's Reagent and undergoes Cannizzaro's reaction. (3)

On vigorous oxidation it gives 1, 2-Benzene dicarboxylic acid. Identify the compound & give relevant equations.

23. Mannat had gone for a trekking expedition with her family. After coming back her mother was suffering from severe muscle pain, when Mannat suggested her to take aspirin. (4)

(i) What are the values associated with the suggestion ?

(ii) How does aspirin relieve the muscular pain ?

(iii) Mention other applications of aspirin.

(iv) Give equation for the preparation of aspirin from phenol.

24. (a) How will you distinguish between the following pairs ? Give tests with equations : (3+2)

- (i) Ethanol and Propanol
 (ii) Methylamine and N-Methylmethanamine
 (iii) Propanal and Pentan-3-one
- (b) Write down the mechanism for the reaction of ether with HI.

OR

- (a) How will you distinguish between the following pairs of compounds. Give tests with equations :

- (i) Acetophenone and Benzophenone
 (ii) N-Methylmethamine and N,N-Dimethyl methanamine
 (iii) Methanoic Acid and Ethanoic acid

- (b) Write down the mechanism for the reaction of ethanol with conc. H_2SO_4 at 413 K.

25. (a) The rate constant of a first order reaction is $60 s^{-1}$. How much time will it take to reduce the initial concentration of the reactant to its 1/16th value. (5)

- (b) For the reaction $2NO(g) + Br_2(g) \longrightarrow 2NOBr(g)$ following data is obtained :

Exp.	Initial [NO]	Concentration [Br ₂]	Initial Rate (mol L ⁻¹ min ⁻¹)
01	0.10	0.10	1.3×10^{-6}
02	0.20	0.10	5.2×10^{-6}
03	0.20	0.30	1.56×10^{-5}

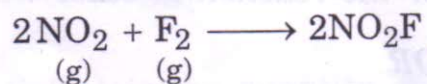
Determine (i) the order with respect to NO and Br₂.

- (ii) The Rate Law (iii) Rate constant

OR

(a) A reaction is of second order with respect to a reactant. How is the rate of reaction affected if the concentration of the reactant is reduced to half? What is the unit of rate constant? (2+3)

(b) For the following reaction :



The data is as follows :

Exp.	Initial [NO ₂]	Concentration [F ₂]	Initial Rate (mol L ⁻¹ min ⁻¹)
01	0.20	0.05	6.0 × 10 ⁻³
02	0.40	0.05	1.2 × 10 ⁻²
03	0.80	0.10	4.8 × 10 ⁻²

Determine :

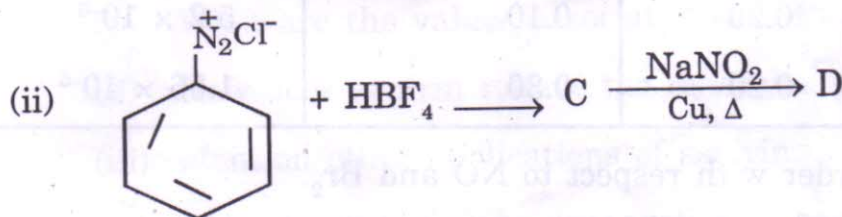
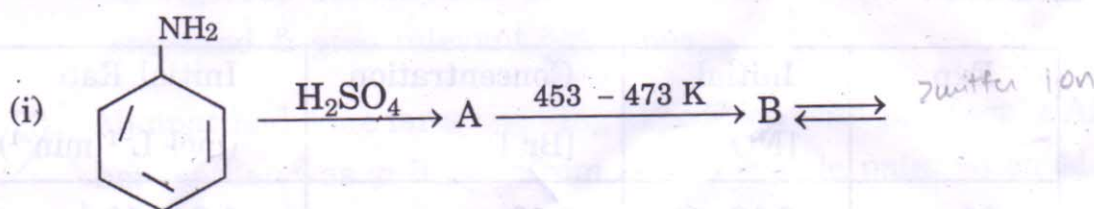
(i) Order of Reaction

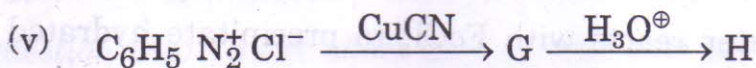
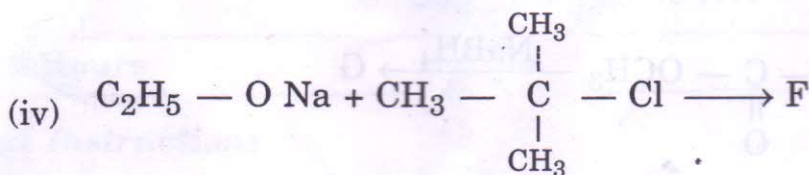
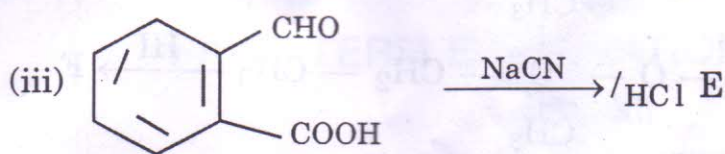
(ii) Rate Law

(iii) Rate of reaction when [NO₂] = 0.5 mol L⁻¹ and [F₂] = 0.6 mol L⁻¹

26. (a) Complete the following :

(½×8=4+1)

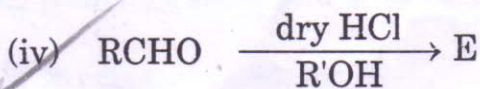
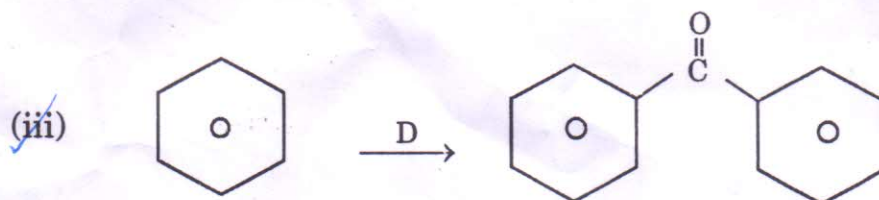
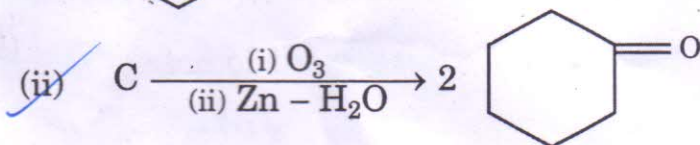
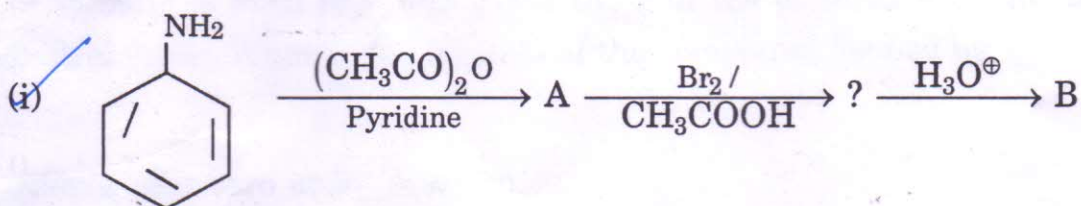


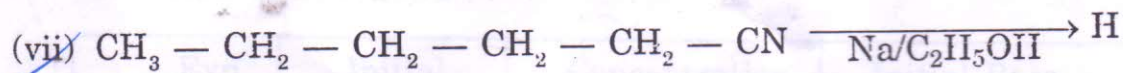
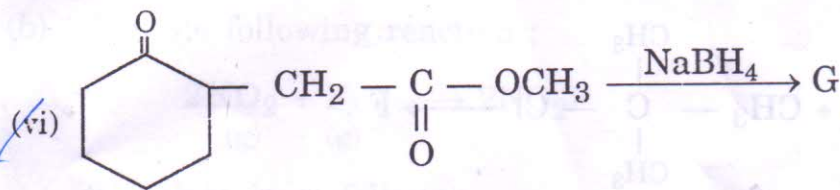
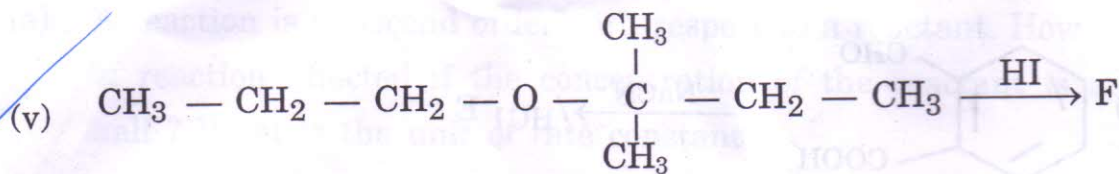


(b) Which has higher pKa value :
Phenol or carboxylic acid – explain why ?

OR

(a) Complete the following :





(b) Methylamine, in water reacts with FeCl_3 to precipitate hydrated ferric oxide. Explain.