



QP – 161

I Semester B.Sc. Examination, March/April 2022  
(CBCS) (Repeaters) (2014-15 and Onwards)  
Paper – I : CHEMISTRY

Time : 3 Hours

Max. Marks : 70

- Instructions :** 1) The question paper has **two** Parts. Answer both the Parts.  
2) **Draw chemical equations and diagrams wherever necessary.**

PART – A

Answer **any eight** of the following questions. **Each** question carries **two** marks.

(8×2=16)

1. Give any two applications of integration in chemistry.
2. Write Mathematical expression of Maxwell-Boltzmann equation for velocity distribution and explain the terms involved in it.
3. Write the significance of Vander-Waal's constants a and b.
4. State Grothaus-Draper law.
5. Define viscosity of liquid and mention its SI unit.
6. What are alkaline earth metals ? Write its general electronic configuration.
7. Define electron affinity.
8. Why is the second ionisation energy greater than the first ionisation energy ?
9. Calculate the equivalent weight of sodium carbonate (Given atomic masses of C = 12, O = 16, Na = 23).
10. Classify the following into electrophiles and nucleophiles :  
 $\text{BF}_3$ ,  $\text{NH}_3$ ,  $\text{CN}^\ominus$ ,  $\text{NO}_2^\oplus$ .
11. Draw chair and boat conformation of cyclohexane.
12. Explain Corey-House reaction with an example.

P.T.O.





## PART - B

Answer **any nine** of the following questions. **Each** question carries **six marks**.

(9×6=54)

13. a) i) If  $\log 5 = 0.6990$  and  $\log 7 = 0.8451$ , find the value of  $\log 35$ .  
ii) Define probability. (4+2)
- b) Write any two rules to find the differentiation. (4+2)
14. a) Describe the experimental determination of critical volume by Amagat's mean density method.
- b) Calculate rms velocity of oxygen molecule at 300 K [mass of  $O_2 = 32 \times 10^{-3}$  kg,  $R = 8.314 \text{ JK}^{-1} \text{ mol}^{-1}$ ]. (4+2)
15. a) Describe the Linde's process for the liquefaction of air.
- b) State the law of corresponding states. (4+2)
16. a) Explain the terms fluorescence and phosphorescence.
- b) Write a short note on chemical sensors. (4+2)
17. a) Mention any four differences between ideal and non-ideal solutions.
- b) Define Parachor. (4+2)
18. a) Explain steam distillation of a liquid mixture.
- b) 0.001 kg of a solute is dissolved in 0.1 kg of solvent and it gave a depression in freezing point 0.2 K. Calculate the molecular mass of the solute (The cryoscopic constant for water is  $5.0 \text{ kgmol}^{-1}$ ). (4+2)
19. a) Discuss Berkeley-Hartley's method of measurement of osmotic pressure of a solution.
- b) How is benzene prepared from cyclohexane? Give the equation. (4+2)
20. a) Define atomic radius of an atom. Explain how it varies in the periodic table.
- b) Give any two applications of electronegativity. (4+2)





21. a) Explain the formation of oxides and carbonates of alkaline earth elements.  
b) What is diagonal relationship ? Give example. (4+2)
22. a) Calculate the molarity and normality of a solution containing 5.3 g of  $\text{Na}_2\text{CO}_3$  dissolved in  $500 \text{ cm}^3$  of solution.  
b) What is a dibasic acid ? Give an example. (4+2)
23. a) What is isomerism ? Give its classification.  
b) Explain resonance effect with an example. (4+2)
24. a) State Markownikov's rule and discuss its mechanism.  
b) Write the reaction which shows acidic nature of terminal alkynes. (4+2)
25. a) How are dienes classified ? Mention an example for each type.  
b) Calculate angle strain in cyclopentane. (4+2)