

## B. Sc. First Year (Semester-I) Chemistry

Paper	Course	Periods/week	Total Periods	Marks
I	Inorganic Chemistry	2	30	32
II	Organic Chemistry	2	30	34
III	Physical Chemistry	2	30	34

### Marks Distribution Paper-I: Inorganic Chemistry

Name of the chapters	Periods	Weightage	Question paper				Total Marks
			Q. 1	Q. 2	Q. 3	MCQs	
IUPAC Nomenclature of inorganic comps:	03	04	01	-	-	03	<b>04</b>
Periodic table and periodic properties	09	12	01	03	06	02	<b>12</b>
Chemical Bonding-I	12	15	01	06	06	02	<b>15</b>
Chemical Bonding-II	06	07	01	03	-	03	<b>07</b>
<b>Total</b>	<b>30</b>	<b>38</b>	<b>04</b>	<b>12</b>	<b>12</b>	<b>10</b>	<b>38</b>

### Marks Distribution Paper-II: Organic Chemistry

Name of the chapters	Periods	Weightage	Question paper				Total Marks
			Q. 1	Q. 2	Q. 3	MCQs	
IUPAC Nomenclature of Organic Compounds	03	04	02	-	-	03	<b>05</b>
Mechanism of organic reactions	07	09	02	06	-	01	<b>09</b>
Alkenes, Dienes, and Alkynes	10	13	01	03	06	03	<b>13</b>
Alcohols, ethers & epoxides	10	13	01	03	06	02	<b>12</b>
<b>Total</b>	<b>30</b>	<b>39</b>	<b>05</b>	<b>12</b>	<b>12</b>	<b>10</b>	<b>39</b>

### Marks Distribution Paper-III: Physical Chemistry

Name of the chapters	Periods	Weightage	Question paper				Total Marks
			Q. 1	Q. 2	Q. 3	MCQs	
Chemical Mathematics	06	07	01	03	-	03	<b>07</b>
General concepts in chemistry	07	08	02	03	-	03	<b>08</b>
Gaseous State	10	13	01	03	06	03	<b>13</b>
Solid State	07	11	01	03	06	01	<b>11</b>
<b>Total</b>	<b>30</b>	<b>39</b>	<b>05</b>	<b>12</b>	<b>12</b>	<b>10</b>	<b>39</b>

Note: 1.  $\pm 02$  marks adjustment in given weightage should be allowed.

**MODEL QUESTION PAPER**  
**FACULTY OF SCIENCE**  
**B. Sc. (First Year) Semester-I**  
**EXAMINATION Part-I October/November 2009**

**Time: 2.10 Hrs**

**CHEMISTRY**

**Marks: 50**

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N. B.:

- (i) *Use separate answer book for each paper.*
  - (ii) *Attempt all questions.*
  - (iii) *Use of logarithmic table and calculator is allowed.*
  - (iv) *A figure to the right hand side indicates full marks.*
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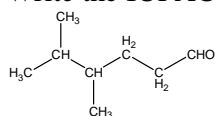
**Paper-I: INORGANIC CHEMISTRY**

- Q. 1 Answer the following** **04**
- a) What is the name of  $\text{KMgF}_3$ .
  - b) Define electronegativity.
  - c) What are the causes of chemical bonding?
  - d) Write the types of hybridization and geometry of  $[\text{Ni}(\text{CN})_4]^{2-}$ .
- Q. 2 Answer any two of the following** **06**
- a) Give the general characteristics of d block elements.
  - b) Calculate the percentage ionic character of HCl molecule by using Hanny and Smith relation.  
Given: Electronegativity of H = 2.1; Electronegativity of Cl = 3.5.
  - c) Calculate the electronegativity of fluorine by Pauling's method.  
Given:  $E_{\text{H-H}} = 104.2 \text{ Kcal mol}^{-1}$ ,  $E_{\text{F-F}} = 36.6 \text{ kcal mol}^{-1}$ ,  $E_{\text{H-F}} = 134.6 \text{ kcal mol}^{-1}$ .
  - d) Explain the various postulates of VSEPR.
- Q. 3 Answer any one of the following** **06**
- a) What is the ionic bond? Explain how energy changes in the formation of ionic bond.
  - b) Define ionization potential. Give its trends in periodic table and explain factors affecting on it?

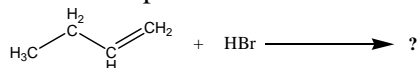
## Paper-II: ORGANIC CHEMISTRY

### Q. 1 Answer the following 05

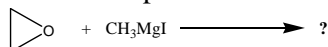
- a) Write the IUPAC name of



- b) What is Inductive effect?  
c) Define carbonium ions with one example  
d) Predict the product



- e) Predict the product



### Q. 2 Answer any two of the following 06

- a) Write the formulae of following compounds  
i) 1,4-Pentadiene, ii) 2-Methyl-2-propanol, iii) Pentan-2-one  
b) Explain the resonance with suitable example?  
c) Discuss 1,2 addition of Br<sub>2</sub> to propene with mechanism.  
d) Discuss the preparation of ethers via Williamson's synthesis?

### Q. 3 Solve any one of the following 06

- a) Preparation of acetylene from iodoform and explain substitution reaction of acetic acid on ethyne.  
b) Explain the addition of following reagents on glycerol  
1) Nitric acid, 2) Hydroiodic acid, 3) Acetyl chloride, 4) KHSO<sub>4</sub>

## Paper-III: PHYSICAL CHEMISTRY

### Q. 1 Answer the following 05

- a) Arrange the given equation to the form of general equation of straight line  $Y = mx + c$  and find out slope and intercept.  
$$2y - 8x = 12$$
  
b) How will you define molality?  
c) State law of rational intercept.  
d) Define: i) Ideal gas ii) Critical temperature.  
e) A solution contains 1 mole of alcohol and 4 moles of water. What is the mole fraction of water in solution?

### Q. 2 Answer any two of the following 06

- a) What is permutation? Explain it.  
b) Explain the deviation of real gases from ideal behaviour.  
c) What is molarity of solution prepared by dissolving  $25.5 \times 10^{-3}$  Kg of pure KOH in 500 ml of solution? (At. Wt. of K = 39.1, O = 16, H = 1.)  
d) State and explain the term: i) Unit cell ii) Space lattice.

### Q. 3 Solve any one of the following 06

- a) Explain the crystal structure determination of KCl by x-ray diffraction method.  
b) Derive the Van der Waals equation. Give its interpretation at low pressure.

**MODEL QUESTION PAPER**  
**FACULTY OF SCIENCE**  
**B. Sc. (First Year) Semester-I**  
**EXAMINATION Part-II October/November 2009**

**Time: 45 Min**

**CHEMISTRY**

**Marks: 30**

N. B.:

- (i) One mark to each correctly answered MCQ.
- (ii) Negative marking system is applicable.
- (iii) Use black ball point pen to darken the circle of correct choice in OMR answer sheet.
- (iv) Darken only once circle for the answer of a MCQ.
- (v) Circle once darken is final. No change is permitted.

**Paper-I: INORGANIC CHEMISTRY**

- 1. IUPAC name of  $I_3^-$  is**
  - a) Iodo
  - b) Triiodide (1-) ion
  - c) Iodide
  - d) Iodine ion
- 2.  $H_5C_5^-$** 
  - a) Cyclopentadienide
  - b) Pentadienide
  - c) Hydrocarbon
  - d) None of the above
- 3.  $B_{10}H_{14}$  is**
  - a) Nido decaborane (14)
  - b) Decaborane
  - c) Arachnaborane
  - d) Closo decaborane
- 4. Long form of the periodic table is the combination of**
  - a) Mendeleeff & Deboriner
  - b) Mosley & Newland
  - c) Mosley & Modern periodic law
  - d) Newland & Dobe
- 5. D block elements are also know as**
  - a) Inner transition elements
  - b) Transition elements
  - c) Lanthanides
  - d) Actinides
- 6. NaCl is a**
  - a) Covalent compound
  - b) Ionic compound
  - c) Coordinate compound
  - d) Metallic compound
- 7. Axial overlapping of atomic orbitals gives**
  - a) Sigma bond
  - b) Pi bond
  - c) Dative bond
  - d) Metallic bond
- 8. Hybridization of  $CH_4$  is**
  - a) sp
  - b)  $sp^2$
  - c)  $sp^3$
  - d)  $dsp^2$
- 9. Bonding orbitals are denoted by**
  - a)  $\sigma$
  - b)  $\sigma^*$
  - c)  $\pi$
  - d)  $\pi^*$
- 10. Correct order of strength bond formed between two sp,  $sp^2$  &  $sp^3$  is**
  - a)  $sp^3-sp^3 > sp^2-sp^2 > sp-sp$
  - b)  $sp^2-sp^2 > sp-sp > sp^3-sp^3$
  - c)  $sp-sp > sp^2-sp^2 > sp^3-sp^3$
  - d)  $sp^3-sp^3 > sp-sp > sp^2-sp^2$

**Paper-II: ORGANIC CHEMISTRY**

11. A carbanion has  
a)  $sp^3$  hybrid carbon  
b)  $sp^2$  hybrid carbon  
c)  $sp^1$  hybrid carbon  
d) all of above
12. IUPAC name of  $\text{CH}_2=\text{CH}-\text{CH}=\text{CH}_2$  is  
a) 1-butene  
b) 2-butene  
c) 1,3-butadiene  
d) 1,2-butadiene
13. Select correct structure of 1-amino-2-propanol  
a)  $\text{CH}_3-\text{CH}_2(\text{NH}_2)-\text{CH}_2-\text{OH}$   
b)  $\text{CH}_3-\text{CH}(\text{OH})\text{CH}_2-\text{NH}_2$   
c)  $\text{CH}_3-\text{CH}(\text{OH})-\text{CH}_2-\text{CH}_2-\text{NH}_2$   
d) None of these
14. IUPAC name of  $\text{CH}_3\text{OCH}_2-\text{CH}_2-\text{NH}_2$   
a) 1-Methoxyethanamine  
b) 1-Methyl ethanamine  
c) 2-Amino-methoxyethane  
d) 2-Methoxyethanamine
15. Dehydrohalogenation of 2-bromobutane with alcoholic KOH gives  
a) 1-Butene  
b) 2-Butene  
c) 2-Methyl propene  
d) 2-Butanol
16. Addition of HCN on propyne gives  
a) 2-Methyl-2-propene nitrile  
b) Acrylonitrile  
c) Acetonitrile  
d) Cynopropane
17. 1,3-Butadiene and ethene gives  
a) Cyclohexene  
b) cyclohexane  
c) Cyclopentene  
d) Cyclopentane
18. Ethane-1,2-diol on dehydration by using  $\text{ZnCl}_2$  gives  
a) Vinyl alcohol  
b) Acrylaldehyde  
c) Ethylene oxide  
d) Acetaldehyde
19. Ethylmethyl ether combines with HI gives  
a) Ethyl iodide  
b) Methyl iodide  
c) Both  
d) None of these
20. Action of peracid on ethene gives  
a) Alcohol  
b) Ketone  
c) Ethylene oxide  
d) Aldehyde

**Paper-III: PHYSICAL CHEMISTRY**

21. The pH of the 0.001 M HCl is  
(a) 0.001  
(b) 3  
(c)  $10^{-3}$   
(d) -3
22.  $\text{Log}_a b \times \text{Log}_a b$  is equal to  
(a) One  
(b) Two  
(c) Three  
(d) Zero
23. The value of  $\int e^x dx$  is  
(a)  $x^n$   
(b)  $x^{n-1}$   
(c)  $n x^n$   
(d)  $e^x$
24. The molarities of 0.1 N solution of HCl and 0.1 N solution of  $\text{H}_2\text{SO}_4$  are respectively  
(a) 0.1M and 0.1 M  
(b) 0.05 M and 0.1 M  
(c) 0.1M and 0.05 M  
(d) 0.1M and 0.2 M
25. The normality of a solution of sulphuric acid is  $\frac{N}{10}$ . Its molarity will be

- (a)  $\frac{M}{5}$  (b)  $\frac{M}{10}$   
 (c)  $\frac{M}{20}$  (d)  $\frac{N}{40}$
26. Which one of the following has molality equal to one?  
 (a) 36.5 gm of HCl in 500 ml of water. (b) 36.5 gm of HCl in 1000 ml of water.  
 (c) **36.5 gm of HCl in 1000 gm of water.** (d) 36.5 gm of HCl in 500 gm of water.
27. The root mean square velocity of gas molecules is given by the relation  
 a)  $V_{\text{rms}} = \sqrt{RT/M}$  (b)  $V_{\text{rms}} = \sqrt{3RT/M}$   
 (c)  $V_{\text{rms}} = \sqrt{2RT/M}$  (d)  $V_{\text{rms}} = \sqrt{8RT/M}$
28. Excluded volume is ----- times the actual volume of molecules  
 (a) 1/2 (b) Three  
 (c) Four (d) Two
29. In Vander Waals equation of state for n mole of non ideal gas, the net force of attraction among the molecules is given by  
 (a)  $\frac{an^2}{V^2}$  (b)  $[P + \frac{an^2}{V^2}]$   
 (c)  $[P - \frac{an^2}{V^2}]$  (d)  $-\frac{an^2}{V^2}$
30. The number of atoms in a simple cubic unit cell are  
 (a) 4 (b) 2  
 (c) 3 (d) **1**