Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Science

End Sem Examination Dec 2024

BT3CO01 Chemistry -I

Programme: B.Sc. Branch/Specialisation: Biotechnology

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

			Marks	BL	PO	CO	PSO
Q.1	i.	Which electromagnetic radiation has the shortest wavelength? (a) Ultra-violet (b) Infra Red (c) Microwaves (d) Gamma rays	**1**	01	01	01	01
	ii.	Shape of P-orbtal is _____. (a) Spherical (b) Dumbell (c) Double dumbbell (d) Rectangle	**1**	01	01	01	01
	iii.	The rate of reaction of organic compounds is slow due to- (a) Ionic bonding (b) Amphoteric nature (c) Covalent bonding (d) Coordinate covalent bonding	**1**	01	01	02	01
	iv.	The shape of BF_3 is _____. (a) Linear (b) Trigonal Planar (c) Tetrahedral (d) Octahedral	**1**	01	01	02	01
	v.	Which of the following thermodynamic law gives the concept of enthalpy? (a) First law of thermodynamics (b) Second law of thermodynamics (c) Third law of thermodynamics (d) Fourth law of thermodynamics	**1**	01	01	03	01

vi.	In which thermodynamic process there is no flow of heat between the system and surrounding. (a) Isobaric (b) Adiabatic (c) Isochoric (d) None of these	**1**	01	01	03	01		
vii.	How does a catalyst increase the rate of a reaction? (a) By forming an intermediate complex (b) By increasing activation energy (c) By lowering the activation energy (d) By changing equilibrium constant	**1**	01	01	04	01		
viii.	Autocatalytic reactions are the ones in which- (a) One of the products poisons the catalyst (b) There is no catalyst employed (c) Only one reactant is involved (d) One of the products catalyses the reaction	**1**	01	01	04	01		
ix.	What is the pH value of neutral solution? (a) 0 (b) 5 (c) 7 (d) 14	**1**	01	01	05	01		
x.	Which of the indicators is best for titration of HCl *vs* NaOH, if the HCl is in a burette and NaOH in a conical flask? (a) Phenolphthalein (b) Methyl orange (c) EBT (d) Congo red	**1**	01	01	05	01		
Q.2 i.	What is Hund's rule?	**2**	02	01	01	01		
ii.	Write about the Aufbau principle.	**3**	03	01	01	01		
iii.	What are the quantum numbers? Write about the types of quantum numbers.	**5**	04	03	01	01		
OR iv.	Explain the shape of S, P and D atomic orbitals.	**5**	04	03	01	01		
Q.3 i.	What is ionic bonding? Write general characteristics of ionic bonding.	**4**	03	01	02	01		
ii.	What is hybridization? Explain hybridization in tetrahedral compound with suitable example.	**6**	04	02	02	01		

OR iii.	Write short notes on: (a) Hydrogen bond (b) Fajan's rule	**6**	04	02	02	01		
Q.4 i.	Write difference between state of system and state variables.	**4**	03	02	03	01		
ii.	Write a detail note on the laws of thermodynamics.	**6**	04	02	03	01		
OR iii.	Write short note on: (a) Thermodynamic system (b) Thermodynamic properties	**6**	04	02	03	01		
Q.5 i.	Write the characteristics of enzyme catalysis.	**4**	03	01	04	01		
ii.	Define catalysis. Write about the types of catalysis.	**6**	04	03	04	01		
OR iii.	Explain acid catalysis with mechanism.	**6**	04	03	04	01		
Q.6 i.	Write short note on common ion effect.	**4**	02	01	05	02		
ii.	Define electrolytes. Write difference between strong and weak electrolytes.	**6**	03	03	05	02		
OR iii.	Define degree of ionization. Write the factors affecting it.	**6**	03	03	05	02		

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Marking Scheme
BT3CO01 (T) Chemistry -I (T)

Q.1	i)	d) Gamma rays	**1**
	ii)	b) Dumbell	**1**
	iii)	c) covalent bonding	**1**
	iv)	b) Trigonal Planar	**1**
	v)	a) First law of thermodynamics	**1**
	vi)	b) Adiabatic	**1**
	vii)	c) By lowering the activation energy	**1**
	viii)	d) One of the products catalyses the reaction	**1**
	ix)	c) 7	**1**
	x)	b) Methyl orange	**1**
Q.2	i.	What is Hund's rule?- 2 Marks	**2**
	ii.	Write about the Aufbau principle.- 3 Marks	**3**
	iii.	What are the quantum numbers? – 1 mark Write about the types of quantum numbers.- 4 marks	**5**
OR	iv.	Explain the shape of S, P and D atomic orbitals. – 5 marks	**5**
Q.3	i.	What is Ionic bonding? – 2 marks Write general characteristics of ionic bonding?- 2 marks	**4**
	ii.	What is hybridization? – 2 marks Explain hybridization in tetrahedral compound with suitable example.- 4 marks	**6**
OR	iii.	Write short notes on: a) Hydrogen bond - 3 marks b) Fajan's Rule – 3 marks	**6**
Q.4	i.	Write difference between state of system – 2 marks and state variables.- marks	**4**
	ii.	Write a detail note on the laws of thermodynamics.- 6 marks	**6**
OR	iii.	Write short note on: a) Thermodynamic System- 3 marks b) Thermodynamic properties- 3 marks	**6**
Q.5	i.	Write the characteristics of enzyme catalysis.- 4 marks	**4**
	ii.	Define catalysis. – 2 marks Write about the types of catalysis.- 4 marks	**6**
OR	iii.	Explain Acid catalysis with mechanism.- 6 marks	**6**
Q.6	i.	Write short note on common ion effect?- 4 marks	**4**
	ii.	Define electrolytes. – 2 marks Write difference between strong and weak electrolytes.- 4 marks	**6**
	iii.	Define degree of ionization. – 2 marks Write the factors affecting it.- 4 marks	**6**

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P.T.O.