

# Model Question Paper-1 with effect from 2021 (CBCS Scheme)

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## First Semester B.Sc (H) Degree Examination

### Subject Code 21BS13

TIME: 03 Hours

Max. Marks: 100

Note: Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.

MODULE 1			Marks
Q.1	a	State (i) Heisenberg Uncertainty Principle (ii) Hund's rule (iii) Pauli's Exclusion Principle	8
	b	Enumerate the salient features of Bohr's Model, and give any two limitations	8
	c	Explain the dual behavior of matter	4
<b>OR</b>			
Q.2	a	State Modern Periodic Law. Discuss the salient features of modern periodic table	8
	b	Define atomic radius. Discuss the variation of atomic radius across a period and down the group. Explain why halogens relatively high values of electron affinity.	8
	c	Discuss variation of ionization energy (i) across a period (ii) down the group	4
<b>MODULE 2</b>			
Q.3	a	What is homolytic and heterolytic bond breaking? Explain with suitable example	8
	b	What are carbocations? Explain the relative stability of 1°, 2° and 3° carbocations with examples	8
	c	What are Electrophile and Nucleophiles? Discuss with examples.	4
<b>OR</b>			
Q.4	a	Explain Corey-House synthesis with example and show how an alkane is converted to aromatic compound.	8
	b	Explain the mechanism of Ozonolysis and mention the industrial applications of ethene and propene.	8
	c	Show how alkenes are synthesized by Wittig's reaction and Hoffmann's elimination reaction.	4
<b>MODULE 3</b>			
Q.5	a	Define order of the reaction. Mention its properties. Derive an integrated rate equation for rate constant of a zero-order reaction.	8
	b	Derive an expression for the rate constant of a unimolecular reaction based on collision theory (Lindemann's theory). Explain in high pressure and low-pressure conditions	8
	c	In a chemical reaction $X \longrightarrow Y$ , it is found that rate of the reaction increased by 2.25 times when concentration of 'X' increased by 1.5 times. Find the order of the reaction with respect to 'X'.	4
<b>OR</b>			
Q.6	a	Define Indicator. Explain Ostwald's theory of indicator by taking phenolphthalein and methyl orange indicator.	8
	b	Explain the pH titration curve for the strong acid and strong base titration and draw the titration curve	6
	c	What is titration curve? Explain the choice of indicator by titration curve	7

<b>MODULE 4</b>			
Q.7	a	What is green Chemistry? Explain the need of green chemistry with basic Principles.	8
	b	Discuss the green synthesis by Rearrangement and Addition reaction with suitable example	8
	c	Write a note on Heck and Hunds-diecker reactions	4
<b>OR</b>			
Q.8	a	What is green catalysis? Discuss the merits and demerits of Heterogeneous catalysis.	8
	b	What is biocatalysts? Explain the Phase transfer catalysis by taking micellar/surfactant.	8
	c	Discuss the catalytic properties of zeolites and silica.	4
<b>MODULE 5</b>			
Q.9	a	Explain the minimization of errors in analytical experiments.	8
	b	How are errors classified? Write the distribution of random errors in Gaussian curves.	8
	c	What is accuracy and precision? Explain	4
<b>OR</b>			
Q.10	a	What is Gravimetry? Mention the Properties of precipitates and explain the factors influencing completion of precipitation	8
	b	Explain Co-precipitation and post- precipitation with suitable example.	8
	c	The following results were obtained in the determination of bismuth present in a sample. 59.83, 59.88, 60.04, 60.24, 60.32 and 60.45. Determine the standard deviation and coefficient of variation.	4

Table showing the Bloom's Taxonomy Level, Course Outcome and Program Outcome				
Question		Bloom's Taxonomy Level attached	Course Outcome	Program Outcome
Q.1	(a)	L1, L2	CO.1	
	(b)	L2	CO.1	
	(c)	L2	CO.1	
Q.2	(a)	L1	CO.1	
	(b)	L2	CO.1	
	(c)	L3	CO.1	
Q.3	(a)	L2	CO.2	
	(b)	L2	CO.2	
	(c)	L2	CO.2	
Q.4	(a)	L1	CO.2	
	(b)	L2	CO.2	
	(c)	L2	CO.2	
Q.5	(a)	L2	CO.3	
	(b)	L2	CO.3	
	(c)	L2	CO.3	
Q.6	(a)	L2	CO.3	
	(b)	L2	CO.3	
	(c)	L2	CO.3	
Q.7	(a)	L2	CO.4	
	(b)	L2	CO.4	
	(c)	L2	CO.4	
Q.8	(a)	L2	CO.4	
	(b)	L2	CO.4	
	(c)	L2	CO.4	
Q.9	(a)	L2	CO.5	
	(b)	L2	CO.5	
	(c)	L3	CO.5	
Q.10	(a)	L2	CO.5	
	(b)	L2	CO.5	
	(c)	L2	CO.5	
Bloom's Taxonomy Levels	<b>Lower order thinking skills</b>			
	Remembering( knowledge):L <sub>1</sub>	Understanding Comprehension): L <sub>2</sub>	Applying (Application): L <sub>3</sub>	
	<b>Higher order thinking skills</b>			
	Analyzing (Analysis): L <sub>4</sub>	Valuating (Evaluation): L <sub>5</sub>	Creating (Synthesis): L <sub>6</sub>	