

## FEDERAL PUBLIC SERVICE COMMISSION COMPETITIVE EXAMINATION-2022 FOR RECRUITMENT TO POSTS IN BS-17 UNDER THE FEDERAL GOVERNMENT

Roll Number

## **CHEMISTRY, PAPER-I**

TIME ALLOWED: THREE HOURS PART-I(MCQS): MAXIMUM 30 MINUTES			PART-I (MCQS) PART-II	MAXIMUM MARKS = 20 MAXIMUM MARKS = 80				
<ul> <li>NOTE: (i) Part-II is to be attempted on the separate Answer Book.</li> <li>(ii) Attempt ONLY FOUR questions from PART-II. ALL questions carry EQUAL marks.</li> <li>(iii) All the parts (if any) of each Question must be attempted at one place instead of at different places.</li> <li>(iv) Write Q. No. in the Answer Book in accordance with Q. No. in the Q.Paper.</li> <li>(v) No Page/Space be left blank between the answers. All the blank pages of Answer Book must be crossed.</li> <li>(vi) Extra attempt of any question or any part of the question will not be considered.</li> <li>(vi) Use of calculator is allowed.</li> </ul>								
PART-II								
Q. 2.	<b>(a)</b>	Derive Schrodinger wave equation for p	article in one dimensional	box.	(10)			
	<b>(b)</b>	Discuss Heisenberg's Uncertainty principle.						
	(c)	What is corrosion? How it can be prevented?						
Q. 3.	<b>(a)</b>	What is Stereoisomerism? Discuss it with reference to coordination complexes.						
	<b>(b)</b>	Define and explain Jahn-Teller theorem.			(06)			
	(c)	Write a short note on column chromatog	graphy.		(06) <b>(20)</b>			
Q. 4.	<b>(a)</b>	What is Valence Bond theory? How does this theory explains the structure of inorganic molecules?			(08)			
	<b>(b)</b>	Define and explain the phenomenon of resonance in inorganic compounds.			(06)			
	(c)	Write some general characteristics of ac	tinides.		(06) (20)			
Q. 5.	<b>(a)</b>	What is photoelectric effect? How quantum mechanics explains this effect?			(08)			
	<b>(b)</b>	What is wave-function? Discuss its inter	at is wave-function? Discuss its interpretation given by Born.		(06)			
	(c)	What are fuel cells? Discuss their worki	ng with suitable examples.		(06) <b>(20)</b>			
Q. 6.	(a)	What are electron-deficient compounds?	? Discuss bond in such con	npounds.	(07)			
	(b)	Define and explain the VSEPR mo substances.	del to explain the geon	netry of inorganic	(07)			
	(c)	Discuss variation in oxidation states of l	anthanides.		(06) (20)			
Q. 7.	(a)	What is Nernst equation? Explain it.			(08)			
	<b>(b)</b>	Define and explain Kohlrausches's law.			(07)			
	(c)	Write a short note on Arrhenius equation	n.		(05) (20)			
Q. 8.	(a)	What is crystal field theory? How complexes?	does this theory explain	the geometry of	(08)			
	<b>(b)</b>	Explain Lewis theory of acids and bases	s.		(06) (20)			
	(c)	Write a short note on thin layer chromat	ography.					
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## **CHEMISTRY, PAPER-II**

TIME AI PART-I(1	LOWED: THREE HOURS MCQS): MAXIMUM 30 MINUTES	PART-I (MCQS) PART-II	MAXIMUM MARKS = 20 MAXIMUM MARKS = 80					
<ul> <li>NOTE: (i) Part-II is to be attempted on the separate Answer Book.</li> <li>(ii) Attempt ONLY FOUR questions from PART-II. ALL questions carry EQUAL marks.</li> <li>(iii) All the parts (if any) of each Question must be attempted at one place instead of at different places.</li> <li>(iv) Candidate must write Q. No. in the Answer Book in accordance with Q. No. in the Q.Paper.</li> <li>(v) No Page/Space be left blank between the answers. All the blank pages of Answer Book must be crossed.</li> <li>(vi) Extra attempt of any question or any part of the attempted question will not be considered.</li> </ul>								
PART-II								
Q. 2.	Define the following terms and give suit	table examples	(4 each)	(20)				
	(i) Aromaticity (ii) Conj	ugation (iii	) Inductive effect					
	(iv) Imine-enamine Tautomerism (v) Intra molecular Hydrogen Bonding							
Q. 3.	Write down Preparations of Alkanes and Aldehydes. Also give specific example of addition reactions of alkenes with special reference to Markonikav and anti Markonikav rule. (20)							
Q.4. (a)	Starting from acetylene how you can pre-	epare 1-Octyne.	(10)					
<b>(b)</b>	Write down the condition for the conver	rsion of 2-Octyne to cis	2-Octene. (10)	(20)				
Q. 5.	Write the structural formula of your cl molecular formula C <sub>4</sub> H <sub>6</sub> . Also explai isomerism.	noice for all the struct n cis, trans, E,Z and	ural isomers with the syn, anti geometrical	(20)				
Q. 6.	Phenol is more acidic than methylalcol structures of phenoxide ion.	nol. Explain in detail.	Also draw resonating	(20)				
<b>O.</b> 7. (a)	Describe the instrumentation of IR spec	trophotometer in detail.	(15)					
(b)	What are the basic Principals of IR Spec	etroscopy?	(05)	(20)				
		1 5						
Q.8. (a)	What is chemical shift? What are the fa	ctors effecting chemica	ll shift? (10)					
(b)	Describe the instrumentation of NMR sp	pectroscopy.? *****	(10)	(20)				