Code No. 1016

Time : 2 Hours Cool-off time : 15 Minutes

Second Year – March 2016

Part – III

CHEMISTRY

Maximum : 60 Scores

General Instructions to Candidates :

- There is a 'cool-off time' of 15 minutes in addition to the writing time of 2 hrs.
- You are not allowed to write your answers nor to discuss anything with others during the 'cool-off time'.
- Use the 'cool-off time' to get familiar with questions and to plan your answers.
- Read questions carefully before answering.
- All questions are compulsory and only internal choice is allowed.
- When you select a question, all the sub-questions must be answered from the same question itself.
- Calculations, figures and graphs should be shown in the answer sheet itself.
- Malayalam version of the questions is also provided.
- Give equations wherever necessary.
- Electronic devices except non-programmable calculators are not allowed in the Examination Hall.

നിർദ്ദേശങ്ങൾ :

- നിർദ്ദിഷ്ട സമയത്തിന് പുറമെ 15 മിനിറ്റ് 'കൂൾ ഓഫ് ടൈം' ഉണ്ടായിരിക്കും. ഈ സമയത്ത് ചോദ്യങ്ങൾക്ക് ഉത്തരം എഴുതാനോ, മറ്റുളളവരുമായി ആശയവിനിമയം നടത്താനോ പാടില്ല.
- ഉത്തരങ്ങൾ എഴുതുന്നതിന് മുമ്പ് ചോദ്യങ്ങൾ ശ്രദ്ധാപൂർവ്വം വായിക്കണം.
- എല്ലാ ചോദ്യങ്ങൾക്കും ഉത്തരം എഴുതണം.
- ഒരു ചോദ്യനമ്പർ ഉത്തരമെഴുതാൻ തെരഞ്ഞെടുത്തു കഴിഞ്ഞാൽ ഉപചോദ്യങ്ങളും അതേ ചോദ്യനമ്പരിൽ നിന്ന് തന്നെ തെരഞ്ഞെടുക്കേണ്ടതാണ്.
- കണക്ക് കൂട്ടലുകൾ, ചിത്രങ്ങൾ, ഗ്രാഫുകൾ എന്നിവ ഉത്തരപേപ്പറിൽ തന്നെ ഉണ്ടായിരിക്കണം.
- ചോദ്യങ്ങൾ മലയാളത്തിലും നൽകിയിട്ടുണ്ട്.
- ആവശ്യമുള്ള സ്ഥലത്ത് സമവാക്യങ്ങൾ കൊടുക്കണം.
- പ്രോഗ്രാമുകൾ ചെയ്യാനാകാത്ത കാൽക്കുലേറ്ററുകൾ ഒഴികെയുള്ള ഒരു ഇലക്ട്രോണിക് ഉപകരണവും പരീക്ഷാഹാളിൽ ഉപയോഗിക്കുവാൻ പാടില്ല.

1.	(a)	Which of the following is a molecular s (a) Diamond	solid (b)	? Graphite		
		(c) Ice	(d)	Quartz	(Score : 1)	
	(b)	Unit cells can be classified into prim	itive	and centered unit cells. D	ifferentiate	
		between primitive and centered unit cel	lls.		(Score : 1)	
	(c)	Presence of excess Sodium makes Nat	Cl cr	ystal coloured. Explain on t	he basis of	
		crystal defects.			(Scores : 2)	
2.	(a)	Number of moles of the solute per kilogram of the solvent is				
		(a) Mole fraction	(b) (d)	Molality Molar mass	(Score · 1)	
		(c) Molanty	(u)	Molal mass	(Score : 1)	
	(b)	'The extent to which a solute is dissociated or associated can be expressed by				
Van't Hoff factor.' Substantiate the statement.				ent.	(Score : 1)	
	(c)	The vapour pressure of pure benzene at a certain temperature is 0.850 bar. A non-volatile, non-electrolyte solid weighing 0.5 g when added to 39 g of benzene (meler mean 78 cm 1^{-1}), meaning the second of 2845 has With the temperature of 2845 has 2				
		mass of the solid substance ?	suie	becomes 0.845 bar. what is	(Scores : 2)	
					. ,	
3.	(a)	Which of the following is a secondary	cell '	?		
	~ /	(a) Dry cell	(b)	Leclanche cell		
		(c) Mercury cell	(d)	None of these	(Score : 1)	
	(b)	What is the relationship between resista	(Score:1)			
	(c)	One of the fuel cells uses the reaction of hydrogen and oxygen to form water. Write down the cell reaction taking place in the anode and cathode of that fuel cell. (Scores : 2)				
4.	(i)	The molecularity of the reaction 2NO -	+ 0 ₂	$\rightarrow 2NO_2$ is,		
		(a) 5	(b)	2		
		(c) 3	(d)	0	(Score : 1)	
101	.6	2				

	(ii)	(ii) (a) What do you mean by rate of a reaction ?(b) What will be the effect of temperature on rate of a reaction ?			(Score : 1)		
					(Score : 1)		
	(iii)	A first order reaction is found to have a rate constant, $k = 5.5 \times 10^{-14} s$				⁴ s ⁻¹ . Find out	
		the half-life of the reaction.			(Score : 1)		
5.	(i)	Catalysis can be classified into two groups – homogeneous and heterogeneous. (a) What do you mean by homogeneous catalysis ?					
		(b)	Write one example for he	catalysis.	(Scores:2)		
	(ii)	Whi	ch of the following is an en	nulsifying ag	gent?		
		(a)	Milk	(b)	Butter		
		(c)	Gum	(d)	Lamp black	(Score : 1)	
6.	(a)	Whi	ch of the following is the o				
		(a)	Bauxite	(b)	Magnetite		
		(c)	Malachite	(d)	Calamine	(Score : 1)	
	(b)	There are several methods for refining metals. Explain a method Zirconium.				for refining (Scores : 2)	
7.	(a)	Account for the following : (i) NH ₃ acts as a Lewis base.					
		(ii)	PCl_3 fumes in moist air.				
		(iii)	(Scores : 3)				
	(b)	(i) Suggest any two fluorides of Xenon.					
		(ii) Write a method to prepare any one of the above mentioned Xenon fluorides. (Scores : 2					
	 (a) Account for the following : (i) H₂O is a liquid while H₂S is a gas. 						
		(ii) (iii)	Noble gases have very low NO_2 dimerises to N_2O_4 .	w boiling poi	ints.	(Scores : 3)	
	(b)	(i) (ii)	What are interhalogen con Suggest any two example	mpounds? s of interhale	ogen compounds.	(Scores : 2)	
1016				4			

8.	Which of the following oxidation state is not shown by Manganese ? (a) +1 (b) +2			
		(c) +4 (d) +7 (Score : 1)		
	(b)	Represent the structure of dichromate ion. (Score : 1)		
	(c)	Potassium permanganate $(KMnO_4)$ is a strong oxidizing agent. Write any two		
		oxidizing reactions of $KMnO_4$. (Scores : 2)		
0				
9.	(a)	Write down the ionization isomer of $[Co(NH_3)_5Cl]SO_4$. (Score : 1)		
	(b)	Write the IUPAC name of the above compound. (Score : 1)		
	$[Ni(CO)_4]$ is diamagnetic while $[NiCl_4]^{2-}$ is paramagnetic though both are			
		tetrahedral. Why ? (Scores : 2)		
10.	Aryl halides are less reactive in nucleophilic substitution reactions.			
	(i) Write any two reasons for less reactivity.			
	(ii) Give one example for nucleophilic substitution reactions of aryl halid			
		(Score : 1)		
	(b)	Write a method for the preparation of alkyl halides. (Score : 1)		
	(c)	Which of the following is not a polyhalogen compound?		
		(a) Chloroform (b) Freon		
		(c) Carbon tetrachloride (d) Chloro benzene (Score : 1)		
11.	(a)	Complete the following : OH		
		$\overbrace{\qquad}^{\text{dil. HNO}_3} _$		

(Scores : 2)

(b) Explain the following :

OH

- (1) Esterification
- (ii) Williamson Synthesis

 $\xrightarrow{\text{Con. HNO}_3}$

(Scores : 2)

1016

6

12.	Alde	Aldehydes, Ketones and Carboxylic acids are Carbonyl compounds.				
	(u)	example.	(Score : 1)			
	(b)	How will you prepare benzaldehyde by Gatterman-Koch reaction ?	(Score : 1)			
	(c)	 Write the reactions of carboxylic acid with the following reagents. chemical equations) (i) Thionyl chloride (SOCl₂) 	(Write the			
		(ii) Chlorine in presence of small amount of red phosphorous.				
		(iii) Lithium Aluminium hydride (LiA lH_{A})/ether.	(Scores : 3)			
		OR				
	(a)	Write a test to distinguish between aldehydes and ketones.	(Score : 1)			
	(b)	How will you prepare benzaldehyde by Etard's reaction?	(Score:1)			
	(c)	How will you bring about the following conversions ? (Write the equations)	e chemical			
		(i) Ethanol \rightarrow Ethanoic acid				
		(ii) Benzamide \rightarrow benzoic acid				
		(iii) Benzaldehyde \rightarrow meta nitro benzaldehyde	(Scores : 3)			
13.	Amines are classified as primary, secondary and tertiary amine.					
	(a)	Represent the structure of secondary and tertiary amine.				
	(b)	How will you convert nitrobenzene to aniline ?				
	(c)	Aniline does not undergo Friedel-Crafts reaction. Why ?	(Scores : 3)			
14.	Can	Cane Sugar, Glucose and Starch are Carbohydrates.				
	(a)	Represent the structure of Glucose.	(Score : 1)			
	(b)	Write a method to prepare Glucose from Starch. Write the chemical e the reaction.	equation of (Score : 1)			
	(c)	Suggest any two uses of Carbohydrates.	(Score : 1)			

15.	Poly	Polymers can be classified based on molecular forces.				
	(a)	Classify the following polymers into elastomers and fibres :				
		Rubber, Nylon 6,6, Buna-S, 7	(Scores : 2)			
	(b)	(b) What do you mean by thermosetting polymers ? Give one example.				
16.	(a)	Identify an analgesic from the following :				
		(a) equanil	(b)	aspirin		
		(c) serotonin	(d)	cimetidine	(Score : 1)	
	(b)	Differentiate between antiseptics and antibiotics.			(Scores : 2)	

.