LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **PHYSICS**

THIRD SEMESTER – **NOVEMBER 2022**

UCH 3401 – APPLIED CHEMISTRY FOR PHYSICS

Date: 01-12-2022 Dept. No. Max. : 100 Marks

Time: 09:00 AM - 12:00 NOON

SECTION - A

Answer ALL the Questions

1.	**Define the following.**			**(5 x 1 = 5 Marks)**
	a)	Meissner effect.	K1	CO1
	b)	First derivative curve in DTG.	K1	CO1
	c)	Gibbs' phase rule.	K1	CO1
	d)	Corrosion	K1	CO1
	e)	Isoelectric point.	K1	CO1
2.	**Fill in the blanks.**			**(5 x 1 = 5 Marks)**
	a)	The transition temperature for different types of material falls below _____ K.	K1	CO1
	b)	Thermoanalytical methods are equipped with a purge gas system to provide an _____ atmosphere.	K1	CO1
	c)	In the phase diagram of water, the point where all three phases coexist is called _____.	K1	CO1
	d)	Galvanic corrosion occurs when two _____ metals are in contact in the presence of an electrolyte.	K1	CO1
	e)	Molisch's test results a _____ ring in the test of carbohydrate.	K1	CO1
3.	**Match the following.**			**(5 x 1 = 5 Marks)**
	a)	Non-linear optics -- Thermocouple	K2	CO1
	b)	DTA -- Irreversible interfacial reaction	K2	CO1
	c)	Eutectic point -- Copper(II) to copper(I)	K2	CO1
	d)	Corrosion -- Frequency doubling	K2	CO1
	e)	Fehling's test -- Non-variant	K2	CO1
4.	**State TRUE or FALSE**			**(5 x 1 = 5 Marks)**
	a)	Superconductors expel a magnetic field.	K2	CO1
	b)	In the DTG analysis of copper sulphate pentahydrate, all the water molecules are removed below 150 ^{o}C.	K2	CO1
	c)	Phase diagram does not give conditions of equilibria between different phases of system.	K2	CO1
	d)	The most stable metals, such as gold and platinum, do not corrode easily because they do lose electrons easily.	K2	CO1
	e)	Monosaccharides are reducing in nature because they contain	K2	CO1

		more number of hydroxyl functional groups.		
		SECTION - B		
Answer any TWO of the following in 100 words			**(2 x 10 = 20 Marks)**	
5.		Describe the BCS theory and Josephson effect.	K3	CO2
6.		a) Illustrate the DTG analysis of copper sulphate pentahydrate. **(5)** b) Compare and contrast TGA and DTA. **(5)**	K3	CO2
7.		Illustrate the phase diagram of sulphur system.	K3	CO2
8.		a) Discuss the cathodic and anodic protection for the prevention of corrosion. **(6)** b) Explain the Benedict's test for carbohydrate. **(4)**	K3	CO2
		SECTION C		
Answer any TWO of the following in 100 words			**(2 x 10 = 20 Marks)**	
9.		a) Prove that superconductors are diamagnetic in nature. **(5)** b) Distinguish type-I and II superconductors. **(5)**	K4	CO3
10.		a) Explain the principle involved in differential thermal analysis. **(5)** b) Illustrate the galvanic corrosion and its prevention. **(5)**	K4	CO3
11.		Sketch and explain the phase diagram of lead-silver system.	K4	CO3
12.		Explain the structure of sucrose and starch.	K4	CO3
		SECTION D		
Answer any ONE of the following in 150 words			**(1 x 20 = 20 Marks)**	
13.		a) Illustrate the characteristics of cholesteric and columnar liquid crystals. **(10)** b) Describe the thermograms of calcium oxalate monohydrate and silver nitrate. **(10)**	K5	CO4
14.		a) Derive the phase rule for a heterogeneous system. **(6)** b) Write a short note on corrosion inhibitors. **(6)** c) Explain the following terms. i) Iodine number ii) Acid number iii) RM value iv) Saponification value **(8)**	K5	CO4
		SECTION E		
Answer any ONE of the following in 150 words			**(1 x 20 = 20 Marks)**	
15.		a) Illustrate the characteristics of smectic and nematic liquid crystals. **(10)** b) Explain the principle and instrumentation of thermogravimetric analysis. **(10)**	K6	CO5
16.		a) Draw and explain the phase diagram of water system. **(10)** b) Explain the electrochemical corrosion of iron. **(4)** c) Differentiate reducing and non-reducing sugars. **(6)**	K6	CO5

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