

SECTION A

1. Attempt all the following questions in brief

7x2= 14

Qno.	Question	CO
a.	Why graphite is used as lubricant?.	1
b.	Define the term Hypo chromic and Hyper chromic shift?	2
c.	Explain why we use dry ether in preparation of Grignard reagent.	5
d.	Classify the following as thermo plastic and thermosetting. Poly styrene, Polythene, Bakelite, Nylon, Urea formaldehyde, Teflon.	5
e.	Write down the absorption frequencies for following groups: i) -OH ii) >C=O iii) -CHO iv) -CH ₃	2
f.	What is gross and net calorific value?	4
g.	Find out the Atom economy % for the following given reaction. $\text{CH}_3\text{CH}=\text{CH}-\text{CH}_3 + \text{HCl} \rightarrow \text{CH}_3\text{CH}_2\text{CHClCH}_3$	1

SECTION B

2. Attempt any *three parts* of the following questions

3X7 = 21

Qno	Question	CO
a	i) What are the 12 principles and importance of green synthesis?	1
	ii) Write down the examples of optically active compounds which do not contain chiral centre with proper explanation.	2
b	i) What is battery? Discuss the working, construction and principle of Lechlanche cell.	3
	ii) Discuss preparation, structures and properties of buck minister fullerene.	1
c	i) Name and write structure of three modes of orientation of groups in polypropylene. Which of them is prepared by the Ziegler-Natta Catalyst?	3
	ii) Discuss the anodic coatings done for the protection of copper vessel.	
d	i) Complete the following reactions with reagents, conditions and products	5
	i) $\text{CH}_3\text{COCl} \longrightarrow$	
	ii) $(\text{CH}_3\text{CO})_2\text{O} \longrightarrow$	
	iii) $\text{CH}_3\text{CONH}_2 \longrightarrow$	
	iv) Reduction of a nitrile with LAH	
	v) Cyclo butanone \longrightarrow	
ii) Discuss the green route of synthesis of paracetamol.	1	
e	i) Write short notes on Plaster of Paris with applications.	3
	ii) 0.25 gm of a coal sample on burning in combustion chamber in presence of O ₂ was found to increase weight of CaCl ₂ tube by 0.08 gm and KOH tube by 0.5 gm. Find % of carbon and Hydrogen in the coal.	4
f	i) Name the raw material used in the preparation of Portland cement? Discuss the details of manufacturing and setting of Portland cement with schematic diagram.	3
	ii) What are Organo-mettalic compounds? How Grignard reagents are prepared? Write any five synthetic applications of Grignard reagents.	5

g	i) A zeolite softener was 90% exhausted by removing the hardness completely when 10000 liters of hard water was passed through it. The exhausted zeolite bed required 200 liters of 3% sodium chloride solution for complete regeneration. Calculate the hardness of water sample.	4
	ii) Draw molecular orbital diagram of O ₂ molecule ion. Calculate its bond order and predict its magnetic properties	1

SECTION C

Qno 3	7X1=7	CO
i) Complete the following reactions with reagents, conditions and products		
vi) CH ₃ CH ₂ CHO →		
vii) C ₆ H ₅ CH ₂ CHO →		
viii) CH ₃ CH ₂ COCH ₃ →		
ix) CH ₃ CH ₂ COOH →		
x) Cyclo hexanone →		
ii) Discuss the corrosion issues and prevention in		3
a) Oil & Gas Industry. b) Pulp & Paper Industry		

Qno 4	7X1=7	CO
i) 500 ml of a water sample, on titration with N/50 HCl gave a titre value of 29ml to phenolphthalein end point and another 500 ml sample on titration with same acid gave a titre value of 58 ml of to methyl orange end point. Calculate the alkalinity of the water sample in terms of CaCO ₃ and comment the type of alkalinity present.		4
ii) Write down the molecular orbital configuration of NO, NO ⁺ and NO ⁻ . Arrange them in increasing order of their stability		1

Qno5	7X1=7	CO
i) Discuss the different types of boiler troubles causes by hard water.		4
ii) Calculate the amount of lime & soda required for softening 30000.liters of water using 20 ppm of sodium aluminate as coagulant. Impurities in water are as follows Ca ²⁺ =160 ppm ,Mg ²⁺ =96 ppm, dissolved CO ₂ =34 ppm and HCO ₃ ⁻ =403 ppm.		
Qno6	7X1=7	CO
i) Write the chemical structure of poly isoprene. How would you crosslink the chains of polyisoprene.		5
ii) Explain the conductivity of polymers with conjugated Pi electron system. How is this conductivity enhanced by doping?		
Qno 7	7X1=7	CO
i) For XY ₂ bent molecule shows various types of stretching and bending vibrations in I R spectroscopy.		2
ii) What is Beer-Lambert law in UV-VIS absorption spectroscopy? A compound having concentration 10 ⁻³ g/l resulted absorbance value 0.20 at lambda max 510 nm using 1 cm cell . Calculate its absorptivity and molar absorptivity values. Molecular weight of compound is 400.		

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