



A sample of water on analysis has been found to contain following in ppm:  
 $\text{Ca}(\text{HCO}_3)_2 = 4.86$ ;  $\text{Mg}(\text{HCO}_3)_2 = 5.84$ ;  $\text{CaSO}_4 = 6.80$ ;  $\text{MgSO}_4 = 8.40$  and  
 $\text{NaCl} = 4.2$ .

Calculate the temporary and permanent hardness of the water in Degree French.

Q 3 a

Discuss the appropriate method of spectroscopy to determine the chromophore present in the organic molecule. Give principle, instrumentation and working of the spectrophotometer. (Draw suitable schematic diagram)

a, b, d

b, c

b

Night-time trespassing occurred at the border of India, how should our soldiers trace it? Explain the construction and working of the spectroscopy technique used in it. Draw suitable well labelled diagram.

b, c

Or

Answer the following:

1. Why the molecules containing  $\sigma$  to  $\sigma^*$  is studied in vacuum UV radiation whereas  $n$  to  $\pi^*$  in visible region?

d

2. Give the two conditions required for a molecule to give IR spectra.

d

c In UV-Visible spectroscopy which shift occurs and why when:

2

d

(a) Pyridine is converted to 2-methyl pyridine

(b) Biphenyl molecule to 2-methyl biphenyl

Or

A solution of thickness 4 cm absorbs 70% of the incident light at 600nm. Calculate the concentration of the solution (Extinction coefficient  $\epsilon = 3000 \text{ dm}^3 \text{ mole}^{-1} \text{ cm}^{-1}$ ).

b, d

Q 4 a

Answer the following: Any three

Sacrificial anode, D.C.

1. How is cathodic protection of iron different from its galvanization?

a, d

2. Why deposition of dust on a metal surface for a long period is undesirable?

b

3. Why with decrease in the size of nanoparticles band gap increases?

a

4. Explain differential aeration corrosion with example and chemical reactions.

d



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22 only

	b	Calculate the Pilling-Bedworth ratio for the following oxide obtained from Aluminium $2Al \rightarrow Al_2O_3$ Given: oxide density=3.70g/cc; At.wt. of Al=27; At.wt. of O=16; metal density=2.70g/cc. Also state whether the film is protective or non protective	2	
Q5	a	Differentiate between low density polyethylene (LDPE) and high density polyethylene (HDPE)	2	
	b	Name the reactants and give their structures to produce the following polymer. Also give two applications of each polymer. 1. Polyurethane 2. Araldite	6	
	c	Justify: Conductivity of Polymer could be increased to the extent of metal. <u>Or</u> Give the structural requirements for an organic polymer to show appreciable conductivity.	2	
Q6		Answer the following: <u>Any three</u> 1. Discuss any three principles of green chemistry in detail. 2. Explain components responsible for biodegradation of a polymer. 3. Why there is need to produce and use Biodegradable polymers nowadays? 4. Write the importance of green chemistry.	6	



## END Semester Examination

Programme: F.Y.B.Tech

Course Code: AS19001

Branch: All Branches

Duration: 3 hrs

Student PRN No.

Semester: I

Course Name: Applied Chemistry

Academic Year: 2019-20

Max Marks: 60

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**Instructions:**

- Figures to the right indicate the full marks.
- Mobile phones and programmable calculators are strictly prohibited.
- Writing anything on question paper is not allowed.
- Exchange/Sharing of stationery, calculator etc. not allowed.
- Write your PRN Number on Question Paper.

		All questions are compulsory	Marks	CO
Q 1	a	Explain in detail the principle, construction and working –charging as well as discharging along with suitable chemical reactions and diagram of a Lithium ion battery.	6	a, c
	b	Explain the working of Direct Methanol Fuel cell with suitable chemical reaction and appropriate well labelled diagram.	4	c
		<u>Or</u> Explain why in practical the output of DMFC fuel cell is lower than the ideal cell. Draw suitable well labelled diagram.		a, d
	c	Why particularly Li is chosen as cathode material in Lithium ion battery?	2	c
Q 2	a	Explain Reverse osmosis for purification of water along with its principle and suitable diagram.	5	c
	b	A dyeing industry needed to analyse water for its hardness. Which will be the appropriate method to determine temporary, permanent and total hardness present in water? Discuss it in detail along with chemical reactions.	4	a, b, d
	c	100 ml of a raw water sample on titration with N/50 H <sub>2</sub> SO <sub>4</sub> required 12.4 ml of the acid to phenolphthalein end point and 15.2 ml of the acid to methyl orange end point. Determine the type extent of alkalinity present in the water sample.	3	a, b, d
		<u>Or</u>		