


6. a. Find the  $\lambda_{\max}$  of a radiation emitted from LED semiconductor that has a band gap energy of 450 kJ mol<sup>-1</sup>. (5 M)  
 b. How the quantum confinements affect the energy levels and electrical conductivity. Explain with the suitable diagram. (5 M)
7. Describe the biotic components of ecosystem with suitable examples. Discuss the energy flow in an ecosystem. (10 M)
8. What are endemic and endangered species? Give examples for each. List the major threats to the biodiversity and explain any two threats. (10 M)
9. Explain the natural processes that are involved in water cycle with a schematic diagram. (10 M)
10. What are the sources of CO, NO and SO<sub>2</sub> pollutants? Describe their effects to the environment and human beings. (10 M)
11. Illustrate the steps involved in sewage water treatment. Enumerate the individual role to reduce and prevent water pollution. (10 M)
12. Classify the environmental hazards. Give examples for each. Explain the types of biological hazards and their preventive measures with suitable examples. (10 M)

### QP MAPPING

Q. No.	E/A/T	Module Number	Marks	BL	CO Mapped	PO Mapped	PEO Mapped	PSO Mapped
Q1	T	2	10	3	1	1,2		
Q2	T	2	10	3	1	1,2		
Q3	A	3	10	2	1	1,2		
Q4	T	3	10	3	1	1,2		
Q5	T	4	10	3	2	6,11		
Q6	A	4	10	2	2	6,11		
Q7	E	5	10	1	3	2		
Q8	E	5	10	1	3	2		
Q9	E	5	10	1	3	2		
Q10	A	6	10	2	3	2		
Q11	A	6	10	2	3	2		
Q12	E	7	10	1	4	6,7		



 <b>VIT-AP</b> UNIVERSITY	<b>Final Assessment Test – Winter (2024-25) Freshers - May 2025</b>	
	Maximum Marks: 100	Duration: 3 Hours
Course Code: CHY1009	Course Title: Chemistry and Environmental Studies	
Set No: 3	Exam Type : <b>Closed Book</b>	School: SAS
Date: <u>22/05/2025</u>	Slot: <u>B<sub>2</sub></u>	Session: <u>FN</u>
<b>Keeping mobile phone/smart watch, even in 'off' position is treated as exam malpractice</b>		
<b>General Instructions:</b> <ol style="list-style-type: none"> <li>1. "fx series" - non programmable calculator are permitted: YES</li> <li>2. Any assumptions made should be clearly stated.</li> <li>3. <math>T(K) = T(^{\circ}C) + 273</math>, <math>R</math> (Universal gas constant) = <math>8.314 \text{ J mole}^{-1} \text{ K}^{-1}</math>;  <math>F</math> (Faraday constant) = <math>96500 \text{ C mol}^{-1}</math>; <math>1 \text{ cal} = 4.185 \text{ J}</math>; <math>h</math> (Planck's constant) = <math>6.626 \times 10^{-34} \text{ J s}</math>;  <math>c</math> (Velocity of light) = <math>3 \times 10^8 \text{ m s}^{-1}</math>; <math>N</math> (Avogadro number) = <math>6.023 \times 10^{23}</math>.</li> </ol>		

**Answer any TEN Questions, Each Question Carries 10 Marks ( $10 \times 10 = 100$  Marks)**

1. a. Determine the equilibrium constant for the Langmuir adsorption when 0.45 fraction of the total surface is covered by molecular  $\text{H}_2$  at  $25^{\circ}\text{C}$  and 1 atm. (5 M)  
 b. A mole of an ideal gas undergoes an isothermal reversible expansion from a volume of 20.0 L to 40.0 L at a temperature of 250 K. Calculate the change in entropy ( $\Delta S$ ) for the gas during this process. (5 M)
2. a. A possible reaction for the degradation of the pesticide DDT to a less harmful compound was simulated in the laboratory. The reaction was found to be first order, with rate constant ( $k$ ) =  $6.0 \times 10^{-8} \text{ s}^{-1}$  at  $28^{\circ}\text{C}$ . What is the half-life for the degradation of DDT in this experiment? (5 M)  
 b. A Carnot engine has an efficiency of 70% when the cold reservoir temperature is  $30^{\circ}\text{C}$ . What is the efficiency if the cold reservoir temperature is lowered to  $-20^{\circ}\text{C}$ ? (5 M)
3. a. Assume that a galvanic cell reaction follows one electron transfer with a standard cell potential of 1.0 V. Determine the value of  $K$  for the overall cell reaction at  $25^{\circ}\text{C}$ . (5 M)  
 b. Name the anode, cathode and electrolyte materials of silver and mercury button cells. Write the chemical reactions involved in the button cells. (5 M)
4. a. 40000 coulombs (C) charge were passed during the electrolysis of  $\text{MgCl}_2$ . Calculate the amount of magnesium deposited at the cathode during the electrolysis. Equivalent weight of  $\text{Mg} = 12.15 \text{ g mol}^{-1}$ . (5 M)  
 b. Why magnesium wires are connected in ship hulls? Explain the process involved with the help of electrochemical series. (5 M)
5. a. A polymer sample has the following composition: 130 molecules of molecular mass 1350 g/mol, 350 molecules of molecular mass 3500 g/mol and 600 molecules of molecular mass 6500 g/mol. Calculate the number and weight average molecular weight. (5 M)  
 b. Distinguish between  $T_g$  and  $T_m$ . Draw the heat vs temperature plots of  $T_g$  and  $T_m$ . (5 M)