[This question paper con	tains 4 printed pages.]			
Sr. No. of Question Paper	: 6521	D	Your Roll No		
Unique Paper Code	: 253303				
Name of the Course	: B.Sc. (Hons.) Mic	crobiology	y Part II		
Name of the Paper	: MIHT-305 : Micro	obial Physi	ology and Metabolism -I		
Semester	: III				
Duration: 3 Hours			Maximum Marks: 75		
Instructions for Candid	lates				
1. Write your Roll No. on the top immediately on receipt of this question paper.					
2. Attempt any five que	estions.				
3. All questions carry equal marks.					
1 (a) Define the follo	wing terms (Any six)	:			
(i) Photoorga	notroph				
(ii) Symport					
(iii) Balanced s	growth				
(iv) Generation	ı time				
(v) Carboxyso	ome				
(vi) Absorption	n spectrum				
(vii) Water acti	vity		(2×6=12)		
(b) Give an example	e of each of the follow	ving:			

(i) Mixotroph

(iii) Microaerophile

(ii) Ionizing radiation resistant Microbe

 $(1 \times 3 = 3)$

2.	(a)	Differentiate between the following pairs (Any three):
		(i) Passive and Facilitated Diffusion
		(ii) Batch and Continuous Culture
		(iii) Cyclic and Non-Cyclic Photophosphorylation
		(iv) Thermophiles and Psychrophiles (4×3=12)
	(b)	Giving a suitable example and explain how is methane generated during metabolism in methanogins. (3)
3.	(a)	Write short notes on the following (Any three):
		(i) ABC Transporter
		(ii) Synchronous Growth
		(iii) Hydrogen Oxidizers
		(iv) Methods for determination of Microbial Cell Mass (4×3=12)
	(b)	Explain any one contribution of the following scientists (Any two):
		(i) W. Stoeckenius
		(ii) S. Winogradsky
		(iii) R. Emerson $(1.5\times2=3)$
4.	(a)	Write balanced chemical equations catalyzed by following enzymes (Any six):
		(i) Transketolase
		(ii) PGAL – Dehydrogenase

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		(iii) Phosphoribulokinase
		(iv) PEP-Synthatase
		(v) ATP-Citrate lyase
		(vi) Hydrogenase
		(vii) Fumarate Reductase (1.5×6=9)
	(b)	How does pH influence the growth of microorganisms? Classify organisms into various groups on the basis of their preferences for pH. Describe the mechanism/s such microbes possess to maintain a neutral cellular pH. (2+2+2=6)
5.	(a)	Explain the mechanism of nutrient uptake by PEP-PTS in microorganisms. (4)
	(b)	Define chemolithotrophy. Classify aerobic chemolithotrophs into physiological groups with examples. (5)
	(c)	Write about the factors that affect the length of the lag phase during the growth of microorganisms. (3)
	(d)	Give an example of each of the following:
		(i) Hyperthermophile
		(ii) Barophile
		(iii) Compatible Solute (1×3=3)
6.	(a)	How do aerobes and other oxygen tolerant microbes protect themselves
		from oxygen toxicity? Explain briefly. (4)

- (b) Write an account of siderophores and their role in microbial metabolism?
 (4)
 (c) What is the function of LHCs and RCs in photosynthesis?
 (3)
- (d) Describe the mechanism of photosynthesis in *Halobacterium helobium*.

(4)

(400)