U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

June 2025 Semester End Main Examinations

Programme: B.E. **Semester: III**

Branch: BIOTECHNOLOGY **Duration: 3 hrs.**

Course Code: 23BT3PCMBG / 22BT3PCMBG **Max Marks: 100**

Course: Microbiology

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

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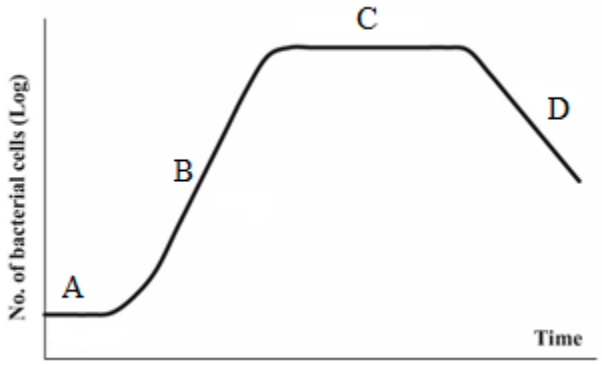
Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	*CO*	*PO*	Marks
1	a)	An intact bacterial cell was subjected TEM analysis for studying its ultrastructure. The image obtained was however fuzzy and not clear for revealing inner contents of the cell. I. What might be the problem with the technique? II. Suggest a suitable solution for getting clear and distinct image of a bacterial cell.	*CO1*	*PO 1,2*	**10**
	b)	The contribution by a French chemist (also as biologist) to the field of modern microbiology were immense and greatly influenced their industrial applications. Name the scientist and justify his contributions.	*CO1*	*PO 1,2*	**10**
		OR			
2	a)	In a DNA homology experiments conducted for two fungi namely Penicillium notatum and Aspergillus niger following results obtained. Justify the results obtained. i. More than 95% of DNA formed was homoduplex ii. Traces of heteroduplex formed were denatured easily at a temperature of 40^0C.	*CO 1*	*PO 1,2*	**10**
	b)	"Theory of Spontaneous generation was a huge controversy in scientific field during 18^{th} century". Substantiate the statement with relevant scientific studies performed to prove and disprove the theory.	*CO 1*	*PO 1,2*	**10**
		UNIT - II			
3	a)	The following curve is obtained by plotting the logarithm of the number of viable cells versus the incubation time when a microorganism is grown in a closed system using a liquid medium for 4 days at 37 ^{0}C.	*CO2*	*PO2*	**10**

			 i. Name the above plot. ii. Identify the phases A, B, C & D and discuss factors which determine the beginning and end of each phase Write the significance of B and C phases.	*CO 2*	*PO 2*	**12**
	b)	Classify the groups of bacteria based on their pH requirement with classic examples under each group.	*CO2*	*PO2*	**8**
		OR			
4	a)	Gram-positive bacterium could be differentiated from gram-negative bacterium" Substantiate the statement with relevant diagram.	*CO2*	*PO2*	**10**
	b)	Tabulate the differences between SPC and DMC with respect to their working principle, technique and merits and demerits over each other. Give the proper reasoning for the following incorrect observations made with respect to quantitative determination of microbial growth. i. The number of colonies counted on a standard petriplate (10^{-2} dilution) were 950 which is further used to calculate CFU. ii. Number of bacterial cells counted through DMC were 1 lac/mL. iii. When same sample was accurately and finely diluted, spread very uniformly on an agar plate using appropriate lower dilutions the CFU obtained were 0.6 lac/mL.	*CO2*	*PO2*	**10**
		UNIT - III			
5	a)	Identify and discuss the specific genetic recombination process responsible in the following cases. i. Genetic recombination in which a DNA fragment from a donor bacterium enters a recipient bacterium (through physical contact) and it is exchanged for a piece of the recipient's DNA. And the efficiency of such transfer is very high. ii. In an environment a bacterial culture X was infected by phages and was lysed to release virions. The new virions infected another bacteria that was deficient for tryptophan (Trp^-). In the next generation the Trp^- bacteria could grow on minimal medium as well.	*CO 2*	*PO 2*	**10**
	b)	Explain the utilisation of glucose differently (rather through EMP) by *Zymomonas mobilis*. Name the key enzyme in the pathway.	*CO 2*	*PO 2*	**10**

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			OR			
	6	a)	*Zymomonas mobilis* and *Lactobacillus lactis* were incubated in glucose broth. The glucose has been catabolised to yield pyruvate. Assuming that complete anaerobic environment is established during the next successive incubation, direct the metabolic pathway and comment on the end products.	*CO3*	*PO2*	**10**
		b)	Define the two different transduction processes? Describe the transduction process that involves integration of external DNA at a targeted site in the recipient organism.	*CO2*	*PO2*	**10**
			UNIT - IV			
	7	a)	Distinguish dry heat sterilization from moist heat sterilization. Demonstrate an experiment to prove the efficiency of moist heat sterilization.	*CO2*	*PO2*	**10**
		b)	Discuss the types, mode of action and applications of halogens and alcohols as antimicrobial agents.	*CO2*	*PO2*	**10**
			OR			
	8	a)	Define antibiotics. Discuss the types and mechanism of antibiotics acting on protein synthesis.	*CO2*	*PO2*	**10**
		b)	You are provided with solution of nutrients components such as growth regulators, hormones and vitamins. What sterilization method you would like to employ and Why? Write the procedures of sterilization method with diagrammatic representation.	*CO2*	*PO2*	**10**
			UNIT - V			
	9	a)	Discuss *B.thuringiensis* as an ecofriendly pesticide in eradicating plant pests.	*CO3*	*PO2*	**10**
		b)	Microbes play a vital role in processing of various foods improving their quality. Justify	*CO3*	*PO2*	**10**
			OR			
	10	a)	Distinguish the nature of microflora present in fresh water and marine water environments.	*CO 3*	*PO 2*	**10**
		b)	Discuss various categories of biofertilizers and their importance in agriculture.	*CO 3*	*PO2*	**10**

READFAR EXAMS 2024-25

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