LOYOLA COLLEGE (AUTONOMOUS) CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **PLANT BIOLOGY AND PLANT BIOTECHNOLOGY**

THIRD SEMESTER – **NOVEMBER 2024**

UPB 3502 – MICROBIOLOGY

Date: 12-11-2024 Dept. No. Max. : 100 Marks

Time: 09:00 am-12:00 pm

	SECTION A - K1 (CO1)	
	Answer ALL the Questions	**(10 x 1 = 10)**
1.	**Fill in the blanks**	
a)	Bergey's Manual of Systematic Bacteriology provides comprehensive details on the classification and identification of bacteria based on their _____ and biochemical properties.	
b)	_____ media are used to cultivate microorganisms that require specific nutrients or antibiotic conditions.	
c)	The process of converting glucose to ATP in the presence of oxygen is known as _____ respiration.	
d)	_____ is a type of bacterial recombination involving the transfer of genetic material via a bacteriophage.	
e)	The virus that causes rabies belongs to the _____ family.	
2.	**State whether the following statements are TRUE or FALSE**	
a)	Microbes that live in extreme environments such as hot springs or deep-sea vents are known as psychrophiles.	
b)	The primary function of the bacterial cell wall is to provide structural support and protection from environmental stresses.	
c)	Oxidative phosphorylation occurs in the mitochondria and is responsible for the majority of ATP production.	
d)	The lac operon system controls the metabolism of glucose in bacteria.	
e)	The Baltimore classification system categorizes viruses based on their genetic material and replication methods.	
	SECTION A - K2 (CO1)	
	Answer ALL the Questions	**(10 x 1 = 10)**
3.	**Choose the correct answer**	
a)	What is the primary purpose of differential staining? a) To identify bacteria by their size b) To distinguish between different types of bacteria based on their cell wall properties c) To determine the colour of microorganisms d) To count the number of bacteria in a sample	
b)	What is the primary method used to isolate a single bacterial colony? a) Streak plating b)Pour plating c) Spread plating d) Filtration	
c)	What is the end product of alcoholic fermentation? a) Lactic acid b) Ethanol c) Acetyl-CoA d) Pyruvate	
d)	Which type of plasmid is primarily involved in antibiotic resistance in bacteria?	

	a) Conjugative plasmid b) R-plasmid c) Col plasmid d) Virulence plasmid
e)	What is the primary role of the viral envelope in animal viruses? a) To provide structural support b) To assist in attachment and entry into host cells c) To replicate viral DNA d) To produce viral proteins
4.	**Answer the following, each in about 50 words**
a)	Mention the importance of staining techniques in microbiology.
b)	What is the significance of the lag phase in the bacterial growth curve?
c)	Write a note on anoxygenic photosynthesis.
d)	Enumerate the function of plasmids in bacterial cells.
e)	What is the primary function of the capsid in viruses?
	SECTION B - K3 (CO2)
	Answer any TWO of the following in 500 words (2 x 10 = 20) **Draw diagrams / flowcharts wherever necessary**
5.	Explain the six-kingdom classification system proposed by Carl Woese. Discuss how it differs from the traditional five-kingdom system.
6.	Describe the normal growth curve of bacteria and explain the phases of growth in detail.
7.	Evaluate the role of microbial enzymes in industrial applications with specific examples.
8.	Discuss the David Baltimore classification of viruses.
	SECTION C – K4 (CO3)
	Answer any TWO of the following in 500 words (2 x 10 = 20) **Draw diagrams / flowcharts wherever necessary**
9.	Analyze the factors influencing bacterial growth and reproduction in various environments.
10.	Outline the pathways involved in glycolysis and how they lead to the production of alcohol in fermentation
11.	Discuss the regulation of gene expression in prokaryotes, with a focus on the lac operon.
12.	Explain the structure and lifecycle of plant viruses, using Tobacco Mosaic Virus (TMV) as an example.
	SECTION D – K5 (CO4)
	Answer any ONE of the following in 1000 words (1 x 20 = 20) **Draw diagrams / flowcharts wherever necessary**
13.	Evaluate the mechanisms of bacterial recombination, focusing on conjugation, transduction, and transformation.
14.	Critically evaluate the processes of photosynthesis in bacteria.
	SECTION E – K6 (CO5)
	Answer any ONE of the following in 1000 words (1 x 20 = 20) **Draw diagrams / flowcharts wherever necessary**
15.	Evaluate the effectiveness of different staining techniques (simple, differential, and special) in the identification and diagnosis of bacterial infections.
16.	Elaborate on the various methods for the cultivation of viruses.

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