

MICROBIOLOGY

PAPER-MCBA-VI (A+B)

Time Allotted: 4 Hours

Full Marks: 100

The figures in the margin indicate full marks. Candidates should answer in their own words and adhere to the word limit as practicable. All symbols are of usual significance.

Use separate answer books for each Group.

GROUP-A

		Answer Question No. 1 and any <i>four</i> questions from the rest.	
1.		Answer any <i>five</i> questions form the following:	$2 \times 5 = 10$
	(a)	What is multifactorial virulence? Give example.	
	(b)	What is the basis of Baltimore System of classification?	
	(c)	Define LD ₅₀ .	
	(d)	What is TAB vaccine?	
	(e)	What is biphasic medium?	
	(f)	Is alcohol an antibiotic? Justify your answer.	
	(g)	Name the receptor for Cholera toxin. What is sub unit vaccine?	
2.	(a)	What gene functions of lambda phage are essential for the following:	2+2
		(i) Establishment of lysogeny	
		(ii) Maintenance of lysogeny	
		How these genes function?	
	(b)	State the molecular basis of induction.	3
	(c)	What is phage lysate? How can it be prepared from a lysogenic <i>E. coli</i> strain?	1+2
3.	(a)	What is the causative agent of typhoid fever?	1
	(b)	Give two examples of antibiotics used for treatment of typhoid and mention the prophylaxis of typhoid fever.	2+2
	(c)	Describe the molecular pathogenesis of "cholera".	5
4.	(a)	What are biotype and serotype?	3
	(b)	How does tetanus toxin associated with inhibition of neurotransmitter release?	4
	(c)	State the name and morphological features of the causative agent of titanus.	1+2

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5.	(a)	Name the causal organism of Botulism. State the mechanism of action of botulism toxin.	1+2
	(b)	State the symptoms and preventive measures of the Anthrax injection.	2+2
	(c)	Write down the major difference between exotoxins and endotoxins.	3
6.	(a)	Write a note on the microbiota of mouth or oral cavity.	4
	(b)	Write down the mechanism of action of the following:	2+2
		(i) Azidothymidine (AZT)	
		(ii) Nalidixic acid	
	(c)	What is toxoid?	2
7.	(a)	What are the virulence determinants of Bacillus anthracis?	4
	(b)	How MDT is favourable for tuberculosis treatment?	2
	(c)	Why are Mycobacteria so named?	2
	(d)	Why are Mycobacteria said to be acid fast?	2
8.		Define any <i>five</i> of the following terms.	2×5 = 10
	(a)	Nosocomial infection	
	(b)	Q protein	
	(c)	Cholera toxin	
	(d)	Portals of entry	
	(e)	Role of normal flora of human body	

(f) Secondary infection.

GROUP-B

Answer Question No. 9 and any *four* questions from the rest.

 $2 \times 5 = 10$

- 9. Answer any *five* questions form the following:
 - (a) Define ADCC.
 - (b) What are the functions of MIRL and S protein?
 - (c) Define cytokines. Give two examples of cytokines.
 - (d) Mention any two functions of IFN- γ .
 - (e) What is a hapten?
 - (f) Define antibody avidity.
 - (g) What is the difference between a monocyte and a macrophage?
 - (h) Why gram positive bacteria are generally resistant to complement mediated lysis?

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10.(a)	"Antibody to native HEL does not bind to reduced HEL." — Explain.	2
(b)	What are professional antigen presenting cells (APCs)? Give example.	3
(c)	Discuss the role of anatomic barriers as first line of defense against pathogenic microorganisms.	3
(d)	Write down biological functions of NK cells.	2
11.(a)	Differentiate between innate immunity and adaptive immunity.	4
(b)	What are the hallmark features of localized inflammatory response?	2
(c)	What are adjuvants? What are their functions?	2
(d)	Which one of these will be more immunogenic:	2
	(i) BSA in Freund's complete adjuvant	
	(ii) BSA in Freund's incomplete adjuvant.	
12.(a)	How do C3b and C4b help in opsonization?	3
(b)	Enucleated cells are more susceptible to complement-mediated lysis than nucleated cells. Why is this so?	2
(c)	How do the three pathways of complement activation differ in the substances that can initiate activation?	3
(d)	What are anaphylatoxins?	2
13.(a)	Discuss salient features of adaptive immunity.	4
(b)	Briefly describe about allotypic determinant.	2
(c)	What is clonal selection theory?	2
(d)	Why sabin polio vaccine is advantageous over salk polio vaccine?	2
14.(a)	A 15 years old girl breaks out with hives every time she eats seafood. Identify and describe the type of hypersensitivity the girl experiences.	4
(b)	What is prozone effect?	2
(c)	Identify the cell types from the descriptions given below:	$1 \times 4 = 4$
	(i) Expresses CD8 marker	
	(ii) Responsible for delayed type hypersensitivity.	
	(iii) Non-phagocytic cells which releases a number of pharmacologically active mediators.	
	(iv) Flattened epithelial cells lacking micro villi which are present in MALT.	
15.(a)	Write short note on oxygen-dependent killing mechanism by phagocytes.	2
(b)	What is C_3 convertase?	2
(c)	Differentiate between:	1.5 + 1.5
	(i) Agglutination and precipitation.	
	(ii) Sequential and non-sequential epitopes.	
(d)	Explain the role of stromal cell in hematopoiesis.	3

16.(a)	What are mitogens?	2
(b)	Differentiate between agretope and paratope.	2
(c)	What are conjugate vaccines?	2
(d)	What are allotypes?	2
(e)	Indicate whether the statements given below are true or false. Justify your answer.	$1 \times 2 = 2$
	(i) Antihistamines are effective for the treatment of type III hypersensitivity.	

(ii) Babies can acquire IgE-mediated allergies by passive transfer of maternal antibody.

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