


Name:			
Enrolment No:			
UPES End Semester Examination, May 2023			
Course: PROBIOTICS Semester: VI Program: BSc Microbiology Duration: 3 Hours Course Code: HSMB3008 Max. Marks: 100 Instructions: Read Questions Carefully			
S. No.	Section A Short answer questions/ MCQ/T&F (20Qx1.5M= 30 Marks)	Marks	COs
Q1	Which of the following disturbs the normal bacteria inhabiting our GI tract? A. Antibiotics and Wine. B. Infectious diseases such as dysentery, salmonella and cholera C. Sugary foods and carbohydrates such as white bread, pastries and pasta D. Prolonged use of ibuprofen, aspirin, hydrocortisone, contraceptive pill and sleeping pills E. All of the above	1.5	CO2
Q2	_____ is the major secretory immunoglobulin that helps fight mucosal infections and neutralize toxins: A. IgM B. IgG C. IgA D. IgG	1.5	CO3
Q3	Synbiotics are a combination of: A. Prebiotics and Probiotics B. Probiotics and Psychobiotics C. Prebiotics and Postbiotics D. All of the Above	1.5	CO5
Q4	T cells mature in the: A. Bone marrow B. Thymus C. Blood D. Lymph	1.5	CO3

Q5	B cells activate: A. Humoral immunity B. Cell mediated immunity C. Autoimmunity D. Innate immunity	1.5	CO3
Q6	Hematopoiesis occurs in which of the following organ? A. Liver B. Bone marrow C. kidneys D. central nervous system	1.5	CO3
Q7	PAMP refers to: A. Pathogen Associated Molecular Patterns B. Phagocyte Associated Microbial Patterns C. Phagocyte Associated Molecular Patterns D. All of the above	1.5	CO3
Q8	The following refers to swelling as a result of inflammation: A. Erythema B. Edema C. Granuloma D. Vasodilation	1.5	CO3
Q09	The below probiotic bacterial genera shows characteristic 'Y' shaped morphology: A. <i>Lactobacillus</i> B. <i>Propionibacterium</i> C. <i>Bifidobacterium</i> D. <i>Bacillus</i>	1.5	CO1
Q10	Which cell type forms an important link between the innate immune response and the adaptive immune response? A. Dendritic cell B. Neutrophil C. B cell D. Innate lymphoid cell (ILC)	1.5	CO3
Q11	Function of M-cells present in mucosa-associated lymphoid tissue is to: A. Act as gatekeepers to the mucosal immune system B. Continuously sample the lumen of the small intestine for antigens C. Transporting antigen to the underlying mucosal lymphoid tissue D. All of the above	1.5	CO3

Q12	<p>The following type of cell junction can restrict the passage of water, electrolytes, and other small molecules across the epithelium. They also form channels that allow selective diffusion of ions and solutes between cells, thus helping paracellular ion transport:</p> <ul style="list-style-type: none"> A. Desmosomes B. Gap Junctions C. Tight Junctions D. All of the above 	1.5	CO2
Q13	<p>Celiac disease is caused due to an immunological reaction to:</p> <ul style="list-style-type: none"> A. Albumin B. Globumin C. Gluten D. Casein 	1.5	CO5
Q14	<p>Bacteriocins produced by probiotic lactic acid bacteria are generally:</p> <ul style="list-style-type: none"> A. Small cationic antimicrobial peptides B. Lipopolysaccharides C. Surfactants D. All of the above 	1.5	CO4
Q15	<p>The most effective intervention by probiotics in treatment of Celiacs disease is:</p> <ul style="list-style-type: none"> A. Degradation of gluten in the intestinal lumen by probiotics B. Reducing the inflammation associated with gluten intake C. Reducing intestinal permeability, cytokine and antibody production. D. A and B E. All of the above 	1.5	CO5
Q16	<p>Crohn's disease is a type of:</p> <ul style="list-style-type: none"> A. Inflammatory bowel disease (IBD) B. Neurological disease C. Cardiovascular disease D. Autoimmune disease 	1.5	CO5
Q17	<p>Physiological capability of any microbe to intervene as probiotics in colon must essentially be:</p> <ul style="list-style-type: none"> A. Aerobic B. Anaerobic C. Facultative D. B & C E. None of the above 	1.5	CO5

Q18	Caucasus Mountain villagers were drinking a fermented yoghurt drink on a daily basis. Scientific studies into the drink found that it contained a beneficial microbe which seemingly improved their health and increased their lifespan. Name pioneering scientist: A. Louis Pasteur B. Paul Ehrlich C. Elie Metchnikoff D. Robert Koch	1.5	CO1
Q19	The following is formed in the GI tract in millimolar quantities and especially occur in high amounts in those areas where anaerobic microorganisms are predominant: A. Vitamins B. Proteins C. SCFA's D. All of the above	1.5	CO3
Q20	Molecular technique that can most effectively characterize probiotics and GI tract microbiota? A. Metagenomics B. Culturable bacteria C. DGGE D. RFLP	1.5	CO4
Section B (4Qx5M=20 Marks)			
Q1	A. Define Probiotics. B. Write down the major mechanisms of action of Probiotics.	5 (1+4)	CO1
Q2	A. What is the difference between innate and adaptive immunity? B. What are the major functions of innate immune system?	5 (2+3)	CO3
Q3	Write a brief note on the microbial ecology of human Colon.	5	CO2
Q4	A. What are Peyer's patches? B. Where are they located? C. What is their function?	5 (1+1+2)	CO3

Section C
(2Qx15M=30 Marks)

<p>Q 1</p>	<p>In a research project you are involved to conduct <i>in vitro</i> and <i>in vivo</i> studies for screening potential probiotics strains from different samples of curd and milk:</p> <p>A. Name a selective media that you can use to isolate such microbes from given milk and curd samples.</p> <p>B. Draw a flow-chart highlighting major guidelines for evaluation of a candidate probiotic strain that must survive in stomach.</p> <p>C. Write down the <i>in vitro</i> tests that you must perform to initially screen for possible probiotics.</p> <p>D. What are germ-free animal models?</p> <p>E. Why are germ-free animal models useful for studies of probiotics and gut bacterial function?</p>	<p>15 (1+5+5+2+2)</p>	<p>CO4</p>
<p>Q2</p>	<p>A. Identify the metabolic pathway from above figure.</p> <p>B. Identify the missing intermediates (A- E) in the pathway.</p> <p>C. Give two examples of bacteria that can conserve energy via this pathway.</p> <p>D. Explain why this pathway represents substrate level phosphorylation and not oxidative phosphorylation?</p> <p>E. What will be the total yield of [E] from 1 mole of Glucose.</p> <p>F. What is the net energetic yield of this pathway.</p>	<p>15 (2+5+2+2+2+2)</p>	<p>CO1</p>

Section D
(2Qx10M=20 Marks)

Q 1	A. What is necrotizing enterocolitis (NEC)? B. What causes NEC? C. What are the three different stages of NEC? D. Briefly explain the intervention of probiotics for treatment of NEC.	10 (2+2+3+3)	CO5
Q2	A. What is the difference between Eubiosis and Dysbiosis? B. Describe the main factors that are known to cause dysbiosis? C. State the consequences of dysbiosis on human health.	10 (2+4+4)	CO2