UPES
End Semester Examination, December 2023

Course: Bact & Virology　　　　　　　　　　Semester　: I
Program: MSc Microbiology　　　　　　　　Duration　: 3 Hours
Course Code: HSMB 7009　　　　　　　　　Max. Marks: 100

Instructions:
1. All the questions are compulsory.
2. Please write down the Serial Number of the question before attempting it.
3. The question paper consists of 28 questions and it is divided into four sections A, B, C and D.
4. Section A comprises of 20 questions carrying 1.5 mark each.
5. Section B comprises of 4 questions carrying 5 marks each.
6. Section C comprises of 2 questions carrying 15 marks each.
7. Section D comprises of 2 questions carrying 10 marks each.
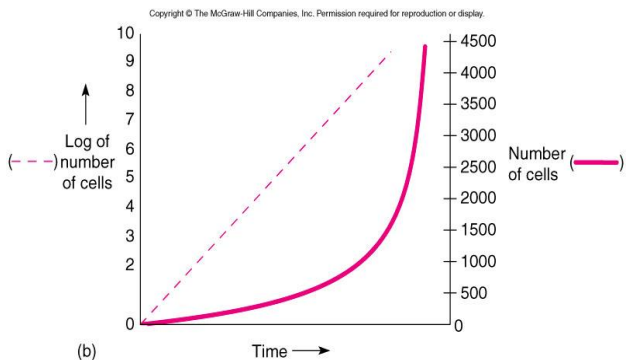There is no overall choice. However, an internal choice might be provided.

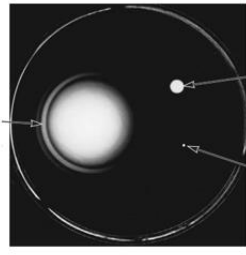| S. No.	Section A **Short answer questions/ MCQ/T&F** **(20Qx1.5M= 30 Marks)**	Marks	Cos
Q 1	Reverse transcriptase was discovered by ------------------- and ------------------ for which they got nobel prize in 1975. A) Rosalind Franklin and Maurice Wilkins B) Frankel Conrat and Singer C) Howard Martin Temin and David Baltimore D) Hershey and Martha Chase	**1.5**	**CO5**
Q 2	In viruses, enveloped is derived from A) Cellular membranes including of organelles B) Host cell membrane C) Viral encoded lipids D) All of the above	**1.5**	**CO2**
Q3	Which of the following virus is ether sensitive? a. Influenza b. Adenovirus c. Polio virus d. Norovirus	**1.5**	**CO4**
Q4	Define gene reassortment. Where is it observed?	**1.5**	**CO4**

Q5	'Vaccines are used for prevention and therapy of viral infection.' Comment on the statement.	1.5	CO6
Q6	Why do emerging viruses like Zika and Ebola continue to plague us? a) These viruses mutate and thus emerge stronger b) Deforestation is the main culprit c) Mosquitoes allow zoonotic infections to happen d) Both a and c	1.5	CO4
Q7	From which of the following specimens; can Rotavirus be isolated? a. Sputum b. Throat c. Feces d. Nose	1.5	CO5
Q8	Which of the following viruses affects liver? a. HSV b. EBV c. HAV d. HIV	1.5	CO5
Q9	'Hershey and Chase experiment on was done on a virus.' Could you name the virus and its host?	1.5	CO5
Q10	Enders, Weller and Robbins received nobel prize for: a) Discovering retrovirus b) Developing cell culture c) Propagating polio virus in human cell culture d) Developing ELISA	1.5	CO4
Q11	An enzyme called ------------ present in tears and breaks ------------------of bacteria.	1.5	CO1
Q12	A bacterium doubles every minute and there are 100,000 CFU/ml at given time (t =80 mins). What will be conc. of cells at 79 mins?	1.5	CO1
Q13	Cell membrane inhibitors are ………..spectrum antibiotics. (Broad/narrow)	1.5	CO2
Q14	'Serological tests are performed on ribosomes of bacteria.' Justify the statement.	1.5	CO1
Q15	Define negative staining. Where is it used?	1.5	CO1
Q16	'Some bacteria are parasitic.' Are there any parasites of bacteria that you have heard of?	1.5	CO2
Q17	Archaea are prokaryotes.' Comment on the statement.	1.5	CO2
Q18	Give an example of media that is both selective and differential and reason why,	1.5	CO2

Q19	Arrange on the basis of water activity : Jams, cereals and fresh vegetables.	1.5	CO3
Q20	Define conjugation.	1.5	CO1

<div align="center">

Section B
(4Qx5M=20 Marks)

</div>

Q 1	Enlist and explain the pathways by which viruses assemble with examples.	5	CO5
Q2	Explain the two kinds of plots showing bacterial growth below with view of what do they depict and what can we infer from them?	5	CO4
Q3	'A mixed bacterial culture (3 types of strains) was plated on two plates having Serine and Acetate. When it was grown on Serine, two bacteria grew happily while one formed a tiny colony. When they were grown on Acetate, regions of no growth were observed.' Based on this; answer the following : (i) Elaborate plate is that of Serine and which one is of Acetate? (2) (ii) What are acetate and serine called in the context of phenomenon studied in bacteriology responsible for this? (1) (iii) Write briefly as to what do you think has happened? (2)	5	CO1

Q4	With suitable illustrations and text; explain what are two component systems and where are they found?	5	CO3

<table>
<tr><td colspan="4" align="center">Section C
(2Qx15M=30 Marks)</td></tr>
<tr>
<td>Q 1</td>
<td>'Rotavirus is a reovirus; an Oral vaccine for which was conceptualized and prepared in India. A child died upon administration of vaccine due to diarrhea and mutant virus was isolated from feces.'
Based on this answer the following:
(i)   Which class of viruses is Reovirus in Baltimore scheme and what type of genome do they have? (1)
(ii)   Which type of vaccine do you think was administered to the child that it died? (2)
(iii)   What precautions are taken with such vaccines such as Oral polio vaccine and Rotavirus vaccines? (2)
(iv)   What are different types of viral vaccines? Give examples (7)
(v)   Pfizer BioNtech and Moderna recently developed a type of vaccine for COVID-19. What type was it and what are its advantages. (2)
(vi)   Define herd immunity. (1)</td>
<td>15</td>
<td>CO6</td>
</tr>
<tr>
<td>Q2</td>
<td>'A patient was showing response to an antibiotic, then suddenly the patient started to become resistant when he forgot to take one dose.' Based on this answer the following

(i)   Other than mutation in DNA (assuming it has not happened); what phenomenon in bacteriology based on cell density have you read about which can cause this? (1)
(ii)   In which bacteria was it first discovered? (1)
(iii)   Analyze what has happened in two cases. (4)
(iv)   What is the difference between such systems in gram positive and gram-negative bacteria? (2)
(v)   Explain one such system and its function in bacteria. (7)</td>
<td>15</td>
<td>CO3</td>
</tr>
<tr><td colspan="4" align="center">Section D
(2Qx10M=20 Marks)</td></tr>
<tr>
<td>Q 1</td>
<td>Enlist a few methods of viral diagnosis. Describe any one. (7)

With help of illustration explain one step multiplication cycle of viruses. (3)</td>
<td>10</td>
<td>CO4</td>
</tr>
</table>

| Q2 | With the help of flow chart, illustrations (2), text (6) and examples (2); give an account of general secretion systems in bacteria. | 10 | CO3 |