

Chattogram Veterinary and Animal Sciences University

MS in Microbiology Final Examination; July – December Semester, 2022

Course Title: Avian Microbes; Course code: AMB-602

Full Marks:40; Time: 2 hours

Answer any 4 (FOUR) Questions.

1. Name the virulence factors of the genus *Staphylococcus*, and list the disease conditions produced in poultry by the bacterial pathogens belonging to the genera *Streptococcus* and *Staphylococcus*. How can you confirm the growth of zoonotic *Salmonella* serovars in laboratory by collecting samples from a poultry farm environment? 10
2. What are the subspecies and virulence factors of *Pasteurella multocida*? You are presented with some chickens suffering from arthritis, and the disease is suspected to be caused either by *Staphylococcus aureus* or *Pasteurella multocida*. How you can confirm that the causal agent is indeed *Pasteurella multocida*? Describe the etiologic agents associated with necrotic enteritis, gangrenous dermatitis and tuberculosis in poultry. 10
3. Give a brief list of different antigens seen in avian pathogenic *Escherichia coli*. What are the disease conditions seen in poultry caused by *Escherichia coli*? Which pathogens are commonly associated with chronic respiratory disease (CRD) in poultry in Bangladesh, and how can you confirm their involvement in CRD by producing solid laboratory evidence? 10
4. Describe morphological characteristics and pathogenic diversity of avian influenza viruses and Newcastle disease virus. When a low pathogenic avian influenza virus can also cause high mortality in chickens? How can you confirm an outbreak in poultry caused by a low pathogenic avian influenza virus subtype H9N2? 10
5. What would be the pathognomonic finding that can be considered sufficient in field condition to diagnose a duck plague outbreak without doing any laboratory testing? What should be your suggestion to poultry farmers on ideal vaccination against infectious bursal disease? What is the molecular mechanism to see the evolution of many serotypes in infectious bronchitis virus? 10

Chattogram Veterinary and Animal Sciences University
Department of Microbiology and Veterinary Public Health
MS in Microbiology, July-December 2022
Subject: Molecular Microbiology; Course Code: MMB-602
Total Marks: 40; Time: 2 hours

(Figure of the right margin indicates full marks. Answer any four questions)

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|---|----|---|-----|
| 1 | a. | Why are bacteria used for fundamental studies of cell function? Enlist five model organisms for molecular study. | 3 |
| | b. | Define typing of bacteria. Why is typing an important task for bacteriological study? | 3 |
| | c. | Mention the enzymes with their specific roles involve with DNA replication. Write down the difference between prokaryotes and eukaryotes protein synthesis. | 4 |
| 2 | a. | What is coding sequence (CDS)? How is it differentiating from the ORF? | 2 |
| | b. | Define cell lysate. Which method is widely used for bacterial plasmid extraction, and briefly describes the methods? | 4 |
| | c. | What is promoter region? Briefly describe the <i>lac</i> operon system for <i>E. coli</i> . | 4 |
| 3 | a. | Justify the statement, "Different proteins play different biological roles." | 3 |
| | b. | Sketch; How does DNA ligase join the two DNA fragments? | 2 |
| | c. | Describe the linker and adapter methods with a diagram for the modification of DNA fragments. | 5 |
| 4 | a. | Explain the term "gene knockout." How will you select a specific gene to knock out from the genome? | 3 |
| | b. | What is a regulatory gene? Write down the function of the operator region in the operon system. | 3 |
| | c. | What is selectable marker? Write down the characteristics of ideal cloning vectors. | 4 |
| 5 | a. | What is microbiome? What are the advanced methods/technologies' used for DNA sequencing? | 3 |
| | b. | Mention the canonical bases in DNA sequencing. | 1 |
| | c. | Write down the following short note: | 2× |
| | | I. CRISPR/CAS9 | 3=6 |
| | | II. NCBI | |
| | | III. DNA hybridization | |

Chittogram Veterinary and Animal Sciences University

MS in Microbiology

July – December Semester 2022 Final Examination

Course title: Vaccinology

Course Code: VCL-602

Full Marks- 40, Time- 2 Hours

Answer **any four** questions; Figures in the right margin indicate full marks

1. a) Briefly describe the production procedure of the FMD vaccine suitable for routine vaccination campaigns. 7
b) Write down the methods and routes of administration of vaccines in poultry with examples. 3
2. a) How is the quality of a vaccine ensured during the production process? In this context, clarify the importance of purity, safety, stability, efficacy, and vaccine potency test. 7
b) Define master seed and seed lot. What should be characteristic of seed lot for anthrax vaccine production? 3
3. a) What is the principle of the DIVA vaccine? How could a DIVA strategy be used in a disease eradication program? 5
b) What are the major differences between recombinant vaccines and DNA vaccines? Briefly describe the advantages and disadvantages of each vaccine type. 5
4. a) Enlist the common livestock vaccines in Bangladesh and their time and routes of administration. 6
b) Briefly describe immune modulation. Classify immune modulation with examples. 4
5. Write short notes on **any Two**— 5×2
i) Adjuvant =10
ii) Autogenous vaccine
v) Subunit vaccine

Chattogram Veterinary and Animal Sciences University

MS in Microbiology Final Examination

July-December Semester, 2022

Course Title: Advanced Systemic Bacteriology

Course Code: ASB 602

Total Marks: 40 Time: 2 hours

Answer any four questions. Figures in the right margin indicate full marks.

1. Name the virulence factors of *Listeria monocytogenes* that are involved in attachment, internalization, survival and multiplication in the cytoplasm of infected cells. Give a flowchart illustrating the isolation, identification and typing methods for *Listeria monocytogenes* in foods and environmental samples. How will you differentiate between the causative agents of canine nocardiosis and canine actinomycosis? 2+5+3
2. Enumerate the methods currently employed for identification and strain typing of *Staphylococcus pseudintermedius*. Describe the components of anthrax tripartite toxin. Write down the diseases caused by the major pathogenic *Corynebacterium* species. 3+5+2
3. Make a list of serovars of *Leptospira* which cause clinical infections in domestic animals. Give an overview of the cell associated factors produced by *Pseudomonas aeruginosa* that play role in disease pathogenesis. Briefly describe the antigens used for serotyping of *Escherichia coli* isolates. 2+4+4
4. Write down the pathogenic *Campylobacter* species with their usual habitats and possible consequences of infection. Explain the role of *Campylobacter fetus* subsp. *venerealis* in infertility in cattle. Mention the colony morphology of *Pasteurella multocida*, *Erysipelothrix rhusiopathiae* and *Brucella abortus* on blood agar. 3+4+3
5. List the infectious foot conditions of cattle and their associated etiological agents. Outline the procedure for the isolation, identification and characterization of motile *Salmonella* from poultry. Identify the key characteristics of *Haemophilus*, *Mycobacterium*, *Actinobacillus* and *Bordetella*. 2+4+4

Chattogram Veterinary and Animal Sciences University
Department of Microbiology and Veterinary Public Health
MS in Microbiology; July-December 2022
Subject: Advanced Systemic Virology; Course Code: ASV-602
Total Marks: 40; Time: 2 hours

(Figure of the right margin indicates full marks. Answer any four questions)

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|---|---|--|-----|
| 1 | a | What is the basis of the Baltimore classification for viruses? Write down the prospects of advanced systemic virology. | 3 |
| | b | Enlist the tumor forming viruses. Mention the different types/groups of Bovine Papilloma Virus based on their infection sites in the host body. | 3 |
| | c | Write down the route of inoculation and embryonic changes found in the egg embryo after propagating the following viruses, | 4 |
| | | a) Duck plague virus | |
| | | b) Goose parvo virus | |
| | | c) IBV | |
| | | d) NDV | |
| 2 | a | Enlist the different strains of SARS CoV-2 and IBDV. | 4 |
| | b | Mention the family, nucleic acid, strandness, symmetry, sense, envelop/nacked, segmented/ unsegmented, site of replication of the following viruses: Bovine ephemeral fever virus, Infectious balanoposthitis virus, Derzsy's disease virus, Duck viral hepatitis virus, Nipha virus, Hog cholera virus, Blue tongue virus, Feline leukemia virus. | 6 |
| 3 | a | Define viral reassortment. Explain the molecular criteria of HPAIV characterization. | 4 |
| | b | Mention the various structural and nonstructural proteins, as well as their specific roles in the viruses listed below:
Rota virus, Chikungunya virus, Dengue virus and Rabies virus. | 4 |
| | c | What is the pantropic virus? Mention three semen-borne viruses. | 2 |
| 4 | a | Enlist arthropod borne viruses with their specific vectors, target host cells, and cell receptors for host infection. | 5 |
| | b | List the important viral diseases in laboratory animals. | 2 |
| | c | Write down the laboratory diagnostic procedure for FMDV. | 3 |
| 5 | a | What are the samples you will collect for the following viruses for laboratory diagnosis purposes, | 2 |
| | | I. Egg drop syndrome virus | |
| | | II. Classical swine fever virus | |
| | | III. Nipha virus | |
| | | IV. Canine distemper virus | |
| | b | Enlist the viruses that cause profuse bloody diarrhea. | 2 |
| | c | Write down the short note about the following viruses: | 3+3 |
| | | I. Emerging viral diseases | =6 |
| | | II. Abortion causing viral diseases | |

Chattogram Veterinary and Animal Sciences University

MS in Microbiology

July- December 2022

Subject: Advanced Immunology and Serology

Course code: AIS 602

Total marks: 40

Time: 2 hours

Answer any four (4) questions

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|---|---|--|----|
| 1 | a | Mention contribution of 15 reputed scientists in the field of Immunology | 10 |
| 2 | a | Define phagocytosis. What are the different stage of phagocytosis process? | 5 |
| | b | How do microorganism evade phagocytosis process? | 5 |
| 3 | a | Define cytokines. List different properties of cytokine. Mention role of TNF- α and γ Interferon | 5 |
| | b | Illustrate histology of bursa of Fabricius and Thymus with neat diagram | 5 |
| 4 | a | Explain a typical IgG molecule with diagram. | 5 |
| | b | Differentiate among different immunoglobulin in a tabular form | 5 |
| 5 | a | What is autoimmunity? Explain normal immune response to abnormal antigen and abnormal immune response to normal antigen | 5 |
| | b | What is hybridoma? Define monoclonal antibody. Explain mechanism of production of monoclonal antibody and its used in veterinary field | 5 |