

Department of Zoology, Maulana Azad College

UG HONS. QUESTION BANK		
UG SEMESTER 2		
PAPER	TOPIC	SUGGESTED QUESTIONS
<p>ZOOA-CC2-3-TH</p> <p>Non-Chordate II-Coelomates</p>	Unit 1: Introduction -Evolution of Coelom	<p>1. Define coelom. State its advantages. What are the functions of Blastomeres and Blastocoel? Differentiate between pseudocoelomates and eucoelomates.</p> <p>2. Explain the Gonocoel theory with the help of suitable diagrams. What are schizocoelic and enterocoelic coeloms? Name two examples of each type.</p>
	Unit 2: Annelida	<p>1. Distinguish between polychaeta and oligochaeta with example. What is metamerism? Discuss the role an evolutionary significance of metamerism in Annelida. Distinguish between metamerism and pseudometamerism.</p> <p>2. Describe the structure of a typical nephridia in Annelida. Mention the functions of nephridium. Write short notes on: a) Protonephridia b) Metanephridia c) Nephromyxa d) Solenocyte</p>
	Unit 3: Arthropoda	<p>Q1. (a) Give the etymological meaning of 'Arthropoda'. Name the phyla which are closely related to the Phylum Arthropoda. (b) Mention the characteristic features of the phylum Arthropoda. (c) Make a schematic classification of the phylum Arthropoda with reference to the scheme of E.E. Ruppert and R.D. Barnes, 1994.</p> <p>(</p> <p>Q2. (a) Give characteristic features of the sub-phylum Trilobita with suitable example. (b) Mention salient features of the sub-phylum Chelicerata of the phylum Arthropoda. (c) Classify sub-phylum Chelicerata upto class with suitable example.</p> <p>Q3. (a) Distinguish between Crustacea and Uniramia. (b) Classify Crustacea upto classes giving suitable example. (c) Classify Uniramia upto class level with suitable examples.</p> <p>Q4. Justify the inclusion of following animals under the same phylum but under different subphyla: <i>a) Trilobita (b) Limulus(c) Daphnia (d) Scolopendra</i></p> <p>Q5. Justify the inclusion of following animals under the same phylum but under different subphyla: <i>(a) Trilobita (b) Tachypleus (c) Squilla(d) Periplaneta</i></p> <p>Q6. Justify the inclusion of following animals under the same phylum but under different subphyla and or classes : <i>(a) Carinoscorpius (b) Buthus(c) Cyclops(d) Balanus</i></p> <p>Q7. Justify the inclusion of following animals under the same phylum and subphyla but under different classes : <i>(a) Lepas (b) Argulus (c) Daphnia (d) Cyclops</i></p> <p>Q8. Justify the inclusion of following animals under the same phylum and subphyla but under different classes : <i>(a) Lithobius (b) Julus(c) Pauropus (d) Lepisma</i></p>

		<p>Q9. Give systematic position of the following arthropods (According to E.E. Ruppert and R.D. Barnes, 1994) and specimen characters: (a) King crab; (b) Scorpion; (c) Goose barnacle;(d)Acorn barnacle; (e) Sea spider.</p> <p>Q10. Give systematic position of the following arthropods (According to E.E. Ruppert and R.D. Barnes, 1994) and specimen characters: (a) Mantis shrimp; (b) Centiped; (c) Milliped;(d)Hermit crab; (e) Mole crab.</p> <p>Q11. Give systematic position of the following arthropods (According to E.E. Ruppert and R.D. Barnes, 1994) and specimen characters: (a) Mantis; (b) Silver fish;(c) Prawn;(d)Spring tail; (e) Tadpole fish</p> <p>Q12. Explain the following terms mentioning the animals where these are found: (a) Prosoma &Opisthosoma, (b)Book gill, (c) Book lung (d) Chelicerae & pedipalpi</p> <p>Q13. Explain the following terms mentioning the animals where these are found: (a) Biramous appendage, (b)Antennal gland, (c) nauplius larva (d) Uniramous appendage</p> <p>Q14 (a) What do you mean by Tracheal system of respiration? Name the components of respiratory system in cockroach. (b) Give an illustrative account of tracheae in cockroach. (c) How tracheae are arranged in the body of cockroach?</p> <p>Q15. (a) 'Tracheal system of cockroach is Polypneustic-Holopneustic type'- Justify it. (b) Describe the structure of tracheoles in cockroach. How do the tracheoles differ from tracheae? (c) Comment on Air sac found in tracheal system of arthropods.</p> <p>Q3. (a) Define spiracle. Mention the number and location of spiracles in cockroach body. (b) What type of spiracles do cockroaches possess? Draw and describe the spiracles of cockroach. (c) Comment on the functional significance of spiracles in the respiratory system of cockroach.</p> <p>Q4. (a) 'Gas exchange mechanism in cockroach is a two-phasic process'- justify the statement with suitable illustration. (b) 'Air flow through spiracles in cockroach is a cyclical phenomenon'- Justify it. (c) Comment on the functional significance of tracheal ctenidium and resilin.</p> <p>Q5. (a) Make a diagrammatic illustration of the cross section of cockroach body and label various tracheae and tracheal trunks of the same. (b) Describe the development of tracheole in cockroach. (c) 'Tracheal arrangement of head, thorax and abdomen varies greatly in cockroach'- Justify the statement.</p>
	Unit 4: Onychophora	1. Why do you consider <i>Peripatus</i> as a 'connecting link'? Describe the internal features of <i>Peripatus</i> with special reference to digestive system, nervous system and sense organs. Briefly state the habit and habitat of this animal.

		2. State the evolutionary significance of <i>Peripatus</i> sp. Describe the external features of this specimen.
	Unit 5: Mollusca	<ol style="list-style-type: none"> 1. Write the diagnostic features of Phylum Mollusca. Present the scheme of classification of the phylum after Ruppert and Barnes, 1994. Give two examples of class Polyplacophora. 2. Draw the nervous system of <i>Pila globosa</i> and label it properly. Write briefly the phenomenon of torsion in gastropoda. 3. Discuss the feeding habit of <i>Pila</i> in respect to its habitat. Explain how radula helps in feeding in the species. Draw and label the radula of <i>Pila</i>. 4. Discuss with necessary diagram the double mode of respiration in <i>Pila</i>. What is monopectinate gill? Give its diagram. What is branchial lamella?
	Unit 6: Echinoder mata	1. Draw and describe the structure of water vascular system in an echinoderm. Mention the functioning of podia in <i>Asterias</i> . Differentiate between Ophiopluteus and Echinopluteus.
	Unit 7: Hemichord ata	<ol style="list-style-type: none"> 1. Why <i>Balanoglossus</i> is considered as Invertebrate chordate? Mention the importance of Tornaria larva in relation to phylogenetic status of <i>Balanoglossus</i>? What is Clandestine Evolution? 2. What is the function of proboscis of <i>Balanoglossus</i>? Why <i>Balanoglossus</i> is also called as Tongue worm? Mention the affinities of Hemichordates with Minor phylum and Cephalochordates.
CC-2-4-TH Cell Biology	Unit 1: Plasma Membrane	<ol style="list-style-type: none"> 1. What are the integral proteins of the plasma membrane involved in surface adhesion or signaling? Mention types of active transport. Give its significance. What is facilitated diffusion? 2. (a) What is meant by intercellular junctions? (b) Explain Fluid Mosaic concept of plasma membrane with appropriate diagram? (c) What is lipid raft? (d) How is active transport driven by (i) ATP and (ii) ion gradient? 3. Write a short account on freeze fracture mechanism? What is freeze etching? Differentiate between gap and tight junction. 4. Describe an experiment to explain the phenomenon of membrane fluidity. What do you mean by voltage gated channels? What are transmembrane proteins? 5. Describe the structure and functions on tight and gap junctions. Write about the different types of membrane channels. What is Belt desmosome? 6. Enumerate the chemical composition of plasma membrane. Differentiate between channel and carrier proteins. Why RBC can be considered a model for the study of plasma membrane? Write a short note on membrane polarity. 7. (a) State the functions of glycocalyx. (b) What is hydrophathy plot and why is it used? (c) Point out the events that occur during the passage of action potential at Na^+/K^+ Pump by a labelled diagram. (d) Suppose you were planning to use liposomes in an

		<p>attempt to deliver drugs to a particular type of cell in the body. Is there any way you might be able to construct the liposome to increase its target specificity?</p> <p>8. Briefly describe the process of receptor mediated endocytosis. Differentiate between endocytosis and reverse pinocytosis. Give examples of some phospholipids present in plasma membrane. Both facilitated diffusion and active transport help in glucose transport-explain.</p>
	<p>Unit 2: Cytoplasmic Organelles I</p>	<ol style="list-style-type: none"> 1. Differentiate SER and RER. 2. Mention the function of RER 3. What do you mean by Cis and Trans Golgi? 5. What kind of enzymes lysosome contains? What is the pH value of of the lysosomal lumen? 6. What is endocytosis and autophagy? 7. Who discovered lysosome and in which year? 8. Who controls the synthesis of lysosomal enzymes? 9. What do you mean by lysosomal storage disease? 10. What is called suicide bag? Why? 11. What is lysosomotropism? 12. What is the role of lysosome in Systemic Lupus Erythematosus? 13. Name two cells where ER is absent. 14. Who discovered ER and in which year? 15. What is COPI and COPII? 16. What is sarcoplasmic reticulum? What is its function? 17. Which organelle is responsible for Alzheimer's disease? How? 18. Who discovered Golgi Apparatus and in which year? 19. What is zone of exclusion? Why it is so called? 20. What is forming face and maturing face of Golgi? 21. What is the primary function of Golgi Apparatus? 22. What is Achondrogenesis type IA? 23. What is Golgi fragmentation? 24. What is heterolysosome and autolysosome? <p>B. Write short notes on (5 marks each)</p> <ol style="list-style-type: none"> 1. Lysosomal Storage Disease (LSD). 2. Formation of lysosome. 3. GERL System. 4. Unfolded Protein Response (UPR). 5. Crohn's Disease. 6. Cis and Trans Golgi Network (CGN/ TGN). 7. Role of COPI and COPII in vesicular transport. 8. Structure of Golgi Apparatus 9. Structure of ER. 10. Structure of Lysosome. <p>C. Answer the following (10 marks each)</p> <ol style="list-style-type: none"> 1. Define Cisternae, Vesicle and Vacuole. Write the mechanism of vesicular transport through 2. Mention two important models to explain vesicular transport through GERL System. Explain 3. Which part of the Golgi network is responsible in protein sorting? Why protein sorting is ne

<p>Unit 3: Cytoplasmic Organelles II</p>	<p>1. What is endosymbiotic theory? How do mitochondria support the Endosymbiotic theory? Explain chemiosmotic hypothesis for ATP synthesis. Which portion of aerobic respiration results in the greatest amount of ATP production? Explain the process.</p> <p>2. What is mt-DNA? Why mitochondria are called semiautonomous? Explain the allosteric regulations of citric acid cycle.</p> <p>3. Explain the structure of peroxisomes. Also state its functions.</p> <p>4. What is Centromeres? Write a note on centromeric DNA. State the role of kinetochore in cell division.</p> <p>5. What is non shivering thermogenesis? Explain the structure of ATP synthase.</p>
<p>Unit 4: Cytoskeleton</p>	<p>1. What are cyclins? Why are they named so? Describe the role of G1-S checkpoint in cell cycle regulation. What is Go stage? Comment on its significance. What are proto-oncogenes? Under what condition they become oncogenes?</p> <p>2. What is a protofilament in microtubule? What is the difference between G-actin and F-actin? Name two motor proteins associated with microtubules.</p> <p>3. Describe how Kinesin interact with microtubules. What is the main component of intermediate filament? Mention its function</p>
<p>Unit 5: Nucleus</p>	<p>1. Mention the structure of Nuclear Pore. Distinguish between Euchromatin and Heterochromatin. Define NOR and its significance. What are the different components of nucleolus</p>
<p>Unit 6: Cell Cycle</p>	<p>1. How APC/C triggers separation of sister chromatids during mitosis? Describe the mechanism of formation and action of MPF. Does a somatic cell that has just completed the S phase of its cell cycle compare in respect to its number of chromosomes and amount of DNA with a gamete of the same species?</p> <p>2. How is apoptosis different from necrosis? Describe the intrinsic pathway of apoptosis. Mention the significance of apoptosis. Name one anti-apoptotic and one pro-apoptotic protein of BCL2 family.</p>
<p>Unit 7: Cell Signaling</p>	<p>1. Describe MAPK activation via RTK mediating signalling. Illustrate the role of SOCS in JAK-STAT signalling. Give example of an ion-channel receptor and an intracellular receptor. What is paracrine and endocrine signalling?</p>

UG HONS. QUESTION BANK		
UG SEMESTER 4		
PAPER	TOPIC	SUGGESTED QUESTIONS
CC-4-8-TH Comparative anatomy & Vertebrates	Unit 1: Integumentary System	Draw and describe the structure of a typical amphibian integument.
	Unit 2: Digestive system	<ol style="list-style-type: none"> 1. What are the different digestive enzymes of a monogastric animal with their sources? Describe the structure of a ruminant stomach. What is the function of gizzard in Crocodiles ? 2. What is the function of proventriculus in Birds ? What are the different kinds of oral glands present in a vertebrate? What are pseudo-ruminants? Describe the process of rumination. 3. What does dentition in Mammals mean? ? Write down the dental formula of man and mouse. What are the different kinds of tissues found in a teeth? What are Carnassial teeth? Differentiate teeth on the basis of their mode of attachment. 4. Describe the typical structure of a mammalian tooth. 5. Write down the histological structure of a true ruminant stomach. 6. Describe the comparative anatomy of stomach of <i>Bos</i> and camel. 7. Differentiate between Thecodont and Pleurodont. What is brachydont condition? Classify the cheek teeth based on the cusp pattern.
	Unit 3: Respiratory System	<ol style="list-style-type: none"> 1. State the difference with diagram between the respiratory system of Cartilaginous fish and bony fish. 2. What are the modifications (accessory respiratory system) in fish respiratory system? 3. Draw and explain the structure of an avian lung including air sac. What are the roles of different air sac in bird? 4. What are the modifications taken places in mammals' lung for breathing in air. Also draw the diagram. 5. Compare the general differences between the respiratory organs among fish, bird, mammals.
	Unit 4: Circulatory System	<ol style="list-style-type: none"> 1. Compare the structure of heart of <i>Scoliodon</i> with that of <i>Rana</i> sp. with respective diagrams. Where are Bulbous aorta and Truncus arteriosus situated? 2. What is Foramen of Panizza? State briefly the trend of evolution of aortic arches in vertebrates. Describe with the suitable diagrams the changes of cardiac blood flow pattern in crocodile when it dives.
	Unit 5: Urinogenital System	<ol style="list-style-type: none"> 1. (a) Elaborate your idea on the disparity between the 'tripartite concept' and the 'holonephric concept' of kidney development in vertebrates. (b) 'Metanephric kidney of amniotes differ from anamniotes in being of dual origin'- Justify it. (c) Make a brief comparison between external glomerulus and internal glomerulus.

		<p>2. (a) What is meant by ‘pronephros’? Distinguish between pronephros and mesonephros. (b) Comment on the occurrence of pronephros in vertebrates. Make an illustrative description of pronephric kidney in amphibian tadpole larva.</p> <p>3. (a) Distinguish between mesonephros and opisthonephros. (b) Make a comparative account of opisthonephros in cyclostomes, fish and amphibia.</p> <p>4. (a) Comment on ‘Head Kidney’ and ‘Sexual Kidney’. (b) Describe various characteristics of mesonephros found in the embryos of amniotes.</p> <p>5. (a) Briefly describe the development of metanephric kidney in amniotes. (b) ‘Mesonephros still persists in adult amniotes’ – Justify the statement. (c) What do you mean by ‘renal cyst’ ?</p> <p>6. (a) Describe the basic architectural pattern of vertebrate kidney. Does this basic structure exist in extant vertebrates? (b) Make a labelled diagram of a mammalian kidney. Describe various parts of it.</p> <p>7. (a) Describe various modifications of mesonephric duct in both sexes of vertebrates. (b) What are trunk kidney and tail kidney? What is Wolffian duct?</p> <p>8. (a) Make a comparative account of metanephric kidneys in reptiles, birds & mammals. (b) Distinguish between cortical nephron and juxtamedullary nephron.</p> <p>9. (a) Comment on the Müllerian duct remnants in adult male vertebrates. (b) Trace out an embryonic link between mesonephros and adult reproductive structures in vertebrates. (c) Name the male and female reproductive structures in mammals that are homologous to embryonic mesonephric duct.</p>
	<p>Unit 6: Nervous system and sense organs</p>	<p>1. Give a comparative account of the structure of cerebrum of Chondrichthyes (Shark) Osteichthyes (Salmon), amphibia (<i>Bufo</i> sp.), reptiles (<i>Naja</i> sp.), aves (<i>Columba</i> sp.) and mammal (<i>Cavia</i> sp.)</p> <p>2. Give a comparative account of the structure of cerebellum of Chondrichthyes (Shark) Osteichthyes (Salmon), amphibia (<i>Bufo</i> sp.), reptiles (<i>Naja</i> sp.), aves <i>Columba</i> sp.) and mammal (<i>Cavia</i> sp.)</p> <p>3. What are the distinctive features of the sympathetic division of the vertebrate autonomic nervous system?</p> <p>4. Elucidate the functional anatomy of cerebrum in mammals.</p> <p>5. Distinguish between: a) Pallium and Neopallium b) Foramen of magnum and Foramen of Monro c) Corpus callosum and corpus striatum d) Nuchal Flexure and Pontine Flexure e) Sensory and Motor nerves</p> <p>6. Write about functional modifications of cerebellum in vertebrates.</p>
	<p>Unit 7: Skeletal system</p>	<p>Give an account on the diastylic jaw suspension in vertebrates. What is foramen triossum? Mention the significance of coracoscapular angle in Birds</p>

<p>CC-4-9-TH</p> <p>Animal Physiology: Life sustaining systems</p>	<p>Unit 1: Physiology of Digestion</p>	<p>1. Explain the anatomical features of Gastrointestinal tract with the help of a diagram. State its functions. Write down the source, functions, one inhibiting factor and one stimulating factor of the following Gastrointestinal hormones:</p> <ul style="list-style-type: none"> • Gastrin • Secretin • Cholecystokinin-Pancreozymin <p>2. What is chyme? Write on digestive mechanism in small intestine. Describe the process of deglutition. Write on two hormones affecting stomach emptying.</p> <p>3. What is peristaltic rush? What is function of ileocecal valve? What is the function of motilin?</p> <p>4. What is haustration? Write on importance of mass movement in colon. Describe the basic mechanism of HCl secretion in the stomach. What is the function of crypts of Lieberkün? Mention the role of oxyntic cell and goblet cell.</p> <p>5. Describe the process of protein digestion. What is folds of Kerckring? How Na and Cl are absorbed in the small intestine?</p> <p>6. What is meant by emulsification of fat? Describe the fat absorption in our body. 'Carbohydrate digestion starts in oral cavity and ends in intestine'- explain. What is enterohepatic circulation of bile salts?</p> <p>7</p> <ol style="list-style-type: none"> 1). Mention the purpose of digestion. 2. What is tembolok? What is its function? 3. Differentiate between proventriculus and ventriculus. 4. Name the chambers of a ruminant stomach. 5. Differentiate between monogastric and ruminant animals. 6. What do you mean by diastema? 7. Mention the type of dentition found in human. 8. What do you mean by heterodont and thecodont dentition? 9. What do you mean by dental formula? 10. What do you mean by cranioventral sac? 11. Define dentition. 12. Name the mammals where teeth are absent. 13. What do you mean by lophodont teeth? Where does it found? 14. Write the dental formula of Guinea pig. <p>B. Write short notes on (5 marks each)</p> <ol style="list-style-type: none"> 1. Ruminant stomach. 2. Structure of mammalian tooth. 3. Cusp pattern of mammalian teeth. 4. Dentition pattern in herbivorous mammals. 5. Unusual teeth of mammals. 6. Concrescence theory of Kükenthal and Rose. 7. Differentiation theory of Cope and Osborn. <p>C. Answer the following (10 marks each)</p> <ol style="list-style-type: none"> 1. What do you mean by monogastric animals? Write the structure of the stomach of a monogastric animal. Define thecodont, heterodont and diphyodont dentition.
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		<p>2. What do you mean by pseudoruminants? Where does it found? Explain the structure and mechanism of digestion of ruminant stomach.</p> <p>3. Where from the mammalian teeth originated? Write the structure of a mammalian tooth with proper diagram. Write a short note on dental modification of aquatic mammals.</p>
	Unit 2: Physiology of Respiration	<p>1. Describe the structure of hemoglobin. Describe the effects of increased PCO₂, H⁺, and 2,3-bisphosphoglycerate on the oxygen hemoglobin dissociation curve. Under what conditions does an increase in DPG occur?</p> <p>2. Draw an oxygen-hemoglobin dissociation curve. Put in the points that represent systemic venous and systemic arterial blood (ignore the rightward shift of the curve in systemic venous blood). What is the adaptive importance of the plateau?</p> <p>3. Draw figures showing the reactions of carbon dioxide entering the blood in the tissue capillaries and leaving the blood in the alveoli. What fractions are contributed by dissolved carbon dioxide, bicarbonate, and carbamino compounds?</p> <p>4. What generates the diffusion gradients for oxygen and carbon dioxide in the tissues? What is chloride shift and Haldane effect? Explain the term “respiratory acidosis”. Write the steps of acclimatization to the hypoxia of high altitude.</p>
	Unit 3: Physiology of Circulation	<p>1. What are the characteristics of Bombay Blood Group? What do you mean by haematopoietic stem cells (HSC)? Distinguish between red marrow and yellow marrow. Explain the occurrence of erythroblastosis foetalis with regard to Rh factor incompatibility.</p> <p>2. Explain the different stages process of erythropoiesis with a suitable diagram. State briefly the role of erythropoietin in this respect. Describe briefly the processing of haemoglobin within the RE cells.</p> <p>3. What do you mean by thrombocytopenia? Schematically explain the extrinsic pathway of blood coagulation. What is the difference between HbF and HbA₂? State the adaptive significance of sickle cell trait.</p>
	Unit 4: Physiology of Heart	<p>Define cardiac output. State the basic principle of measuring cardiac output. Describe cardiac function curve. Discuss the characteristics of coronary blood flow.</p>
	Unit 5: Thermoregul ation & Osmoregulat ion	<p>1. Polar bears (<i>Ursus maritimus</i>) regulate their body temperatures both physiologically and behaviourally proportional to their level of activity – Justify this statement.</p> <p>2. Mention the main adaptive features of Polar bear to maintain its thermoregulations.</p> <p>3. The polar bear has developed thermoregulatory mechanism consistent with its semiaquatic way of life.-Justify. Explain briefly the insulation and heat dissipation system of polar bear during extreme weather condition.</p>

		<p>4. What do you mean by water turn overrate? Explain briefly how Camel has adapted the mechanisms that allow it to withstand prolonged water deprivation, high heat load especially in extreme environment.</p> <p>5. What do you mean by selective Brain cooling? Tabulate the anatomical adaptation of camel with special reference to skin, eye, nostril, lip and foot pad. Mention the unique features of camels blood in relation to its thermoregulation.</p>
	Unit 6: Renal Physiology	<p>1. What are the different stages of Urine formation? What do you mean by Glomerular filtrate? Explain briefly the counter current mechanism that takes place during urine formation. Mention the role of different hormones in maintaining water balance</p> <p>2. Comment on Tubular Reabsorption and secretion process. The Loop of Henle act as counter current multiplier-Justify the statement? What do you mean by tubulo glomerular feedback? Mention the importance of Angiotensin II in maintaining Homeostasis process</p>
CC-4-10-TH Immunology	Unit 1: Overview of Immune System	<p>1.a) What happens when an Immunoglobulin is digested with papain?</p> <p>b) Trace the origin and development of B lymphocytes.</p> <p>c) Explain the clonal selection theory of antibody specificity and diversity.</p> <p>2.a) What are the differences between immunization used for prophylaxis and that used for treatment?</p> <p>b) Describe the nonspecific defenses that operate when a disease-producing microorganism first enters the body.</p>
	Unit 2: Innate and Adaptive Immunity	<p>1.a) List four attributes of adaptive immunity and briefly explain how they arise.</p> <p>b) Name three features of a secondary immune response that distinguish it from a primary immune response.</p> <p>c) What are the two primary roles of the thymus?</p> <p>2.a) Briefly Describe the activation process of NK cells.</p> <p>b) Give an account of the cells involved in immune system of vertebrates.</p> <p>c) Spleen Combines innate and adaptive immunity---explain.</p> <p>3.a) Describe the structure of circulating dendritic cells.</p> <p>b) Innate and adaptive immunity act in cooperative ways—explain.</p> <p>c) What will be the effect of bursectomy in chicks?</p> <p>4.a) Explain the difference between a monocyte and a macrophage</p> <p>b) List two primary and two secondary lymphoid organs and summarize their functions in the immune response.</p> <p>5.a). Write short notes on (any four) :</p> <p>a) Rheumatoid arthritis</p> <p>b) CALT</p> <p>c) Immunoglobulin Superfamily</p> <p>d) Peyer's Patch</p> <p>e) Erythroblastosis Fetalis.</p> <p>f) Herd immunity</p> <p>g) Sabin polio vaccine</p>

	<p>Unit 3: Antigens Unit 4: Immunoglobulins Unit 5: Major Histocompatibility Complex Unit 6: Cytokines</p>	<p>1a) What do you mean by antibody affinity and avidity? b) Differentiate between isotypic, allotypic and idiotypic determinants of immunoglobulins. c) Describe the structure of an immunoglobulin monomer with suitable diagram.</p> <p>a) What is cytokine pleiotropism? Explain with example. b) Write a note on Freund's complete adjuvant. c) Describe positive and negative selection in T cell production.</p> <p>3a) Differentiate between i) polyclonal and monoclonal antibodies, ii) MHC I and MHC II. b) Describe the endocytic pathway of antigen processing and presentation. c) Write a short note on T cell receptor complex.</p> <p>4. Write short notes on the following: a) Immunoproteasome b) Radio-immuno assay (RIA) c) Hapten d) Affinity maturation</p> <p>5a) "All immunogens are antigens but all antigens are not immunogens." – Explain. b) Describe the cytosolic pathway of antigen processing and presentation. c) What is TAP? What will happen if TAP coding gene undergoes loss-of-function mutation in an APC population? Give reasons in support of your answer.</p>
	<p>Unit 7: Complement System</p>	<p>1. What is complement system? What are the cells involved in the synthesis of the proteins of complement system. Describe the classical pathway of complementary system with diagram. Differentiate between alternative and Lectin pathway?</p> <p>2. Differentiate between the three types of complement pathways. Write about the various types of Complement receptors by mentioning their major ligands, function and cellular distribution. What is Cascade reaction?</p> <p>3. Define complement system. Why IgM molecules flowing in the blood can't activate complement? Mention the functions of complement system.</p> <p>4. How C1q is unique among the C proteins? Indicate the structural and functional association of C1r and C1s molecules with C1q. Name the substances that initiate the three complement pathways.</p> <p>5. Describe the events of the late stage common to both the classical and alternative pathways. Why does the MBL pathway get activated separately from the alternative pathway? Mention the role of the following-</p> <p>a) Factor H b) RCA protein c) S protein d) Factor B</p>

		6. Write down the formation of Membrane-attack complex. What are the main stages of complement activation? Write down the effector functions of complement?
	Unit 9: Hypersensitivity	1.a) Define hypersensitivity? b) State the Gel and Coomb classification for hypersensitive reaction c) Describe the phases of delayed type hypersensitivity with example.
	Unit 9: Vaccines	1.What are the advantages and disadvantages of a killed vaccine; a live attenuated vaccine, a subunit vaccine; a recombinant vaccine and a DNA vaccine? 2. a) Distinguish between active and passive immunization. b) By what means are microorganisms attenuated? c) Explain the relationship between the incubation period of a pathogen and the approach needed to achieve effective active immunization.
SEC-B	Aquarium Fishery	<ol style="list-style-type: none"> 1. Why keeping of aquarium fishes has become as choiceful habit of man? Mention the adaptive criteria for which the aquarium fishes are not cultured in ponds . Give a list of preferred aquarium fish species 2. Write what are the basic needs for an aquarium. Write names of the aquatic plants and animals for the aquarium. Why glass siphon net, aerator, feeding tube, aquarium heaters and thermostats, fitters are essential to maintain aquarium fishes? 3. Discuss the general characters and several dimorphism of aquarium fishes viz. Guppy, Molly, Sword tail, Gold fish, Angel fish, with suitable diagrams. 4. Write a short note on behaviour of breeding and courtship of aquarium fishes. What is breeding trap and discuss the advantages of breeding traps for breeding and hatching of eggs of aquarium fishes. Give necessary diagrams. 5. Give name of line aquarium fish feed organisms. How those are maintained and supplied to aquarium fishes? Discuss on preparation and composition formulated fish feeds.