ZOOLOGY PART-I (GENERAL)

(THIS SUBJECT HAS STARTED IN THIS COLLEGE FROM THE YEAR 2017)

GROUP- A (Course No ZG-01) Functional Anatomy of Non chordates

1. Classification with distinctive features and suitable examples of sub-kingdom Protozoa (up to phylum) (Levine *et.al*) and phylum Porifera, Cnidaria, Platyhelminthes, Annelida, Arthropoda, Mollusca and Echinodermata (up to class):

- *Amoeba* is included under phylum Sarcomastigophora. 2
- Nereis is an Annelid. 2
- Mosquito is an Insect. 2
- *Asterias* ia an Asterozoan animal. 2
- *Pila* is a Gastropod. 2
- *Sycon* belongs to phylum Porifera. 2
- *Hydra* is a hydrozoans animal. 2
- Silver fish is an Insect. 2
- *Taenia* is a Platyhelminth. 2
- Chiton belongs to phylum Mollusca. 2
- Sea lily belongs to phylum Echinodermata. 2
- Honey bee is an Insect. 2
- Sea cucumber is a Holothuroid. 2

2.General structure and function of the following with reference of the specimen mentioned:

a) Locomotion- Micro fibrils(*Amoeba*), Cilia(*Paramoecium*) .

A) What are micro fibrils? State its role in locomotion in Amoeba. Give an illustrated account of the ultra structure of cilium in *Paramoecium.* (2+3+5)

B) Discuss the process of metachronal rhythm of cilia during the locomotion of *Paramoecium.*. Describe the structure of micro fibrils in *Amoeba.* (5+5)

b) Feeding and digestion-Microphagy (*Amoeba*), Macrophagy (*Periplanata*).

A) Discuss the mechanism of feeding and digestion in *Amoeba.* Discuss circumvallation and circumfluence mode of food capture in *Amoeba.* (4+6)

B) What is Macrophagy? Describe the structure of gizzard and the process of digestion in Cockroach. Differentiate between microphagy and macrophagy. Name the mouth parts of Cockroach. (2+4+2+2)

C) What are macrophagus and microphagus animal? Mention the role of midgut in the digestion of Cockroach. What is permeation? (4+4+2)

c) Respiration-Ctenidium and pulmonary sac(*Pila*), Gills (Pawn), Trachea(Cockroach).

A) Describe briefly the respiratory mechanism of *pila* with proper diagram. Draw and describe the structure of atypical gill of pawn. (5+5)

B) Name the different types of gills in pawn. Mention the respiratory organs in *pila*. Drawn and describe the structure of aquatic respiratory organ of *Pila*. (3+2+5)

d) Excretion-Nephridia(Earth worm):

A) What is Nephridium? Name the different types of nephridia found in earth worm. Describe the structure of septal nephridia of earth worm with labeled diagram and mention their position. (2+2+6)

B) Mention the segmental position and characteristic features of pharyngeal nephridia in earth worm. Write the name of main excretory product of earth worm. (2+3)

e) Circulation-Open circulation(Cockroach), closed circulation(Earth worm):

A) Describe the closed blood vascular system of earth worm. Draw and describe the circulatory system of Cockroach. (5+5)

B) Write the differences between open and closed circulatory system with examples. Describe the different types of pulsatile vessels or hearts found in the circulatory system of earthworm and mention their role in circulation. (3+7)

f) Nervous system-Cockroach ,Apple snail

A) Describe briefly the nervous system of *Pila* with labeled diagram. State the difference between Connective and Commissure. (6+4)

B) With the help of labeled diagram describe the nervous system of Cockroach. (5)

g) Reproduction:

A) Draw and describe briefly the process of conjugation in *Paramoecium.*. Draw and describe the process of budding in *Hydra*. (6+4)

B) What is Metagenesis? Explain the phenomenon with reference to life cycle of *Obelia*. What is budding? What do you mean by ex-conjugant? (2+4+2+2)

GROUP -B (Course No ZG-02) Cell Biology, Genetics and Molecular Biology

1.Fluid mosaic model of plasma membrane:

A) Describe the fluid mosaic membrane of plasma membrane with the help of proper diagram. How does it differ from unit membrane model? (7+3)

B)Mention four functions of plasma membrane. What do you mean by glycocalyx? Define active and passive transport. (4+2+4)

2.Cell cycle check points:

A)What is metastasis? What is the significance of 'S' phase in cell cycle? Write about the characteristic features of cancerous cell. What is Retrovirus? (2+3+3+2)

B)Distinguish between carcinoma and sarcoma. What is cell cycle? Name the different phages of cell cycle. Write the difference between malignant tumor and benign tumor. (3+2+3+2)

3.Physio chemical properties, types, structures and functions of DNA & RNA:

A)Differentiate between DNA and RNA. Describe the structure of a nucleosome with proper diagram. Mention the properties of RNA and DNA. (3+4+3)

B)What do you mean by nucleolar organizer? Mention the main properties of DNA. Discuss the molecular structure of DNA according to the model of Watson and Crick. (2+3+5)

C) Classify chromosome on the basis of position of centromere. What do you mean by core particle and linker DNA of a nucleosome? Describe with labeled diagram the t-RNA structure according to clover leaf model. (3+2+5)

D) Difference between euchromatin and heterochromatin. Difference between nucleotide and nucleotide. Difference between A, B, & Z DNA. What do you mean by melting temperature? Mention the functions of m-RNA. (2+2+3+1+2)

4. DNA as a genetic material explanation with experiment:

A) Prove that DNA is the genetic material with the help of Avery et. al experiment. Explain the experiment of Harsey and Chase. (7+3)

5.Mechanism of Replication, transcription and translation.

A) Prove that DNA replication is semi conservative. What do you mean by genetic code? What is central dogma? (6+2+2)

B) Define transcription. Describe the different steps of transcription. Describe the process of formation of leading strand and lagging strand during DNA replication. (2+5+3)

C) Mentions the functions of different enzyme involve in DNA replication. Define leading and lagging strand in DNA replication. What is okazaki fragment? What do you mean by replication bubble? (4+2+2+2)

D)Mention the difference between conservative , semi conservative and dispersive mode of DNA replication. Describe initiation and elongation phase of *E.Coli* translation. (4+6)

6. Linkage and Recombination:

A) Distinguish between complete and incomplete linkage. What is significance of recombination? What is linkage group? Mention the number of linkage groups in Human and *Drosophila*. (4+2+2+2)

B) What do you mean by linkage theory? Explain incomplete linkage with suitable diagram. Mention the relationship between linkage and crossing over. (3+4+3)

7.Modes of inheritance of autosomal and sex linked genes **in man(Thalassemia and Hemophilia, color blindness.):**

A) What is color blindness? Show the inheritance of color blindness in human. Name two sex linked genes in man. (2+5+3)

B) What is Thalassemia ? Discuss different types of Thalassemia . Describe the genetic cause of hemophilia. (2+4+4)

C) What is hemophilia? How many types of hemophilia are found in man? Mention genetic cause of hemophilia. (2+3+5)

D) Describe the mode of inheritance of any one X-linked recessive gene in man. What will be the pattern of inheritance of hemophilia in the next generation if a normal healthy male marries with a hemophilia carrier female? (4+6)

8.Sex determination in *Drosophila* (Genic balance theory):

A) Describe the process of sex determination in *Drosophila*. What is genic balance theory? What do you mean by sex determination? (6+2+3)

B) Write the role of autosome on sex determination of *Drosophila*. (6)

GROUP-C (Course No. ZG-03) Developmental Biology

1. Spermatogenesis and Oogenesis.

A) What is spermatogenesis? Draw and describe the process of spermatogenesis .Write down the difference between spermatogenesis and oogenesis. (2+4+4)

B) Describe the process of spermiogenesis with suitable diagram. Mention the nuclear changes observed during oogenesis. (5+5)

C) What is spermateleosis? Draw and describe the ultra structure of a mammalian sperm. What is oogenesis? Describe the phase of maturation of ovam. (2+3+2+3)

D) State the significance of oogenesis. What is gametogenesis? Write the location and function of sertoli cell. What is germinal vesicle? Where spermatogenesis and oogenesis takes place? (2+2+2+2+2)

E) What is dictyotene stage? Define vitellogenesis. Describe the hormonal control of spermatogenesis with suitable diagram. (2+3+5)

2. Fertilization in Sea urchin.

A) Describe the cortical reaction with diagram. Define fertilization. What is fertilization cone? (6+2+2)

B)Discuss the process of Fast block to Polyspermy in Sea urchin What is acrosome? How is it formed? (3+2+5)

C) What is polyspermy? Discuss the role of acrosome in fertilization. What is Amphimixis? State the significance of fertilization. (2+3+2+3)

3. Types of eggs and cleavage : process of cleavage in Amphioxus:

A) Classify eggs on the basis of amount and distribution of yolk and give example. Define cleavage. Mention the different planes of cleavage. (4+2+4)

B) Mention the characteristics of cleavage. What is holoblastis equal cleavage? What is bilateral cleavage? What is meroblastic discoidal cleavage? (3+2+2+3)

C) Describe the process of cleavage in Amphioxus. What is determinate and indeterminate cleavage? Define centrolecithal egg? Give example. (4+4+2)

4. Gastrulation in Amphioxus.

A) Define gastrulation. Describe the process of gsatrulation in Amphioxus with labeled diagram.

(2+8)

5. Extra embryonic membranes in Chick.

A) Describe briefly the process of formation of amnion and chorion in chick. What is somatopleure and splanchnopleure? (8+2)

B) Name the different extra embryonic membranes in chick and their functions. Describe the process of yolk sac formation in chick embryo. Mention the functions of allantois. (4+4+2)

C) What do you mean by splanchnic mesoderm? What is extra embryonic coelom? Mention the functions of amniotic fluid. Write the functions of yolk sac. (2+2+2+4)

6. Placenta types and formation:

A) Define placenta. What is choriovitelline placenta? give example. Classify with examples placenta on the basis of degree of involvement of fetal and maternal tissues. (2+2+6)

B) What is cotyledonary placenta? Write the functions of placenta. What is deciduas placenta? What is histotroph? (2+4+2+2)