SYLLABUS

Life and Diversity from Annelida to Arthropoda & Genetics - I

External Marks: 40
Internal Assessment : 10 **Time allotted : 3 Hours**

Note : Nine questions are to be set in all and the candidate are required to attempt five questions including compulsory question.

1. Question 1 is compulsory consisting of 10 parts (1.0 marks each) converting the entire syllabus. Answer to each part should not exceed 20 words.
2. Out of remaining eight, four questions are to be set from each section A & B, possibly splitting them in parts. Candidates is required to attempt four questions, two from each section

1. Phylum – Annelida :

i) General characters and classification up to order level
ii) Biodiversity and economic importance of Annelida
iii) Type study – *Pheretima* (Earthworm)
vi) Metamerism in Annelida
v) Trochophore larva

2. Phylum – Arthropoda :

i) General characters and classification up to order level
ii) Biodiversity and economic importance of insects
vi) Type study – *Grasshopper*

3. Elements of **Heredity and variations.**

4. The varieties of **gene interactions**

5. **Linkage and recombination :** Coupling and repulsion hypothesis, crossing-over and chiasma formation; gene mapping.

6. **Sex determination and its mechanism :** male and female heterozygous systems, genetic balance system; role of Y-chromosome, male haploidy, cytoplasmic and environmental factors, role of hormones in sex determination.

7. **Sex linked inheritance :** Haemophilia and colour blindness in man, eye colour in Drosophila, Non-disjunction of sex-chromosome in Drosophila; Sex-linked and sex-influenced inheritance

8. Extra chromocomal and cytoplasmic inheritance:

i) Kappa particles in Paramecium
ii) Shell coiling in snails.
iii) Milk factor in mice.

SYLLABUS

Life and Diversity from Mollusca to Hemichordata & Genetics – II

External Marks: 40
Internal Assessment : 10 **Time allotted : 3 Hours**

Note : Nine questions are to be set in all and the candidate are required to attempt five questions including compulsory question.

1. Question 1 is compulsory consisting of 10 parts (1.0 marks each) converting the entire syllabus. Answer to each part should not exceed 20 words.
2. Out of remaining eight, four questions are to be set from each section A & B, possibly splitting them in parts. Candidates is required to attempt four questions, two from each section

1. Phylum - Mollusca:

i) General characters and classification up to order level
ii) Biodiversity and economic importance
iii) Type study of - *Pila*
iv) Torsion and detorsion in gastropoda
v) Respiration and foot

2. Phylum – Enchinodermata :

i) General characters and classification up to order level
ii) Biodiversity and economic importance
vii) Type study – *Asteries* (Sea Star)
viii) Echinoderm larvae
ix) Aristotle's Lantern

3. **Phylum Hemichordate :** General Character; Type Study of Ballanglosus

3. **Multiple alleslism :** Eye colour in Drosophila; A, B, O blood group in man.
4. **Human genetics :** Human karyotype, Chromosomal abnormalities involving autosomes and sex chromosomes, monozygotic and dizygotic twins.
5. **Inborn errors of metabolism** (Alcaptonuria, Phenylketonuria, Albinism, sickle-cell anaemia).
6. **Nature and function of genetic material :** Structure and type of nucleic acids; Protein synthesis.
7. Eugenics, euthenics and euphenics; spontaneous and induced (chemical and radiations) mutations; gene mutations; chemical basis of mutations; transition, transversion, structural chromosomal aberrations (deletion, duplication, inversion and translocation); Numerical aberrations (autoploidy, euploidy and polyploidy in animals)
8. **Applied genetics :** genetic counseling, pre-natal diagnostics, DNA-finger printing, transgenic animals.

B.SC. (SEMESTER I & II) PAPER –III (PRACTICAL)

Max. Marks: 100 Time allowed: 6 Hours
(2 Sessions M&E)

(A) Classification up to orders with ecological note and economic importance of the following animals:

1. Protozoa — Lamination of cultures of *Amoeba, Euglena* and *Parmecium;* permanent prepared slides: *Amoeba, Euglena, Trypanosoma, Noctiluca, Eimeria, Paramecium* (binary fission and conjugation), *Opalina, Verticella, Balantidium, Nyctotherus,* radiolarian and formaniferan ooze.
2. Parazoa (Porifera) — Specimens: *Sycon, Grantia, Euplectela, Hyalonema, Spongilla, Euspongia*
3. Coelenterata — Specimens: *Porpita, Valella, Physalia, Aurelia, Rhyzostoma, Metridium, Millipora, Alcyonium, Tubipora, Zoanthus, Madrepora, Favia, Fungia,* and *Astrea.* Permanent prepared slides: *Hydra* (W.M.), *Hydra* with buds, *Obelia* (colony and medusa), *Sertularia, Plumularia, Tubularia, Bougainvillea, Aurelia* (sense organs and stages of life history).
4. Playhelminthes — Specimens: *Dugesia, Fasciola, Taenia, Echinococus.* Permanent prepared slides: *Miracidium, sporocyst, redia, cercaria, scolex* and *proglotttids of Taenia* (mature and gravid).
5. Aschelminthes — *Ascaris* (male and female), *Trichinella, Ancylostoma, Meloidogyne*
6. Annelida — Specimens : *Pheretima, Heteronereis, Polynoe, Aphrodite, Chaetopterus, Arenicola, Tubifex* and *Pontobdella*
7. Arthropoda — Specimens : *Peripatus, Palaemon* (Prawn), *Lobster, Cancer* (crab), *Sacculina, Eupagurus* (hermit crab), *Lepas, Balanus,Cyclops, Daphnia, Lepisma, Periplaneta* (cockroach), *Schistocerca* (locust), *Poecilocerus* (ak-hopper), *Gryllus* (cricket), *Mantis* (praying mantis), *Cicada, Forticula* (earwig), Dragon fly, termite queen, bug, moth, beetle, *Polistes* (wasp), *Apis* (honey bee), *Bombyx* (silk moth), *Cimex* (beg bug), *Pediculus* (body louse), *Millipedes, Scolopendra* (centipedes), *Palamnaeus* (scorpion), *Aranea* (spider), *Limulus* (king crab)
8. Mollusca — Specimens: *Mytilus, Ostrea, Cardium, Pholas, Solen* (razor Fish), *Pecten, Holiotis, Patella, Aplysia, Doris, Limax, Loligo, Sepia, Octopus, Nautilus* (complete and T.S.), *Chiton* and *Dentalium*
9. Echinodermata — Specimens: *Asterias, Echinus, Cucumara, Ophiothrix, Antedon a*nd *Asterophyton*
10. Hemichordata — *Balanglossus*

(B) Study of the following permanent stained preparations:

1. L.S. and T.S. *Sycon;* gemmules, spicules and sponging fibres of *Sycon,* canal system of sponges
2. T.S. *Hydra* (testis and ovary region)
3. T.S. *Fasciola* (different regions)
4. T.S. *Ascaris* (male and female)
5. T.S. *Pheretima* (pharyngeal and typhlosolar regions), Setae, septal nephridia and spermathecae of *Pheretima.*
6. Trachea and mouthparts of cockroach.
7. Statocyst of *Palaemon.*
8. Glochidium larva of *Anodonta;* radula and osphradium of *Pila.*
9. T.S. Star fish (arm).

10. T.S. *Balanoglossus* (through various regions).

(C) Preparation of the following slides:

1. Temporary preparation of *Volvos, Paramecium,* Gemmules and spicules of *Sycon;*
   mouth parts and trachea of *Periplanata* (cockroach).
2. Preparation of permanent stained whole mounts of *Hydra, Obelia, Sertularia, Plumularia* and *Bougainvillea.*
3. Preparation of mouth parts of Mosquito, House fly and cockroach.

(D) Study of Internal Anatomy

1. Computer, simulated study/ model of :
   (i) *Earthworm* : Digestive, reproductive and nervous systems
   (ii) *Pila* : Pallial complex, digestive and nervous system
2. Demonstration of internal anatomy of cockroach : Digestive, reproductive and nervous systems

(E) Cell biology and Genetics:

1. Cell division : Prepared slides of stages of mitosis and meiosis.
2. Salivary gland and polytene chromosomes of Drosophila/ Chironomus.
3. Temporary squash preparations of onion root tip / grasshopper testis for the study of mitosis using acetocarmine stain.