

NORTH MAHARASHTRA UNIVERSITY, JALGAON

Syllabus of S.Y.B.Sc.

Subject :- Zoology from June, 1993.

Paper - I : Section - I : Non-chordates II & Chordates II

*Study of Starfish W.R.T. the following :-

1. Systematic position, ii) Habitat, iii) External Characters- shape, size colour, oral - aboral surface, pedicellariae, iv) Internal Organisation - body wall, skeleton, coelom, & coelomic corpuscles, v) Functional Anatomy - a) Digestive system, food and feeding habits, organs of nutrition, process of digestion and absorption, b) Water vascular system and locomotion, c) Haemal system, d) Respiration, e) Excretion, f) Nervous system oral, aboral and hyponural, g) Sense organs, - neuro sensory cells, eyes, organs of equilibrium, h) Reproductive system and Gonads, Ovulation, fertilization, larval forms symmetry, i) Regeneration and anatomy,

14 Lect.

*Study of Scoliodon W.R.T. the following :-

- 1) Systematic position, 2) Habit and Economic importance
- 3 External characters, 4) Skin.- Histology & derivatives.
- 5) Internal organisation - a) General viscera & coelom b) Digestive system, food and feeding habits, digestion and absorption.
- c) Respiratory system, d) Blood vascular system,
- e) Nervous system - Central and peripheral (Details of cranial nerves to be omitted)
- f) Sense organs, g) Urinogenital system - organs, Copulation and Vivipary.

16 periods

* Classification :-

Study of the General and Distinguishing characters and examples of the following Phyla and respective classes -

- 1) Protozoa - Rhizopoda, Mastigophora, Ciliata, Sporozoa,
- 2) Porifera - Calcarea, Hexactinellida, Demospongia.
- 3) Coelenterata - Hydrozoa, Scyphozoa, Anthozoa, Ctenophora.
- 4) Platyhelminthes - Turbellaria, Trematoda, Cestoda.
- 5) Aschelminthes.
- 6) Annelida - Chaetopoda, Hirudinia.
- 7) Arthropoda - Crustacea, Insecta, Myriapods, Arachnida, Onychophora.
- 8) Mollusca - Scaphopoda, Placophora, Gastropoda, Pelecypoda,

- 9) Echinodermata - Asterozoa, Ophiurozoa, Echinozoa, Holotherozoa, Crinozoa,
- 10) Hemichordata -
- 11) Phylum : Chordata -
 - a) Protochordata - Cephalochordata, Urochordata.
 - b) Vertebrata - Agnatha - Cyclostomata.
Gnathostomata - Pisces - Chondrichthyes.
Osteichthyes,
Amphibia - Apoda, Urodela, Anura,
Reptilia, Lacertilia, Ophidia, Crocodilia, chelonis.

S.Y.B.Sc. - Paper I : Section - I

Aves - Psittaciformes, Falconiformes, Anseriformes, Passeriformes.
Mammalia - Monotremata, Marsupialia, Insectivora, Chiroptera,
Primates, Rodentia.

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S.Y.B.Sc. - Paper I : Section II : ENVIRONMENTAL BIOLOGY

THEORY :-

- Topics :
- 1) Introduction
 - " 2) Biosphere - components as biotic and abiotic factors.
 - " 3) Ecosystem : Definition, freshwater ecosystem - pond or river ecosystem.. Niche, Species, structure & Diversity.
 - " 4) Ecological energetics : Sources of energy Conventional and Nonconventional : Energy absorption , conversion and transfer, Productivity, Ecological efficiency, food web, trophic levels and ecological pyramids,
 - " 5) Ecological regulation - Integration of abiotic and biotic components, Ecological Succession.
 - " 6) Resources : renewable and non-renewable resources.
 - " 7) Pollution : definition, types - as air pollution, thermal pollution, water pollution, sound pollution, radiation pollution.
 - " 8) Ecological Impact of Human civilisation :
 - a) Exploitation of resources
 - b) Industrialisation,
 - c) Urbanisation,
 - d) Population explosion.
 - " 9) Conservation of nature and wildlife management.

Topics : 10) Water Sewage & Electro chemistry.

S.Y.B.Sc. : PAPER - II : SECTION - I : HISTOLOGY OF MAMMALS

1. Gross histological structure of skin as revealed in vertical section. 1. 1(i) Epidermis - its various strata, (ii) Dermis - its various strata, - (iii) Epidermal derivatives - hair, sebaceous and sweat glands, Mention mammary glands, Nail, scales, hoof and horn

2. periods

2. Tooth and tongue :

2.1 Structure of tooth - vertical section, Odontoblast, dentine and enamel.

2.2 Structural components of tongue in a cross section - mucosa and muscles. The microscopic structure of mucosa, papillae and taste buds. Distribution of taste buds on human tongue.

2. periods

3. Alimentary Canal : The basic histological organisation of the alimentary canal. Variations in the structure of each layer in oesophagus, stomach, duodenum, ileum and rectum.

3 periods

4. Salivary glands : The types and positions of different salivary glands. Histological structure of parotid, sub-maxillary and sub-lingual.

1 period

5. Liver and Pancreas :

5.1 The External Morphology and gross microscopic structure. Microscopic structure of a hepatic lobule. The blood supply, sinusoids and bile canal system.

5.2 Pancreas - Cross structure. The exocrine and endocrine part. Microscopic structure of acini and islets of Langerhans. Types of cells from the islets, ultra-structure and their secretion.

3 periods

6. Lungs : Microscopic structure of trachea and lungs.

1 periods

7. Blood vessels and Blood :

7.1 Histological study of artery and vein and capillaries together with the variations in different sized vessels, vasoru

8. Spleen :

8.1 Gross structure and position.

8.2 Microscopic structure as revealed by cross section. Pulp, white pulp - their cellular components, Blood supply Functions.

2 periods

9. Kidneys.
- 9.1 Gross structure - vertical section of the organ,
 - 9.2 Structure of nephron - various regions, Histological details - cross section.
 - 9.3 Renal corpuscle - detailed structure.
 - 9.4 Blood supply.
 - 9.5 Juxta - glomerular complex with its endocrine function
- 3 periods
10. Spinal cord :
- Gross structure and cross section. Cell types and function of gray and white matter.
- 1 period
11. Testis and Ovary :
- 11.1 Testis - external structure.
 - 11.2 Gross - internal structure - vertical section.
 - 11.3 Microscopic structure as revealed in cross section, seminiferous tubules : various cells components, spermatogenic cells and their differentiating stages and structure of the sperm. Cells of Sertoli - structure and function. Leydig cells Position, structure and function
 - 11.4 Ovary - external structure.
 - 11.5 Gross internal structure - position and suspension cortex, stroma, and follicles.
 - 11.6 Developmental stages as regards their cellular structure and functions, aspect with reference to primary, secondary, mature Graafian follicle, corpus luteum, corpus albicans.
- 5 periods

S.Y.B.Sc. : Paper II Section I : Histology of Mammals

12. Pituitary, Thyroid and Adrenal :
- 12.1 General idea of endocrine system.
 - 12.2 Pituitary - position.
 - 12.3 Gross structure - Adenohypophysis and neurohypophysis.
 - 12.4 Cellular components of different zones, ultrastructure pars distalis Acidophils, basophils and chromophobe. Pars tuberalis and Pars intermedia, Pars nervosa
 - 12.5 Functions in brief.
 - 12.6 Thyroid - position.
 - 12.7 Gross structure in cross section.
 - 12.8 Cellular elements.
 - 12.9 Blood supply.
 - 12.10 Functions.
 - 12.11 Adrenal gland - position.

- 12.12 Gross structure - cortex and medulla with sub-regions.
- 12.13 Structure of three zones of cortex.
- 12.14 Cellular elements of medulla.
- 12.15 Functions.

5 periods

S.Y.B.Sc. : Paper II : Section II : Mammalian Physiology

1. Physiology of Digestion : Definition, Types, oral gastric digestion, Intestinal digestion. Nervous and hormonal control of digestion.
2. Circulation : Blood - composition and functions, Double circulation, Pace makers, Neurogenic and myogenic hearts, Blood coagulation (Only mechanism) Cardiac output, Heart beat and its Hormonal control.
3. Respiration : Definition, respiratory tract, ventilation, nervous control of breathing, transport of gases, Haemoglobin, internal and external respiration, chloride shift, Basal metabolic rate and respiratory quotient.
4. Thermoregulation : Definition, Types - poikilothermic and Homoiothermic animals, Thermoregulation in Homoiothermic animals. Body temperature, rhythms - daily and monthly, Peripheral and central thermoreceptors and their role. Role of behaviour - panting, sweating, sub-cutaneous fat, brown fat, aestivation, hibernation, shivering and nonshivering thermogenesis.
5. Osmoregulation : Definition, water and its physiological properties Diffusion, Osmosis, active transport. Hormonal control of osmoregulation.
6. Excretion : Definition. Organ concerned with excretion, uriniferous tubules, formation of urine by counter current multiplication theory, Ultrafiltration, Endocrine control in kidney.

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S.Y.B.Sc. : PRACTICAL

1. Non-Chordates : Starfish
 1. Study of external characters of Starfish (E)
 2. Dissection Starfish so as to study the following systems:
Digestive and Water vascular (E)
 3. Temporary preparation of Gonads (E)
 4. Observation of transverse section passing through arm of starfish and bipinnaria larva (D) (3 practs) 11.6

II. Chordates : Scoliodon

1. Study of external characters of Scoliodon (E)
2. Dissection of scoliodon so as to study the following :
 - .. Digestive system, Arterial system and Brain : (E)
3. Temporary preparation of scales and ampullae of orenzini.
4. Observation of the following : Cranial nerves, muscles of the eye-ball and their innervation, Membraneous labyinth.

3 Practis:

III. Non-Chordates : Classification.

Study of general and distinguishing characters of the prescribed phyla with at least one example from each class under Paper I : Section I (D)

3 Practis

Chordates : Classification.

Study of general and distinguishing characters of the prescribed phyla with at least one example from each order Paper I : Section II (D)

3 Practis

IV. Environmental Biology :

1. O₂ estimation from water sample.
2. Co₂ " " "
3. Study of fauna animals.
4. Report of the visit to a any ecosystem, must be submitted
5. Visit to a public health organisation.

V. Histology of Mammals :

1. Preparation of stained, temporary microscopic slides of the following tissues of Rat.

- | | |
|-------------------------|----------------------------|
| a) Columnar epithelium, | d) Striated muscle fibre |
| b) Areolar, | e) Smooth muscle fibre, |
| c) Cartilage, | f) Medullated nerve fibre. |

3 Practis.

2. Study of permanent slides of the following :

- | | |
|---|------------------------------|
| a) Skin - vertical section | b) Toothe - vertical section |
| c) Tongue - section, | d) Oesophagus - cross |
| e) Stomach-cross sections through caedtionand pyloric regi, | |
| f) Rectum - Cross section | g) Duodenum - cross section. |
| h) Ileum-cross section, | i) Rectum cross section, |
| j) Salivary glands - Parotids, sub-maxillary and sublingual | |
| k) Liver- cross section showing double cell cords, blood vessels bile ductules. | |

cont..7

- l) Pancreas - section showing acini, ducts and islets of Langerhans.
- m) Trachea-cross section.
- n) Lungs section showing alveoli, septa and capillaries.
- o) Artery and vein - cross section,
- p) Blood corpuscles - erythrocytes and leucocytes.,
- q) Spleen section,
- r) Kidney : i) Longitudinal section showing cortex, medulla, renal column, pyramid, renal papilla, calyx and pelvis.
ii) Section showing Malpighian body, collecting ducts.
- s) Spinal cord - cross section,
- t) Testis - section showing seminiferous tubules and interstitial cells.
- u) Ovary section showing follicles in different stages of growth, corpus luteum and corpus albicans.

V. Histology of Mammals :

2.v) Thyroid cross section.

- w) Adrenal glands section showing three zones of cortex and ganglion cells in medulla (D)

3 Practs

VI. Mammalian Physiology :

1. Hb. Estimation and Haemein crystals.
2. W.B.C. Different count.
3. Effect of temp on rate of heart beat in frog.
4. a) Clotting time by capillary method.
b) Effect of isotonic, hypotonic and hypertonic solution on RBC.
5. Detection of Normal constituents of urine.
6. Detection of abnormal constituents of urine.
7. Study of digestion of starch by amylase.

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S.Y.B.Sc. (Zoology) Practicals :

For each question the marks allotted will be equal i.e. 25 marks ea in the following manner.

- 1) a) Dissection (starfish/Dog fish) - 13 Marks
b) Classification - 12 Marks
- 2) Environmental Biology - - 25 Marks

3) Histology - preparation of one stained temporary slide -
10 Marks

Permanent slides under microscopes - 15 Marks.

4) Physiology - i) One major experiment - 15 Marks.
ii) One minor experiment - 10 marks.

The practical examination will be of two sessions Each session
of 3 hours duration:

Time : 9.00 am. to 12.00 noon.
2.00 p.m. to 5.00 p.m.

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obs./-