

**M.Sc., II SEMESTER  
HARD CORE PAPER - 1  
CHORDATA**

<b>UNIT 1.</b>	<b>32 Hrs.</b>
a) Origin of chordates	<b>8hrs</b>
b) Systematic position of protochordates	
c) Adaptive radiation of vertebrates – fishes, amphibians, reptiles, aves and mammals	
<b>UNIT 2.</b>	<b>8hrs</b>
Evolution of circulatory and respiratory system	
<b>UNIT 3.</b>	<b>8hrs</b>
Nervous system and Sense organs in vertebrates - Evolution of brain and spinal cord	
<b>UNIT 4.</b>	<b>8hrs</b>
a) Evolution of urinary system in vertebrates	
b) Integument and its derivatives in vertebrates	

**CHORDATA PRACTICALS**

**4x16=64 Hrs**

**I. Observation of Museum Specimens and Slides:**

**1. Protochordates:** Specimens: Botryllus, Herdmania  
Slides- Salpa (sexual), Doliolum

**2. Fishes :** 1) Rhinobatus 2) Hippocampus 3) Goldfish (aquarium fish) 4) Clarius  
5) Anabas 6) Chimera 7) Acipenser 8) Periophthalmus 9) Triacanthus  
10) Notopterus 11) Exocoetus 12) Diodon hysterix 13) Echenenis neucrates

**3. Amphibians :** 1) Ichthyophis 2) Rhacophorus 3) Rana tigrina 4) Amblystoma  
5) Geganophis

**4. Reptiles :** 1) Sitana 2) Chameleon 3) Phrynosoma 4) Chelone mydas

**5. Birds :** 1) Indian Oriole 2) Indian koel -male and female 3) Indian tailor bird 4) Kite  
5) Jungle fowl

**6. Mammals :** 1) Indian Otter 2) Marmoset 3) Loris 4) Megaloderma lyra (bat)  
5) Pangolin

**7. Integuments of vertebrates :** Scales of fish and reptiles, Hoofs, nails, horns

## **8. Osteology :**

- 1) Skull and lower jaw:- a) Chelonia b) Crocodile c) Bird d) Carnivore mammal (dog)  
e) Herbivore mammal (horse)
- 2) Types of vertebrae:- a) Procoelous b) Ophisthocoelous c) Amphicoelous d) Amphiplatian  
e) Heterocoelous f) Axis and atlas vertebrae.

## **II. Study of following systems in rat by employing computer animation/charts:**

- a) Circulatory system b) Nervous system c) Reproductive system
- d) Digestive system e) Sense organs f) Urinary system

## **REFERENCES :**

1. Alexander, R. M. 1975. The Chordata. Cambridge University Press, London.
2. Barrington, E.J.W. 1965. The Biology of Hemichordata and Protochordata, Oliver and Boyd, Edinburgh.
3. Colbert, E. H, 1969. Evolution of the vertebrates, John Wiley and Sons, Inc., N.Y.
4. Kent, C. G. 1954. Comparative anatomy of vertebrates
5. Kingsley, J.S. 1962. Outlines of Comparative anatomy of vertebrates. Central book depot Allahabad.