SYLLABUS FOR
B. Sc. ZOOLOGY
(With effect from the academic year 2016-17 under CBCS)

Prof. T. RAVINDER REDDY
Chairman
Board of studies

SATAVAHAHA UNIVERSITY
KARIMNAGAR- 505002
TELANGANA STATE
I - SEMESTER
Core Paper – I
Animal Diversity – Invertebrates

Periods: 60
Max. Marks: 80

UNIT – I (15 Periods)

1.1 Brief history of Invertebrates
   1.1.1 Kingdom Animalia
   1.2.1 Brief history of Invertebrates

1.2 Protozoa:
   1.2.1 General characters
   1.2.2 Classification up to classes with examples
   1.2.3 Type study - Elphidium
   1.2.4 Locomotion, Reproduction and Diseases

1.3 Porifera:
   1.3.1 General characters
   1.3.2 Classification of Porifera up to classes with examples
   1.3.3 Type study - Sycon
   1.3.4 Canal system in sponges and Spicules.

UNIT – II (15 Periods)

2.1 Cnidaria
   2.1.1 General characters
   2.1.2 Classification of Cnidaria up to classes with examples
   2.1.3 Type study - Obelia
   2.1.4 Polymorphism in hydrozoa
   2.1.5 Corals and coral reef formation

2.2 Platyhelminthes
   2.1.1 General characters
   2.1.2 Classification of Platyhelminthes up to classes with examples
   2.1.3 Type study - Schistosoma

2.3 Nemathelminthes
   2.3.1 General characters
   2.3.2 Classification of Nemathelminthes up to classes with examples
   2.3.3 Type study - Dracunculus
   2.3.4 Parasitic Adaptations in Helminthes

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UNIT – III (15 Periods)

3.1 Annelida
   3.1.1 General characters
   3.1.2 Classification of Annelida up to classes with examples
   3.1.3 Type study - Hirudinaria granulosa.
   3.1.4 Evolutionary significance of Coelome and Coelom ducts and metamerism

3.2 Arthropoda
   3.2.1 General characters
   3.2.2 Classification of Arthropoda up to classes with examples
   3.2.3 Type study - Prawn
   3.2.4 Insect metamorphosis
   3.2.5 Peripatus - Structure and affinities

UNIT – IV (15 Periods)

4.1 Mollusca
   4.1.1 General characters
   4.1.2 Classification of Mollusca up to classes with examples
   4.1.3 Type study - Pila
   4.1.4 Pearl formation
   4.1.5 Torsion and detorsion in gastropods

4.2 Echinodermata
   4.2.1 General characters
   4.2.2 Classification of Echinodermata up to classes with examples
   4.2.3 Water vascular system in star fish
   4.2.4 Echinoderm larvae and their significance

4.3 Hemichordata
   4.3.1 General characters
   4.3.2 Classification of Hemichordata up to classes with examples
   4.3.3 Balanoglossus - Structure and affinities

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Suggested Readings


5. Barrington. E.J.W., ‘Invertebrate structure and Function’ by ELBS.


B.Sc. ZOOLOGY MODEL PAPER FOR I SEMESTER
ZOOLOGY – CORE PAPER - I
ANIMAL DIVERSITY - INVERTEBRATES

Time: 3 hrs Max. Marks: 80

Section- I (Marks: 5x4=20)
Answer any FIVE of the following
Draw labeled diagrams wherever necessary

1. Unit-I
2. Unit-I
3. Unit-II
4. Unit-II
5. Unit-III
6. Unit-III
7. Unit-IV
8. Unit-IV

Section- II (Marks: 4x15=60)
Answer FOUR of the following
Draw labelled diagrams wherever necessary

1. a) UNIT-I
   Or
   b) UNIT-I

2. a) UNIT-II
   Or
   b) UNIT-II

3. a) UNIT-III
   Or
   b) UNIT-III

4. a) UNIT-IV
   Or
   b) UNIT-IV

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1. Study of museum slides / specimens / models (Classification of animals up to orders)

I. Protozoa (slides)
   1. Amoeba
   2. Paramoecium
   3. Paramoecium Binary fission
   4. Paramoecium Conjugation
   5. Vorticella,
   6. Entamoeba histolytica
   7. Plasmodium vivax

II. Porifera
   8. Sycon
   9. Spongilla
   10. Euspongia,
   11. Sycon - T.S
   12. Sycon - L.S,
   13. Spicules
   14. Gemmule

III. Coelenterata:
   15. Obelia – Colony
   16. Obelia - Medusa,
   17. Aurelia,
   18. Physalia
19. Velella,
20. Corallium,
21. Gorgonia
22. Pennatula

IV. Platyhelminthes
23. Planaria
24. Fasciola hepatica
25. Echinococcus granulosus,
26. Taenia solium,
27. Schistosoma haematobium

V. Nemathelminthes:
28. Ascaris-Male
29. Ascaris-Female
30. Drancunculus
31. Ancylostoma
32. Wuchereria boncrofti

VI. Annelida
33. Nereis
34. Aphrodite
35. Chaetopteurs
36. Hirudinaria
37. Trochophore larva

VII. Arthropoda
38. Cancer
39. Palaemon
40. Scorpion

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41. Scolopendra  
42. Sacculina  
43. Limulus  
44. Peripatus  
45. Nauplius  
46. Mysis  
47. Zoea  

VIII. Mollusca  
48. Chiton  
49. Pila  
50. Pterdo  
51. Murex  
52. Sepia  
53. Loligo  
54. Octopus  
55. Nautilus  
56. Glochidium larva  

IX. Echinodermata  
57. Asterias  
58. Ophiothrix  
59. Echinus  
60. Clypeaster  
61. Cucumaria  
62. Antedon  
63. Bipinnaria larva
X. Hemichordata
   64. *Balanoglossus*
   65. Tomaria larva

XI. Dissections
   Dissect and display and draw a neat labeled diagram of the following.
   66. Prawn- Digestive system
   67. Prawn-Nervous system
   68. Prawn-Mounting of statocyst
   69. Prawn-cephalic appendages
   70. Prawn-Thorasic appendages
   71. Prawn-Abdominal appendages
   72. Pila- Nervous system
   73. Pila- radula mounting

XII. Laboratory Record work shall be submitted at the time of practical examination

XIII. An “Animal album” containing photographs, cut outs, with appropriate write up about the above mentioned taxa. Different taxa/ topics may be given to different sets of students for this purpose.

XIV. Computer aided techniques should be adopted – show virtual dissections

Suggested manuals:
1. Practical Zoology- Invertebrates S.S. Lal
2. Practical Zoology - Invertebrates P.S. Verma
3. Practical Zoology - Invertebrates K.P. Kurl

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ZOOLOGY PRACTICAL SYLLABUS FOR I SEMESTER
ZOOLOGY - PAPER - I
ANIMAL DIVERSITY - INVERTEBRATES

Time: 3 Hrs.                                                   Max. Marks: 25

1. Identify the given spotters (4 specimens&1 slide) giving reasons for the identification with a neat labeled diagram and salient features of spots  5X2=10
2. Dissect and display and draw a neat labeled diagram  2+2=4
3. Project Work  03
4. Certified practical record  03
5. Animal Album  03
6. Viva voce  02

Note:

1. For 1&2 question bank is given

2. 3,4,5 common for all batches

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B.Sc. ZOOLOGY SYLLABUS UNDER CBCS
(With effect from 2016-2017)
II - SEMESTER
Core Paper – II
Ecology, Zoogeography and Animal Behavior

Periods: 60 Max. Marks: 80

UNIT – I (15 Periods)

1.1 Ecology - I
1.1.1 Ecosystem structure and functions.
1.1.2 Pond ecosystem and Forest ecosystem
1.1.3 Biogeochemical cycles - Nitrogen, Carbon, Phosphorus and Water.
1.1.4 Energy flow in ecosystem.
1.1.5 Food chain, food web and ecological pyramids.
1.1.6 Animal Associations - Mutualism, commensalism, parasitism, competition, predation.

UNIT – II (15 Periods)

2.1 Ecology – II
2.1.1 Concept of Species, Population dynamics and Growth curves.
2.1.2 Community Structure and dynamics and Ecological Succession.
2.1.3 Ecological Adaptations.
2.1.4 Environmental Pollution – Sources, Effect and Control measures of Air, Water, Soil and Noise pollution.
2.1.5 Wildlife conservation - National parks and Sanctuaries of India, Endangered species.
2.1.6. Biodiversity and hotspots of Biodiversity in India.

UNIT – III (15 Periods)

3.1 Zoogeography
3.1.1 Zoogeographical regions – Palaearctic, Nearctic, Neotropical, Oriental, Australian and Ethiopian regions - their Climatic and faunal peculiarities
3.1.2 Wallace line, Discontinuous distribution
3.1.3. Continental Drift

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UNIT – IV (15 Periods)

4.1 Animal Behaviour
4.1.1 Types of Behaviour- Innate and Acquired, Instinctive and Motivated behaviour
4.1.2 Taxes, Reflexes, Tropisms
   4.1.3 Physiology and phylogeny of learning, trial and error learning, Imprinting, habituation,
       Classical conditioning, Instrumental conditioning
4.1.5 Social behavior, Communication, Pheromones
4.1.6 Biological rhythms, Biological clocks, Circadian rhythms

Suggested Readings

P.D. Sharma, Environmental Biology’.
P.R. Trivedi and Gurdeep Raj, ‘Environmental Ecology’
Buddhadev Sarma and Tej Kumar, Indian Wildlife Threats and Preservation
Chapman J.L. and Reiss M.J, Ecology Principles and Applications, Second
Benny Joseph, Environmental Studies, TATA MGrav Hill Com., New Delhi.
Veer Bala Rastogi, “Ecology and Animal Distribution”
P.K. Gupta, “Text Book of Ecology and Environment”
Bhatnagar and Bansal, “Ecology and Wildlife biology
Dasman, “Wild life Biology”
Reena Mathur, “Animal Behaviour”
Alocok, “Animal Behaviour- an Evolucionary Approach
B.Sc. MODEL PAPER FOR II SEMESTER
ZOOCOLOGY - Core Paper – II
Ecology, Zoogeography and Animal Behavior

Time: 3 hrs
Max. Marks: 80

Section- I (Marks: 5x4=20)
Answer any FIVE of the following
Draw labeled diagrams wherever necessary

1. Unit-I
2. Unit-I
3. Unit-II
4. Unit-II
5. Unit-III
6. Unit-III
7. Unit-IV
8. Unit-IV

Section- II (Marks: 4x15=60)
Answer FOUR of the following
Draw labelled diagrams wherever necessary

1.a) UNIT-I
Or
b) UNIT-I

2. a) UNIT-II
Or
b) UNIT-II

3.a) UNIT-III
Or
b) UNIT-III

4.a) UNIT-IV
Or
b) UNIT-IV

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I. Major Experiments:
   1. Estimation of salinity (chlorides) of water in given samples.
   2. Estimation of Carbonates in the given water samples.
   3. Estimation of BiCarbonates in the given water samples
   5. Observe the response of invertebrates in different lightening conditions

II. Minor experiments:
   7. Determination of pH of water.
   8. Identification of zooplankton in given water samples.
   9. Identification of zoo geographical realms from the map and identify the specific fauna of respective regions.

III. Submission of project report.
    Study of pond ecosystem/local polluted site.

IV. Submission of field note book and animal album.
    (students are supposed to visit Zoo park to study the management, behavior and enumeration of wild animals in order to submit FNB & students are supposed to study at least 3 endangered and threatened wild animals in India to submit animal album)

V. Viva
VI. Record.

Computer aided techniques should be adopted as per UGC guidelines.

Suggested manuals

1. Robert Desharnais, Jeffrey Bell, ‘Ecology Student Lab Manual, Biology Labs’
PRACTICAL MODEL PAPER FOR II SEMESTER
ZOOLOGY - Core Paper – II
Ecology, Zoogeography and Animal Behavior

Scheme of evaluation

<table>
<thead>
<tr>
<th>Time: 3 Hrs.</th>
<th>Max. Marks: 25</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Major experiment</td>
<td>10</td>
</tr>
<tr>
<td>(principle-2, procedure-4, result-4)</td>
<td></td>
</tr>
<tr>
<td>II. Minor experiment</td>
<td>05</td>
</tr>
<tr>
<td>(principle-1, procedure-2, result-2)</td>
<td></td>
</tr>
<tr>
<td>III. project report</td>
<td>03</td>
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<tr>
<td>IV. Field note book and animal album</td>
<td>02</td>
</tr>
<tr>
<td>V. certified field note book</td>
<td>03</td>
</tr>
<tr>
<td>VI. Viva</td>
<td>02</td>
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</tbody>
</table>

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B.Sc. ZOOLOGY SYLLABUS UNDER CBCS
(With effect from 2016-2017)
III - SEMESTER
Core Paper – III
Animal Diversity- Vertebrates and Developmental Biology

Periods: 60 Max. Marks: 80

UNIT – I (15 Periods)

1.1. Urochordata, Cephalochordata, Cyclostomata
1.1.1. Salient features of Urochordata
1.1.2. Retrogressive metamorphosis and its significance in Urochordata
1.1.3. Salient features and affinities of Cephalochordata
1.1.4. General characters of Cyclostomata
1.1.5. Comparison of the *Petromyzon* and *Myxine*
1.1.6. General characters and classification of Chordata up to orders with examples.

1.2. Pices
1.2.1. General characters of Fishes
1.2.2. Classification of fishes up to order level with examples
1.2.3. *Scoliodon* – Respiratory, Circulatory and Nervous system.
1.2.4. Types of Scales and types of Fins

UNIT – II (15 Periods)

2.1. Amphibia
2.1.1. General characters of Amphibias
2.1.2. Classification of Amphibians up to orders with examples.
2.1.3. *Rana tigrina* - Respiratory, Circulatory and Nervous system.
2.1.4. Parental care in amphibia, Neotony.

2.2 Reptilia
2.2.1. General characters of Reptilia
2.2.2. Classification of Reptilia up to orders with examples
2.2.3. *Calotes* – Respiratory system, Circulatory and Nervous system.
2.2.4. Temporal fosse in reptiles and its evolutionary importance
2.2.5. Distinguished characters of Poisonous and Non poisonous snakes.
2.2.6. Rhynchocephalia.

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UNIT – III (15 Periods)

3.1. Aves
   3.1.1. General characters of Aves
   3.1.2. Classification of Aves up to orders with examples.
   3.1.3. *Columba livia* - Digestive system, Circulatory systems, Respiratory system and Nervous system.
   3.1.4. Migration in Birds
   3.1.5. Flight adaptation in Birds

3.2. Mammalia
   3.2.1. General characters of Mammalia
   3.2.2. Classification of Mammalia up to orders with examples
   3.2.3. Rabbit - Digestive, Respiratory, Circulatory and Nervous system.
   3.2.4. Dentition in mammals.
   3.2.5. Aquatic adaptations in Mammals.

UNIT – IV (15 Periods)

4.1 Developmental Biology and Embryology
   4.1.1 Gametogenesis (Spermatogenesis and Oogenesis)
   4.1.2 Fertilization
   4.1.3 Types of eggs
   4.1.4 Types of cleavages

4.2 Development of Frog up to formation of primary germ layers
4.3 Formation of Foetal membrane in chick embryo and their functions
4.4 Types and functions of Placenta in mammals
4.5 Regeneration in Turbellaria and Lizards

**Suggested Readings:**

4. Alfred Sherwood Romer. Thomas S. Pearson ‘*The Vertebrate Body*, Sixth edition,
   CBS college Publishing, Saunders College Publishing
   McGraw Hill.
   ‘McGraw Hill.
B.Sc. ZOOLOGY MODEL PAPER FOR III SEMESTER
ZOOLOGY - CORE PAPER - III
Animal Diversity- Vertebrates and Developmental Biology

Time: 3 hrs
Max. Marks: 80

Section- I (Marks: 5x4=20)
Answer any FIVE of the following
Draw labeled diagrams wherever necessary

1. Unit-I
2. Unit-I
3. Unit-II
4. Unit-II
5. Unit-III
6. Unit-III
7. Unit-IV
8. Unit-IV

Section- II (Marks: 4x15=60)
Answer FOUR of the following
Draw labelled diagrams wherever necessary

1.a) UNIT-I
   Or
b) UNIT-I

2. a) UNIT-II
    Or
b) UNIT-II

3.a) UNIT-III
    Or
b) UNIT-III

4.a) UNIT-IV
    Or
b) UNIT-IV

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ZOOLOGY PRACTICAL SYLLABUS FOR III SEMESTER
ZOOLOGY - CORE PAPER - III
Animal Diversity- Vertebrates and Developmental Biology

Periods: 30 Max. Marks: 25

I. Dissections (Labeo/Tilapia)
   1. Digestive system
   2. Brain
   3. Weberian ossicles
   4. V & VII cranial nerves
   5. IX & X cranial nerves

II. Spotters:
    Proto chordates:
    6. Amphioxus
    7. Amphioxus T.S. through pharynx

Cyclostomata
   8. Petromyzon
   9. Myxine
   10. Ammocoetus larva

Pisces
   11. Sphyrna
   12. Pristis
   13. Torpedo
   14. Channa
   15. Pleuronectes
   16. Hippocampus
   17. Exocoetus
   18. Echeneis
   19. Labeo
   20. Catla
   21. Clarius
   22. Auguilla
   23. Protopterus

Scales
   24. Placoid
   25. Cycloid
   26. Ctenoid

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**Amphibia**
27. Ichthyophis
28. Amblystoma
29. Siren
30. Hyla
31. Rachophous
32. Bufo
33. Rana
34. Axolotal larva

**Reptilia:**
35. Draco
36. Chamaeleon
37. Gecko
38. Uromastix
39. Vipera russel
40. Naja
41. Bungarus
42. Enhydrina
43. Typhlops
44. Testudo
45. Trionyx
46. Crocodilus
47. Ptyas.

**Aves**
48. Archaeopteryx
49. Passer
50. Psittacula
51. Bubo
52. Alcedo
53. Columbia
54. Corvus
55. Pavo

**Mammalia**
56. Ornithorhynchus
57. Tachyglossus
58. Pteropus
59. Funambulus
60. Manis
61. Loris
62. Hedgehog
Osteology:

Rabbit – Axial skeleton
63. Skull
64. Vertebral Column

Appendicular skeleton
65. Varanus-Pectoral girdle
66. Varanus-humerus
67. Varanus-radioUlna
68. Varanus-Pelvic girdle
69. Varanus-Femur
70. Varanus-TibioFibula
71. Pigeon -Pectoral girdle
72. Pigeon-humerus
73. Pigeon -radioUlna
74. Pigeon -Pelvic girdle
75. Pigeon -Femur
76. Pigeon -TibioFibula
77. Rabbit -Pectoral girdle
78. Rabbit -humerus
79. Rabbit -radioUlna
80. Rabbit -Pelvic girdle
81. Rabbit -Femur
82. Rabbit –TibioFibula

EMBRYOLOGY
83. Mounting of sperm
84.T.S of testis
85. T.S of ovary
86. Cleavage 2- cell stage
87. cleavage 4- cell stage
88.cleavage 8-cell stage
89. morula
90. blastula of frog
91.gastrula of frog
92. 24 hours chick embryo
93. 48 hours chick embryo
94. 72 hours chick embryo

Histology
95. T.S. of Liver
96. T.S of Pancreas,
97. T.S of Kidney
98. T.S OF Stomach
99. T.S OF Intestine
100. T.S OF Lungs
101. T.S OF Artery
102. T.S OF Vein
103.T.S OF Bone
104.T.S. OF Spinal cord

Laboratory Record work shall be submitted at the time of practical examination

Computer aided virtual dissections.

Suggested manuals

1. S.S.Lal, Practical Zoology – Vertebrata
2. P.S.Verma, A manual of Practical Zoology – Chordata
3. Freeman & Bracegirdle, An atlas of embryology

ZOOLOGY PRACTICAL SYLLABUS FOR III SEMESTER
ZOOLOGY - CORE PAPER - III
Animal Diversity- Vertebrates and Developmental Biology

Time: 3 Hrs.                        Max. Marks: 25

1. Dissection Diagram + Description  2+2=4
2. Spotters(4 chordates+1 Osteology+1 Histology+1 Embryology)  7x2=14
3. Animal Album +collection of different feathers  02
4. Viva voce  02
5. Certified Record  03

Total: 25

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B.Sc. ZOOLOGY SYLLABUS UNDER CBCS
(With effect from 2016-2017)
IV - SEMESTER
Core Paper – IV
Cell and Molecular Biology, Genetics, Evolution
Max. Marks: 80

UNIT – I
1. Cell Biology
1.1. Ultra structure of animal cell
1.2. Structure and functions of plasma membrane and proteins.
1.3. Structure and functions of cell organelles –
   Endoplasmic reticulum, Golgi body, Ribosomes, Lysosomes, centrosomes, Mitochondria and Nucleus
1.4. Chromosomes – Structure, types, giant chromosomes
1.5. Cell Division - Mitosis, Meiosis, Cell cycle and its regulation.

UNIT – II
2. Molecular Biology
2.1 DNA (Deoxyribo Nucleic Acid) – Structure and replication
2.2 RNA (Ribo Nucleic Acid) - Structure, types
2.3 Protein Synthesis – Transcription and Translation
2.4 Gene Expression – Genetic Code; operon concept
2.5 Molecular Biology Techniques- Polymerase Chain Reaction, Electrophoresis

UNIT – III
3. Genetics
3.1 Mendal's laws of Inheritance and Non-Mendelian Inheritance
3.2 Linkage and Crossing over
3.3 Sex determination and sex-linked inheritance
3.4 Chromosomal Mutations- Deletion, Duplication, Inversion, Translocation, Aneuploidy and Polyploidy.
3.5. Inborn errors of metabolism.

UNIT – IV (15 Periods)
4. Evolution
4.1. Theories of evolution – Lamarckism and Neo-Lamarckism, Darwinism and Neo-Darwinism, Modern synthetic theory.
4.2. Evidences of Evolution
4.3. Hardy Weinberg Law.
4.4. Isolation – Pre-mating and post mating isolating mechanisms
4.5. Speciation: Methods of speciation - Allopatric and sympatric

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Suggested readings


15. Gupta P.K., ‘Genetics’
B.Sc. ZOOLOGY MODEL PAPER FOR IV SEMESTER
ZOOLOGY Core Paper – IV
Cell Biology, Genetics and Evolution

Time: 3 hrs          Max. Marks: 80

Section- I (Marks: 5\times 4=20)
Answer any FIVE of the following
Draw labeled diagrams wherever necessary

1. Unit-I
2. Unit-I
3. Unit-II
4. Unit-II
5. Unit-III
6. Unit-III
7. Unit-IV
8. Unit-IV

Section- II (Marks: 4\times 15=60)
Answer FOUR of the following
Draw labelled diagrams wherever necessary

1.a) UNIT-I
Or
b) UNIT-I

2. a) UNIT-II
Or
b) UNIT-II

3.a) UNIT-III
Or
b) UNIT-III

4.a) UNIT-IV
Or
b) UNIT-IV

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I. CYTOLOGY
1. Preparation and Identification of stages of slides of Mitotic divisions with onion root tips

II. PROBLEMS:
2. problems on mendelian inheritance
3. hardy Weinberg law

III. SPOTTERS:
1. Peripatus
2. Coelocanath fish
3. Lepidosiren
4. Neoceratodus
5. Petromyzon
6. Sphenodon
7. Archaeopteryx
8. Mitosis-prophase
9. Mitosis-metaphase
10. Mitosis-anaphase
11. Mitosis-telophase
12. Meiosis-leptotene
13. Meiosis-zygotene
14. Meiosis-pachetene
15. Meiosis-diplotene
16. Meiosis-diakinesis
17. Meiosis-metaphase I
18. Meiosis-anaphase I
19. Meiosis- telophase I
20. Alcaptonurea
21. Phenyl ketonurea
22. Klinifelter syndrome
23. Down’s syndrome
24. Cri du chat syndrome
25. Turners syndrome

Suggested manulas:
Manual of laboratory experiments in cell biology Edward.G.
B.Sc. PRACTICAL MODEL PAPER FOR IV SEMESTER
ZOOLOGY - CORE PAPER - IV
Cell Biology, Genetics and Evolution

Time: 3 Hrs. Max. Marks: 25

1. Experiment of mitosis 05
2. Problem of genetics/ Hardy weinberg law 05
3. Spotters 5x2=10
4. Certified practical record & viva 05

Total 25

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