GUJARAT UNIVERSITY

5th Semester - Zoology

(SKELETON QUESTION PAPER FOR PRACTICAL EXAMINATION)

PAPER-306 (A-1)

(*Based mainly on Theory Paper 301*)

Date : …….. Marks : 35 Time : ….……

Q.1.A. Dissect / Sketch a labeled diagram of the given animal_____so as to expose the _____ system and show it to the examiner. **07**

A. Make a temporary mounting / sketch a labeled diagram of_____from the given animal and show it to the examiner. **03**

Q.2.A. Dissect /Sketch a labeled diagram of the given animal_____so as to expose the _____ system and show it to the examiner. **07**

B. Make a temporary mounting / sketch a labeled diagram of_____from the given animal and show it to the examiner. **03**

Q.3. Identify specimens 1 to 6 as per instructions: **12**

Sp.1 Identify and comment on its peculiarities.
Sp.2 Identify and comment on its peculiarities.
Sp.3 Identify and comment on its peculiarities.
Sp.4 Identify and comment on its peculiarities.
Sp.5 Identify and comment on its peculiarities.
Sp.6 Identify and comment on its peculiarities.

Q.4. Journal. **03**

GUJARAT UNIVERSITY

5th Semester - Zoology

DETAILS OF PRACTICAL EXAMINATION (Question wise)

PAPER-306 (A-1)

(*Based mainly on Theory Paper 301*)

Q.1.A. Starfish – Water-vascular system
Cuttlefish – Digestive system
B. Starfish – Tubefeet

Q.2.A. Cuttlefish – Nervous system
Earthworm – Reproductive systems
B. Cuttlefish – Jaws
Earthworm – Spermathecum, Ovaries

Q.3. Sp.1 **:** Leucosolenia, T. S. through Leucosolenia, Spicules, Porpita, Physalia, Obelia (W.M. & Medusa)
Sp.2 **:** Canal systems in Porifera,
Sp.3 **:** Crustacean larvae (Nauplius, Zoea, Megalopa)
Sp.4 **:** Echinoderm larvae (Bipinnaria, Brachiolaria, Echinopluteus)
Sp.5 **:** Echinoderm larvae (Ophiopluteus, Auricularia, Doliolaria)
Sp.6 **:** Bonelia, Lingula, Phoronis.

GUJARAT UNIVERSITY

5th Semester - Zoology

(SKELETON QUESTION PAPER FOR PRACTICAL EXAMINATION)

PAPER-306 (A-2)

(*Based on Theory Papers 301 & 302*)

Date : …….. Marks : 35 Time : ……

Q.1 Estimate titrimetrically the_____of the given water sample. **08**
Record your observations & calculations and submit to the examiner.

Q.2 Dissect / Sketch a labeled diagram of the given *Labeo* so as to expose the_____system and show it to the examiner. **06**

Q.3 Make a temporary mounting / Sketch a labeled diagram of____from the *Labeo*. **02**

Q.4 Identify specimens 1 to 5 as per instructions **:** **10**

Sp.1 Identify and describe.
Sp.2 Identify and comment on its peculiarities.
Sp.3 Identify and comment on its peculiarities.
Sp.4 Identify and comment on its peculiarities.
Sp.5 Identify and comment.

Q.5 Viva voce. **06**

Note : All examiners should take the viva sitting together and each examiner should give marks from 06 and then the average marks of all the examiners should be given to the candidate.

Q.6 Journal. **03**

GUJARAT UNIVERSITY

5th Semester - Zoology

DETAILS OF PRACTICAL EXAMINATION (Question wise)

PAPER-306 (A-2)

(*Based on Theory Papers 301 & 302*)

Calcium hardness (using calcium hardness tablets as indicator),
Total Hardness (using total hardness tablets as indicator),
Chlorinity.

Labeo **:** Digestive system and Brain.

Labeo **:** Scales and striated muscle fibres.

Sp.1 Pigeon **:** Digestive system, Heart, Arterial & Venous systems, Brain, Excretory System, Reproductive system, Types of feathers and Air-sacs.

Sp.2 & Sp.3 Swim bladder, Accessory respiratory organs in fishes, Petromyzon, Myxine, Protopterus, Eel, Neoteny (Siren, Necturus, Axolotl larva), Parental care (Male Hippocampus, Male Kurtus, Male Arius, Female Tilapia, Alytes, Pipa, Rhacophorus, Hyla, Rhinoderma).

Sp.4 Aquatic mammals(Dolphin, Whale, Walrus, Seal), Dentition in mammals (dental formulae of Human, Cow, Horse, Elephant, Rat, Dog, Cat), Dinosaurs (Brontosaurus, Triceratops, Tyrannosaurus, Iguanodon, Stegosaurus, Pteranodon, Ichthyosaur, Plesiosaur).

Sp.5 Comparative anatomy of Aortic arches and Brain.

Syllabus of Theory Papers 301 & 302 as-well-as Practical Papers 306 (A-1) & 306 (A-2) only.

Note : All examiners should take the viva sitting together and each examiner should give marks from 06 and then the average marks of all the examiners should be given to the candidate.

GUJARAT UNIVERSITY

5th Semester - Zoology

(SKELETON QUESTION PAPER FOR PRACTICAL EXAMINATION)

PAPER-306 (B-1)

(*Based on Theory Papers 303* & *304*)

Date : …….. Marks : 35 Time : ……

Q.1 Detect any two constituents from the given unknown solution and show your tests to the examiner. **(No need to write the tests)**. **08**

Q.2 .Estimate colorimetrically the concentration of_____from the given unknown solution and submit your results to the examiner. **08**

Note : Students are not supposed to *take the colorimetry readings by themselves.*

Q.3 Prepare the atomic model and show it to the examiner. **10**

a. Carbohydrate

b. Protein

Note:

1) *In case of carbohydrates, the examiners should specify the particular* **acyclic/cyclic structure** *of the monosaccharide* that *the student has to prepare.*
2) *Examiners should make the students* **only write** *the structure of the compound* (like in theory exam) **and not make them draw** *the atomic model.*

Q.4 Viva *voce* **06**

Note: All examiners should take the viva sitting together and each examiner should give marks from 06 and then the average marks of all the examiners should be given to the candidate.

Q.5 Journal **03**

PAPER – 306 (B-1) (Practicals)

(*Based on Theory Paper 303*)

1. *CARBOHYDRATES* :

Detection of carbohydrates **:**

- Monosaccharides – Glucose and Fructose
- Disaccharides - Lactose, Maltose and Sucrose

2. PROTEINS :

Detection of Proteins – Albumin and Casein

3. COLORIMETRIC ESTIMATION OF :

- Proteins (Preparation of Std. Curve by Biuret method).
- Glucose (Nelson-Somogyi method)

4. ATOMIC MODELS OF CARBOHYDRATES :

Preparation of Atomic Models of **:**

- Acyclic as-well-as all cyclic structures of Ribose, Arabinose, Ribulose, Glucose, Mannose, Galactose, Psicose, Fructose and Tagatose.
- Maltose, Lactose and Sucrose.

5. ATOMIC MODELS OF PROTEINS :

Preparation of Atomic Models of **:**

- All amino acids except heterocyclic amino acids.
- Glysyl-Alanine, Glysyl-Valine, Ala-Ser and Glu-Lys.

Note:

1) ***During examination, in case of carbohydrates, the examiners should specify the particular* acyclic/cyclic structure *of the monosaccharide that the student has to prepare.***
2) ***During examination,* students are not supposed to *take the colorimetric readings by themselves.***

GUJARAT UNIVERSITY

5th Semester - Zoology

DETAILS OF PRACTICAL EXAMINATION (Question wise)

PAPER-306 (B-1)

(*Based on Theory Papers 303 & 304*)

Q.1 a) Monosaccharides – Glucose and Fructose
b) Disaccharides - Lactose, Maltose and Sucrose
c) Proteins – Albumin and Casein

Q.2 a) Estimation of Proteins (Preparation of Std. Curve by Biuret method).
b) Estimation of Glucose (Nelson-Somogyi method)

Note : Students are not supposed to *take the colorimetry readings by themselves.*

Q.3 Atomic models of **:**
a) 1**. Acyclic as-well-as all cyclic structures** of Ribose, Arabinose, Ribulose, Glucose, Mannose, Galactose, Psicose, Fructose and Tagatose.
2. Maltose, Lactose and Sucrose.
b) 1. All amino acids except heterocyclic amino acids.
2**. Dipepiteds** (Glysyl-Alanine, Glysyl-Valine, Ala-Ser and Glu-Lys.)

Note : *In case of carbohydrates, the examiners should specify the particular* **acyclic/cyclic structure** *of the monosaccharide, the student has to prepare.*

Q.4 Syllabus of Theory Papers 303 & 304 as-well-as Practical Papers 306 (B-1) & 306 (B-2) only.

Note : *All examiners should take the viva sitting together and each examiner should give marks from 06 and then the average marks of all the examiners should be given to the candidate.*

GUJARAT UNIVERSITY
5th Semester - Zoology

(SKELETON QUESTION PAPER FOR PRACTICAL EXAMINATION)

PAPER-306 (B-2)

(***Based on Theory Paper 304*** **)**

Date : …….. Marks : 35 Time : ….……

Q.1 Make a temporary preparation of_____from the given material and show it to the examiner. **10**

Q.2 Make a temporary preparation of_____from the given material and submit your result to the examiner. **10**

Find out the R_f value, identify the unknown amino acid and submit your results to the examiner.

Q.3 Identify and sketch a labeled diagram of the chick embryo and show it to the examiner. **04**

Q.4 Identify specimens 1 to 4 as per instructions **:** **08**
Sp. 1 Identify and state its uses.
Sp. 2 Identify and describe in brief.
Sp. 3 Identify and comment.
Sp. 4 Identify and describe.

Q.5 Journal. **03**

GUJARAT UNIVERSITY

5th Semester - Zoology

DETAILS OF PRACTICAL EXAMINATION (Question wise)

PAPER-306 (B-2)

(*Based on Theory Papers 304*)

Q.1 a) Slide of Mitosis – Onion root tip.
b) Slide of Barr body – Cheek cells / hair follicle.
c) Slide of Polytene chromosomes - Salivary glands of Drosophila larva..

Q.2 Normal man, Normal woman, Down syndrome, Klinefelter syndrome, Turner syndrome.

OR

Any of the 20 amino acids.

Q.3 Permanent slides of W.M. of 21, 33, 48 & 72 hrs. old chick embryos.

Q.4 Sp. 1 a) TEM, SEM, Centrifuge.

Sp. 2 a) Fluid Mosaic model of Plasma membrane.
b) Specialized structures of plasma membrane **:**
- Specialization due to outpushings/evaginations.
- Specialization due to inpushings/invaginations.
- Specializations due to contact **:**
Desmosomes, Hemi-desmosomes, Septate desmosomes, Tight junctions, Gap junctions, Terminal bars and Interdigitation.

c) Ultrastructure of Polytene chromosome and Lampbrush chromosome.

Sp. 3 a) Cell cycle.
b) Transmission & Scanning electron micrographs of a metaphase chromosome.
c) Nucleosome.
d) Ultrastructure of a Primary constriction.
e) Hammerling's experiment on *Acetabularia*.
f) Bantook's experiment on zygote of *Mayetiola destructor*.
g) Spemann's experiment on eggs of newt.
h) Somatic hybridization.

Sp. 4 a) Types of eggs depending upon the amount of yolk.
b) Types of eggs depending upon the amount of yolk.
c) Patterns of cleavage (as per theory syllabus)
d) Types of placenta in mammals (histological).
e) Blastula stage of chick embryo.
f) Gastrula stage of chick embryo.

NOTE :

1. ***The list of the reference books provided herein the syllabus is not an exhaustive list. Professors and students may use any other suitable & authentic reference source.***

2. ***Besides using chalk & duster, professors are strongly encouraged to make use of additional methods of teaching, to complete the syllabus.***
3. ***It is strongly advisable to take students for an excursion tour or educational visit to any coastal area, NP or sanctuary, in order to study the biodiversity in its natural habitat. However, collection of any fauna from its habitat should be avoided so as to help in maintaining the ecosystem.***
4. ***Prof.-in-charge of such tours should not compel the students to collect specimens for any type of submission work.***

GUJARAT UNIVERSITY

6th Semester - Zoology

(SKELETON QUESTION PAPER FOR PRACTICAL EXAMINATION)

PAPER-312 (A-1)

(*Based on Theory Paper 307*)

Date : …….. Marks : 35 Time : …….

Q.1	Estimate the_____from the given sample water.	**09**
Q.2	Dissect / Sketch a labeled diagram of the given shark/rat so as to expose the_____and show it to the examiner.	**07**
Q.3	Make a temporary mounting / sketch a labeled diagram of_____from the given shark/rat.	**02**
Q.4	Solve the given genetic problem.	**04**
Q.5	Identify specimens 1 to 5 as per instructions **:** Sp.1 Identify and comment on its ecological adaptations. Sp.2 Identify and comment on its ecological adaptations. Sp.3 Identify and comment. Sp.4 Identify and describe. Sp.5 Identify and explain.	**10**
Q.6	Journal.	**03**

GUJARAT UNIVERSITY

6th Semester - Zoology

DETAILS OF PRACTICAL EXAMINATION (Question wise)

PAPER-312 (A-1)

(*Based on Theory Paper 307*)

Q.1 Titrimetric – Acidity, Alkalinity,
Calcium hardness (using Murexide indicator),
Total Hardness (using Eriochrome Black T indicator),
Ca^{++} and Mg^{++}.
Colorimetric – Phosphate and Sulphate.

Q.2 Shark - V, VII, IX, X cranial nerves and Membranous labyrinth.
Rat - Digestive, Arterial, Venous and Reproductive systems and Brain.

Q.3 Shark/Rat - Striated muscle fibres, medullated nerve fibres.

Q.4 Genetics problems 1-5 [APPENDIX for Practical Paper – 312 (A-1)]

Q.5

Sp.1	Sedentary & Fixed Animals	**:** Sponges, Gorgonia.
	Tubeworms	**:** Arenicola, Sabella.
	Planktons	**:** Daphnia, Cyclops.
	Nectons	**:** Fish, Prawn.
	Benthic	**:** Solefish, Sting rayfish, Electric rayfish.
Sp.2	Arboreal	**:** Hyla, Squirrel.
	Burrowing	**:** Snake, Hedgehog.
	Flying	**:** Bird, Bat.

Sp.3 Biomes (Tundra, Savanna, Grassland, Desert and Tropical Rain Forest)
Summer & Winter Thermal stratifications in Fresh water ecosystem.

Sp.4 Sympathetic nervous system of frog.
V.S. of mammalian skin.
Derivatives of mammalian skin (Claw, Nail, Hoof, Horn and Hair)
Rat - Digestive, Arterial, Venous and Reproductive systems and Brain.
- Striated muscle fibres and medullated nerve fibres.

Sp.5 Molecular biology & Genetics **:**

- DNA replication modes
- DNA synthesis in vitro
- Types of DNA and RNA
- Protein synthesis
- Southern blotting
- Thermocycler
- Recombinant DNA
- DNA fingerprinting

GUJARAT UNIVERSITY

6th Semester - Zoology

(SKELETON QUESTION PAPER FOR PRACTICAL EXAMINATION)

PAPER-312 (A-2)

(*Based on Theory Papers 307 & 308*)

Date : …….. Marks : 35 Time : ……

Q.1 Perform the given physiological experiment_____. Record your observations & calculations if necessary, and submit to the examiner. **09**

Q.2 (a) Estimate the concentration of_____in your own blood. **09**

OR

(b) Make a temporary preparation of_____from your own blood.

OR

(c) Determine the_____of your own blood.

Q.3 Identify the specimens 1 to 4 as per instructions **:** **08**

Sp.1 Identify and describe.
Sp.2 Identify and comment.
Sp.3 Identify and describe.
Sp.4 Identify and describe.

Q.4 Viva voce. **06**

Note : All examiners should take the viva sitting together and each examiner should give marks from 06 and then the average marks of all the examiners should be given to the candidate.

Q.5 Journal. **03**

GUJARAT UNIVERSITY

6th Semester - Zoology

DETAILS OF PRACTICAL EXAMINATION (Question wise)

PAPER-312 (A-2)

(*Based on Theory Papers 307 & 308*)

Q.1 a) Total RBC count in your own blood.
b) Total WBC count in your own blood.
d) Preparation of your own blood smear , stained by Geimsa stain, to identify the different WBCs.

Q.2 a) Hb
OR

b) Haemin crystals
OR

c) Bleeding time & Blood clotting time **(*Both to be asked together as one single question*)**

Q3.

Sp.1	Immunity **:**	Lymphatic circulatory system in humans
		T.S. through a lymph node
		T.S. through spleen
		T.S. through thymus
		Structure of a antibody
Sp.2	Respiration **:**	Respiratory muscles
		Alveolar-capillary (respiratory) membrane
		Exchange of the respiratory gases
		Oxygen-haemoglobin dissociation curve
	Reproduction**:**	Mol. structures of Testosterone, Estrogen and Progesterone
Sp.3	Reproduction**:**	Menstrual cycle
		T. S. of uterus
Sp.4	Muscle contraction **:**	T. S. of muscle.
		Ultrastructure of sarcomere.
		Neuro-muscular junction

Q.4 Syllabus of Theory Papers 307 & 308 as-well-as Practical Papers 312 (A-1) and 312 (A-2) only.

Note : All examiners should take the viva sitting together and each examiner should give marks from 06 and then the average marks of all the examiners should be given to the candidate.

GUJARAT UNIVERSITY
6th Semester – Zoology

(SKELETON QUESTION PAPER FOR PRACTICAL EXAMINATION)

PAPER-312 (B-1)

(***Based on Theory Papers 309*** **)**

Date : …….. Marks : 35 Time : ….……..…

Q.1 Estimate colorimetrically the concentration of _____ **10**
from the given unknown solution and submit upir results to the examiner.

Note : Students are not supposed *to take the colorimetric readings by themselves.*

Q.2 Prepare the atomic model of following and show it to the examiner. **12**

a) Simple lipids.

b) Compound lipids.

Note : *Examiners should make the students* **only write** *the structure of the compound* (like in theory exam) **and not make them draw** *the atomic model.*

Q.3 Identify the specimens 1 to 5 as per instructions **:** **10**

Sp.1 Identify and comment.
Sp.2 Identify and describe.
Sp.3 Identify and complete the chart.
Sp.4 Identify and comment.
Sp.5 Identify and comment.

Q.4 Journal. **03**

GUJARAT UNIVERSITY

6th Semester – Zoology

DETAILS OF PRACTICAL EXAMINATION (Question wise)

6th Semester – Zoology

PAPER-312 (B-1)

(*Based on Theory Papers 309*)

Q.1 a) Cholesterol in Serum/Plasma (Ferric chloride method).
b) Creatinine in urine.

Note : Students are not supposed *to take the colorimetry readings by themselves*.

Q.2 a) Glycerol, Butyric acid, Crotonic acid, Tributyrin.
b) Lecithins, Cephalins and Plasmalogens.

Note : *Examiners should make the students* **only write** *the structure of the compound* (like in theory exam) **and not make them draw** *the atomic model.*

Q.3 Sp.1 Basic steroid nucleus
Cholesterol
Structures of **:**
- Glycerol, Butyric acid, Crotonic acid, Tributyrin, Lecithins, Cephalins and Plasmalogens.

Sp.2 Factors affecting enzyme activity **:**
- Temperature
- pH
- Graph showing effect of [S] on the velocity of an enzyme catalyzed reaction.

Sp.3 Glycogenesis (structures required).
Glycogenolysis (structures not required).
Glycolysis (EM Pathway) (structures required)
Urea synthesis (structures required).

Sp.4 Glucogenesis (structures required).
Krebs Cycle (structures required).
ETS.

Sp.5 HMP Shunt Pathway (structures required).
β-oxidation of saturated fatty acids (structures required).

GUJARAT UNIVERSITY
6th Semester – Zoology

(SKELETON QUESTION PAPER FOR PRACTICAL EXAMINATION)

PAPER-312 (B-2)

(*Based on Theory Papers 309 & 310*)

Date : …….. Marks : 35 Time : ……

Q.1 Identify the specimens 1 to 6 as per instructions **:** **12**

Sp.1 Identify and describe.
Sp.2 Identify and state its endocrinological functions.
Sp.3 Identify, sketch and label.
Sp.4 Identify and state its uses.
Sp.5 Identify and comment.
Sp.6 Identify and describe the reproductive behaviour pattern.

Q.2 Submission of 10 permanent slides (5 histology and 5 W.M.). **14**

Q.3 Viva voce. **06**

Note : All examiners should take the viva sitting together and each examiner should give marks from 06 and then the average marks of all the examiners should be given to the candidate.

Q.4 Journal. **03**

GUJARAT UNIVERSITY

6th Semester – Zoology

DETAILS OF PRACTICAL EXAMINATION (Question wise)

PAPER-312 (B-2)

(*Based on Theory Papers 309 & 310*)

Q.1 Sp.1. Mammalian histology by permanant slides **:**
T.S. of Pituitary, Testis, Ovary, Thyroid, Adrenal.

Sp.2 Mammalian histology by permanant slides **:**
T.S. of Pituitary, Testis, Ovary, Thyroid, Adrenal.

Sp.3 Mammalian histology by permanant slides **:**
T.S. of Pituitary, Testis, Ovary, Thyroid, Adrenal.

Sp.4 Histotechnology **:**
Microtome Toxicology
by chart **:**
LD_{50} test
Animal Biotechnology by chart **:**
- Classical organ culture technique.
- Trowel's type II culture chamber.

Sp.5 Animal behaviour **:**
Communication in/between bats & moths.
Social organization in Baboons.

Sp.6 Animal behaviour **:**
Courtship signals **–** e.g. Balloon Fly (*Hilara sartor*)
Persuasion & Appeasement**–**e.g. ♂ Stickleback's zigzag dance, Herring gull.
False information – e.g. Scorpion fly (*Hylobittacus apicalis*)

Q.3 Syllabus of Theory Papers 309 & 310 as-well-as Practical Papers 312 (B-1) & 312 (B-2) only.

Note : All examiners should sit together to take the viva and each examiner should give marks from 06 and then the average marks of all the examiners should be given to the candidate.

NOTE :

1. ***The list of the reference books provided herein the syllabus is not an exhaustive list. Professors and students may use any other suitable & authentic reference source.***
2. ***Besides using chalk & duster, professors are strongly encouraged to make use of additional methods of teaching, to complete the syllabus.***