NORTH MAHARASHTRA UNIVERSITY, JALGAON.

T. Y. B. Sc. Zoology: Questions bank

(With effect from June, 2009)

Chairman: Dr. A. Y. Mahajan, D. N. College, Faizpur. Dist- Jalgaon.

Coordinator: Dr. S. S. Patole, S. G. Patil College, Sakri. Dist- Dhule.

Semester III

Course Name and Number	Question bank preparation Committee Members
Zoo: 311 (Functional anatomy of Non-Chordates)	1. Dr. V. R. Borane, Jijamata College, Nandurbar. 2. Dr. R. D. Patil, Navapur College, Dist- Nandurbar.
Zoo: 312 (Cell and Molecular Biology)	1. Dr. B. C. More, A. M. Patil College, Pimpalner. 2. Dr. S. S. Patole, S. G. P. College, Sakri.
Zoo: 313 (Mammalian Histology)	1. Prof. V. S. Sonawane, Nutan Maratha Coll. Jalgaon 2. Dr. Ram Prakash, Bendale Mahila College, Jalgaon.
Zoo: 314 (Biochemistry)	1. Dr. Sunil Shine, Jaihind College, Dhule. 2. Dr. R. T. Mahajan, M. J. College, Jalgaon.
Zoo: 315 (Research Methodology)	1. Dr. L. B. Pawar, S. G. Patil College, Sakri. 2. Dr. D. N. Patil, S. G. Patil College, Sakri. 3. Dr. S. S. Patole, S. G. Patil College, Sakri. 4. Dr. R. T. Mahajan, M. J. College, Jalgaon.
Zoo: 316 (Biotechnology)	1. Dr. R. P. Borale, Jaihind College, Dhule.
Zoo: 316 (Sericulture)	1. Prof. R. K. Petare, A. M. Patil College, Pimpalner. 2. Prof. Y. M. Nandre, A. M. Patil college, Pimpalner.
Zoo: 316 (Economic Zoology)	1. Dr. S. S. Patole, S. G. Patil College, Sakri. 2. Prof. S. P. Khodke, A. M. Patil College, Pimpalner.

Semester IV

Zoo: 321 (Functional anatomy of Chordates)	1. Dr. R. D. Patil, Navapur College, Dist- Nandurbar. 2. Prof. R. D. Patil, V. N. College, Shahada.
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Zoo: 323 (Mammalian Physiology)	1. Prof. R. K. Petare, A. M. Patil College, Pimpalner. 2. Dr. D. N. Patil, S. G. Patil College, Sakri.
Zoo: 324 (Food and Nutrition)	1. Dr. R. T. Mahajan, M. J. College, Jalgaon. 2. Dr. Manoj Chopda, M. J. College, Jalgaon.
Zoo: 325 (Microtechnique)	1. L. B. Pawar, S. G. Patil College, Sakri 2. Dr. D. N. Patil, S. G. Patil College, Sakri.
Zoo: 326 (Animal Husabandry)	1. Prof. S. P. Khodke, A. M. Patil College, Pimpalner. 2. Dr. B. C. More, A. M. Patil College, Pimpalner.
Zoo: 326 (Toxicology)	1. Dr. G. K. Gosavi, G. T. Patil College, Nandurbar 2. Prof. V. S. Vaidya, Dondaicha
Zoo: 326 (Bioinformatics)	1. Dr. R. P. Borale, Jaihind College, Dhule.

FUNCTIONAL ANATOMY OF NON CHORDATE

Unit: 1 Paramoecium caudatum

Q.1) Multiple choice questions (2 marks each)

1) Paramoecium found in ……..

a) land b) soil c) freshwater d)None of above

2) Paramoecium is ……..

a) rounded shaped b) shapeless c) slipper shaped d) None of these

3) The body surface is covered by ……..

a) flagella b) tentacles c) cilia d) pellicle

4) The external elastic cuticular membrane called…….

a) cilia b) pellicle c) flagella d) None of these

5) The cytoplasm is differentiated into …….region

a) single b) two c) three d) four

6) Trichocysts are ……

a) rod like b) slipper like c) oval d) kidney

7) Macronucleus is roughly ……shaped

a) rod b) shipper like c) shapeless d) kidney

8) In paramoecium there are ……contractile vacuoles

a) single b) double c) absent d) None of these

9) Paramoecium swimming is by the beating of ……

a) flagella b) cilia c) pseudopodia d) None of these

10) Paramoecium feeds in the ……..

a) heterozoic b) holozoic c) saprozoic d) None of these

11) food is ingested by a definite ……

a) food vacuole b) contractile vacuole c) cytostome d) cilia

12) The cytopyge is a ……..

a) oral spot b) anal spot c)plasmid d) None of these

13) The functional role of contractile vacuoles in paramoecium are ……

a) Thermoregulation b) food storage c) osmoregulation d) digestion

14) Response to temperature is ……in protozoa

a) thermo taxis b) chemo taxis c) rheotaxis d) geotaxis

15) Response to light is ……in protozoa

a) photo taxis b) galvanotaxis c) thigmotaxis d) geotaxis

16) Response to touch ……. in protozoa

a) thigmotaxis b) phyotaxis c) galvanotaxy d) rheotaxis

17) Response to chemical is ……. in protozoa

a) chemotaxis b) phototaxis c) thermotaxis d) geotaxis

18) Response to electric current is …… in protozoa

a) rheotaxis b) galvanotaxis c) geotaxis d) phototaxis

19) Response to gravity is ……in *Paramoecium*

a) geotaxis b) galvanotaxis c) chemotaxis d) None of these

20) Paramoecium undergoes a sexual phenomenon called ……

a) endomixis b) binary fission c) conjugation d) None of these

Q.2 Define /explain /comment (2 marks each)

1) oral groove 2) pellicle 3) cilia 4) kinetosome 5) kinetodesmata 6) trichocysts 7) cytopyge 8) cyclosis 9) cytogamy 10) autogamy 11) endomixis 12) kappa particle 13) Pi particles 14) mu particles 15) lambda particles.

Q.3 Question for (6 mark each)

1) Describe responses of paramoecium

2) Behavior in paramoecium

3) Describe transverse binary fission

4) Describe process of conjugation in paramoecium

5) Explain structure of pellicle & cilia in paramoecium

6) Describe process of endomixis in paramoecium

7) Significance of conjugations

Q.4 Short Note /Sketch & label (4 marks each)

1) Locomotion in paramoecium

2) Nutrition in paramoecium

3) Osmoregulation in permeation

4) Autogamy in paramoecium

5) Cytogamy in paramoecium

6) Kappa particle

7) Draw & label structure of paramoecium

8) Draw & label stages of binary fission

9) Draw & label stages in endomixis.

Q.5 Question for (3 mark each)

1) Structure of paramoecium 2) Pellicle

3) Basal bodies 4) Trichocysts

5) Nucleus of paramoecium 6) Cytopyge

7) Feeding mechanism in paramoecium

Unit: 2 *Hirudinaria granulose* (an Indian (cattle leech)

Q.1) Multiple choice questions (2 marks each)

1) Leech is blood sucking animal called ……..

a) carnivorous b) omnivorous c) saguivorous d) none of above

2) The leech belongs to class ……..

a) oligochaeta b) Hirudinea c) Polychaeta d) none of these

3) The body of leech is metamerically divided into ……..segments

a) 33 b) 35 c) 36 d) 38

4) The male genital pore is situated on …….somite

a) 9^{th} b) 10^{th} c) 11^{th} d) 17^{th}

5) The female genital pore is situated on …….somite

a) 10^{th} b) 11^{th} c) 12^{th} d) 17^{th}

6) Botryoidal tissue probably …… in function

a) excretory b) respiratory c) locomotory d) nervous

7) Denticles on the jaw in a single row are called ……..

a) diphyodont b) polyphyodont c) monostichodont d) homodont

8) The anticoagulant substance secreted by leech during feeding is ……

a) Hirudin b) Plasma c) R.B.C d) thrombocyte

9) Nephridia are …… in function

a) respiratory b) excretory c) Nervous d) circulatory

10) Free nerve ending is ……..

a) chemoreceptor b) photoreceptor c) tango receptors d) none of these

11) Annular receptors are ……

a) Photoreceptors b) chemoreceptor c) tango receptors d) none of these

12) Leech is ……..

a) Monoceous b) dioceous c) None of these d) Both

13) Clitellar glands secrete ……

a) albuminous fluid b) Plasma c) blood d) none of these

Q.2 Define /explain /comment (2 marks each)

1) Suckers 2) Clitellum 3) Muscles 4) Botryoidal tissue 5) Crop

6) Haemolysis 7) Coelom 8) Chemoreceptors 9) Tango receptors

10) Photoreceptors 11) Cocoon

Q.3 Question for (6 mark each)

1) Describe digestive system of leech with the help of suitable diagram

2) Describe dorsal & ventral channels in leech

3) Describe lateral & latero ventral channels of haemocoelomoic system

4) Describe testicular nephridia of leech with the help of suitable diagram

5) Describe central nervous system of leech with the help of suitable diagram

6) Describe Peripheral nervous system of leech

7) Eyes of leech

8) Describe male reproductive organs of leech with the help of suitable diagram

9) Describe female reproductive organs of leech with the help of suitable diagram

10) Describe copulation, fertilizations & cocoon formation

Q.4 Show Note /sketch & table (4 marks each)

1) External morphology of leech
2) Body wall of leech
3) Locomotion in leech
4) Crop
5) Food feeding & digestion
6) Coelom
7) Apical lobe
8) Ciliated organ

9) Autonomic nervous system
10) Physiology of excretion
11) Segmental receptor
12) Atrium
13) Copulation
14) Cocoon formation
15) Sketch and label external features of leech
16) Sketch and label T.S of body wall
17) Sketch and label digestive system of leech
18) Sketch and label V.S of annular receptor
19) Sketch and label V.S of segmental receptor
20) Sketch and label V.S of an eye
21) Sketch and label reproductive system of leech
22) Sketch and label stages in cocoon formation

Q.5 Question for (3 mark each)

1) Epidermal glands
2) Looping movement
3) Basal bodies
4) Initial lobe
5) Physiology of excretion
6) Testis sac
7) Development in leech

Unit: 3 Pila globosa

Q.1) Multiple choice questions (2 marks each)

1) Pila globosa is adapted to lead ……..life

a) Aquatic b) Aerial c) Amphibious d)Arborial

2) Whorls are demarcated by lines called ……..

a) Sutures b) Spire c) lip d) umbilicus

3) The smooth margin of the aperture is called ……..

a) Spire b) Sutures c) Peristome d) None of these

4) A covering of the skin on the visceral mass is called …….

a) Peristome b) mantle c) peristome d) none of these

5) Monopectinate gill is …….

a) comb like b) feather like c) rod like d) none of these

6) Bipectinate gill is ……

a)) comb like b) feather like c) rod like d) none of these

7) The buccal cavity contains a ribbon like structure called ……..

a) Radula b) cartilage c) jaws d) none of these

8) The heart of pila consists of ……chambers

a) Two b) three c) four d) one

9) The small spaces in which blood is collected are called ……

a) Lacunae b) sinuses c) crop d) radula

10) The large spaces in which blood is collected are called ……..

a) Lacunae b) sinuses c) radula d) crop

11) The respiratory pigment in the blood of pila is called ……

a) Haemocyanin b) hemoglobin c) pericardial fluid d) haemolymph

12) Haemocyanin contains ……..

a) Copper b) iron c) silver d) none of these

13) Pila excretes ……

a) ammonia b) uric acid c) both a&b d) none of these

14) Osphradium serves as ……..

a) olfactory organ b) photoreceptors c) tango receptors d) thermo receptor

15) statocysts are the organs of ……

a) olfaction b) photoreception c) equilibrium d) touch

16) …….. types of sperms are produced in the testis of *Pila*

a) eupyrene b) oligopyrence c) both a&b d) absence

Q.2 Define /explain /comment (2 marks each)

1) Shell of pila	2) Conchiolin	3) Operculum
4)Ommatophore	5) Mantle/Pallium	6) nuchal lobes
7) Pallial complex	8) monopectinate	9) Hypobranchial gland
10) Bipectinate	11) Odontophore	12) Radula
13) Food of pila	14) Ctenidium	15) Lamellae
16) Pericardium	17) Lacunae	18) Sinuses
19) Haemocyanin	20) Organ of Bojanus	21) Ammonotelic

22) Uricotelic 23) Osphradium 24) eyes

25) Statocysts 26) Tentacles 27) Dioecious

28) Eupyrene 29) Oligopyrene 30) ranspose seminalis

31) Penis 32) Hypobranchial gland 33) Receptaculum seminis

34) pulmonary sac

Q.3 Question for (6 mark each)

1) Describe Alimentary canal of pila with neat labeled diagram

2) Describe digestive gland, food feeding & digestion in *Pila*

3) Describe respiratory organs of pila 4) Describe heart of pila

5) Describe excretory system of pila 6) Describe nervous system of pila

7) Eyes 8) Describe male reproductive system of pila with a neat labeled diagram 9) Describe female reproductive system of pila with a neat labeled diagram

Q.4 Short note /Sketch & label (4 marks each)

1) External morphology of pila 2) Operculum 3) Foot in pila

4) Mantle cavity & pallial complex 5) Organs of branchial chamber

6) Organs of pulmonary chamber 7) Locmotion in pila 8) Radula

9) Salivary glands of pila 10) Digestive glands of pila

11) Food feeding & digestion of pila 12) Ctenidinum

13) Aquatic respiration of pila 14) Aerial respiration

15) Pericardium 16) Blood of pila

17) Ant. Renal chamber 18) Renal chambers in Pila

19) Physiology of excretion 20) Ganglia of pila

21) Osphradium 22) statocysts

23) Eyes 24) Testis of pila

25) Copulatory organs of pila 26) Ovary of pila

27) Copulation in pila 28) Draw & label external featues of pila

29) Draw & label mantle cavity & pallial complex 30) Draw & label operculum

31) Draw & label Alimentory canal 32) Draw & label radula

33) Draw & label T.S of lamella 34) Draw & label head of pila

35) Draw & label excretory organs 36) Draw & label nervous system of pila

37) Draw & label osphradition 38) Draw & label stotocys

39) Draw & label male reproductive organs 40) Draw & label L.S of eye

41) Draw & label male copulaly organs & sperms 42) Draw & label female reprod. Organs

Unit: 4 Arthropoda

I) Appendages in crustacean

Q.1) Multiple choice questions (2 marks each)

1) The antennules are …….. in function

a) excretory b) tactile c) masticatory d) respiratory

2) The antennae are ……..in function

a) balancing b) masticate c) respiratory d) None of these

3) The mandibles are used for……..

a) respiration b) mastication c) sensation d) balancing

4) The maxillulae are used in ……..

a) respiration b) manipulation c) sensation d) balancing

5) The maxillulae help in …….

a) respiration b) manipulation c) both a&b d) None of these

Q.2 Define /explain /comment (2 marks each)

1) Antennules 2) Antennae 3) Mandibles 4) Maxillulae

5) Maxillae 6) Legs 7) Pleopods 8) Uropods

Q.3 Question for (6 mark each)

1) Describe cephalic appendages in palaemon with a suitable diagram

2) Describe thoracic appendages in palaemon with a suitable diagram

3) Describe abdominal appendages in palaemon with a suitable diagram

Q.4 Short Note /Sketch & label (4 marks each)

1) Antennules 2) Mandibles 3) Walking legs

4) Uropods 5) Draw & label Antennule 6) Draw & label antenna

7) Draw & label mandible 8) Draw & label maxillula

9) Draw & label maxilla 10) Draw & label leg of male

11) Draw & label uropod 12) Draw & label male abdominal appendages

II) – Mouth parts in insects

Q.1 Define /explain /comment (2 marks each)

1) Mandibulate 2) Labrum 3) Labium 4) Hypopharynx

5) Epipharynx 6) Dipterous mouth parts 7) Hemipterous 8) Proboscis

Q.2 Question for (6 mark each)

1) Describe biting & chewing type (mandibulate) of mouth parts

2) Describe chewing & lapping mouth parts

3) Describe piercing & sucking mouth parts 4)sponging mouth parts

Q.3 Short Note /Sketch & label (4mark each)

1) Maxillae 2) Lower lip 3) Dipterous mouth parts 4) Hemipterous mouth parts

5) Siphoning mouth parts 6) Draw &label biting & chewing type of mouth parts

7) Draw &label chewing & lapping mouth parts

8) Draw &label piercing & sucking mouth parts

9) Draw &label sponging mouth parts

C):- Mollusca

Q.1 Questions for (6 marks each)

1) Describe torsion in gastropods

Q.2 Short Note Question for (4 marks each)

1) Significance of torsion

2) Torsion in gastropods

3) Occurrence of torsion

Unit: 5 General topics

A) Porifera

Q.1) multiple choice questions (2 marks each)

1) The spicules are ……..like structure

a) needle b) kidney c) button d) None of these

2) The spicules are composed of ……..

a) $CaCo_3$ b) $NaCo_3$ c) Kco_3 d) $PbCl_2$

3) The spicules are stain well with ……..

a) methylene blue b) carmine c) eosin d) orcein

Q.2 Define /explain /comment (2 marks each)

1) Spicules	2) Axial filament	3) Megascleres	4)Monaxons
5) styles	6) Rhabds	7)Tetraxons	8) Triaxons
9) Polyaxons	10) Desma	11) Microscleres	12) Spires
13) Asters	14) Gemmules	15) Micropyle	

Q.3 Question for (6 mark each)

1) Types of spicules

2) Describe megascleres with its types

3) Describe development of spicules

4) Describe gemmule formation and add a note on its significance

Q.4 Short note /sketch & label (4 marks each)

1) Microscleres

2) Development of monaxon spicule

3) Development of hexactinal spicule

4) Uses of skeleton

5) Gemmule formation

6) Germination of gemmule

7) Signification of gemmule

8) Draw & lable gemmule with spicules

9) Development of monaxon spicules

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CELL & MOLECULAR BIOLOGY

Unit 1– Introduction to cell biology

Q 1) Question for 2 marks.

1) The plasma membrane is ……

a) Permeable b) selecting permeable c) Impermeable d) semi permeable

2) …… is the power house of the cell

a) Ribosome b) Liposome c) Mitochondria d) Golgi

3) Cluster of ribosomes is called …….

a) Mesosomes b) Polysome c) Dictyosome d) Phagosome

4) Function of detoxication in liver cell is carried out by

a) Ribosome b) Mitochondria c) ER d) Nucleus

5) The plasma membrane is …….

a) Permeable b) Selectively permeable c) Impermeable d) Semi permeable

6) Which is following is semiautonomous

a) Mitochondria b) Chloroplast c) Centrosome d) Both a & b

Q.1. Define / Explain / Comments (2 marks)

1) Plasma membrane 2) Exocytosis 3)Endocytosis

4) Mitochondria 5) Lysosome/ Suicide bag 6) Ribosome

7) Nucleus 8) Endoplasmsic reticulum 9) Golgi body

Q. 2) Questions for 3 marks.

1) Sketch & label mitochondria 2) Sketch & label Golgi complex

3) Sketch & label Nucleus 4) Function of ER

5) Function of Ribosome

Q 3) Question for 4 marks

1) Structure & function of Mitochondria

2) Structure & function of Golgi complex

3) Structure & function of Nucleus

4) Function of plasma membrane

Q.4 Question for 6 marks.

1) Describe Danielli & Devison model for cell membrane structure

2) Describe fluid mosaic model.

Unit 2 DNA as a genetic material

Q.1 Question for 2 marks

1) …….. is the genetic material

a) DNA b) Protein c) Lipid d) Engines

2) In Streptococcus pneumonia …… strain is pathogenic strain

a) R strain b) S strain c) E strain d) None of the above

3) …… first coined the terms plasmid

a) Griffith b) Watson & crick c) Lederberg d) Artery McCarty

Q. 1. Define / Explain (2 marks)

1) Bacteriphage	2) Auxotroph	3) prototroph
4) Virulent	5) Avirulent	6) R- plasmid
7) f- factor	8) Col-factor	9) Degradative plasmid
10) Plasmid.	11) Cosmid	

Q.2 Question for 3 marks

1) In brief explain bacterial transformation

2) In brief explain bacterial conjugation

3) In brief explain bacterial transduction

4) Enlist types of plasmid

Q.3 Question for 4 marks

1) Explain Griffith experiment.

2) Explain Hershey & chase experiment.

Q.4 Question for 6 marks

1) Describe Beedle & Tatum expt. of Conjugation

2) Describe Artery & Mc Carty expt.

3) Describe Zender & Ledgerberg U tube expt

4) Life cycle of bacteriphage

Unit 3 Nucleic acids

Q.1 Question for 2 marks

1) …… is the ransp base.

a) Adenine b) cytosine c) Guanine d) None of the above

2) In the nucleotide the phosphate molecule is attached to ……. Carbon of deoxyribose sugar

a) First (c_1) b) Sixth (c_6) c) Third (c_3) d) Fourth (c_4)

3) The two polynucleotide strand of the DNA double helix are

a) Parallel b) Horizontal c) Vertical d) Ant parallel

Q. 2. Define/Explain (2 marks each)

1) Nucleotide 2) nucleoside 3) Purines 4) Pyrimidines

Q.3 Question for 3 marks.

1) B form DNA 2) A from DNA 3) Z from DNA

4) Sketch & label Watson & Crick Model of DNA

Q.4 Question for 4marks

1) Mitochondnal DNA & their function.

2) Chloroplast DNA & their function.

3) Write a note on denaturation & renaturation of DNA

4) Write Structure & Function of r RNA

5) Write Structure & Function of t RNA

6) Write Structure & Function of m RNA

Q.5 Questions for 6 marks

1) Chemical composition of DNA

2) Salient features of Watson & crick model of DNA

3) Properties of DNA

4) Life cycle of RSV virus

5) Life cycle of HIV virus

Unit 4. Gene & Genetic code **M-8**

Q.1 Question for 2 marks

1) The term gene was introduced by …… In 1909

a) Johannsen b) Darwin c) Benzer d) Crick

2) A …… is the nucleotide sequence in mRNA which codes for a particular amino acid

a) Codon 2) Non- Codon c) Anticodon d) None of the above

3) …… is the initiation codon

a) AUG 2) UAA c) AUC d) UGA

4) …… is the termination codon

1) AUG 2) VAA 3) VUA 4) VGA

Q. 1. Define/ Explain (2 marks each)

1) Gene 2) Recon 3) Muton 4) Cistron

5) Codon 6) Initiation Codon

Q.2 Questions for 3 marks

1) Concept of gene.

2) One gene one enzyme hypothesis

3) One gene polypeptide hypothesis

Q.3 Questions for 4 marks

1) Triplet of genetic code is degenerate justify

2) Explain genetic code.

3) Give properties of genetic code.

4) Explain Wobble hypothesis

Q.4 Questions for 6 marks

1) What is genetic code? Give the properties of genetic code

2) Explain prokaryotic DNA replication

3) Explain **Eu**karyotic DNA replication

Unite 5. Central dogma of molecular biology M-10

Q.1 Question for 2 marks

1) …… is the process of synthesis of RNA chain complementary to one strand of duplex DNA

a) Transcription b) Translation c) Tranversion d) Transition

2) RNA synthesis is catalyzed by …… enzyme

a) RNA polymerase b) DNA polymerase c) RNA ligase d) Transferase

Q. 1. Define /Explain (2 marks each)

1) Transcription 2) Translation 3) Tata box

4) hn RNA 5) Axon 6) Intron

7) Splicing 8) Sigma factor 9) RNA Poly I

10) RNA polymerase II 11) RNA Poly III

Q.2 Question for 3 Marks

1) Inhibitors of transcription

2) Explain the splicing of pre mRNA in eukaryotes.

3) Amino acyl t RNA synthetase

4) Polysome.

5) Gene regulation.

Q .3 Question for 4 Marks

1) Activation of amino acid

2) Polypeptide chain elongation

3) Polypeptide chain termination

4) Ribosomes Structure and functions

Q.4 Question for 6 Marks

1) What is gene regulation? Describe the lac-operon model for gene regulation

2) Describe the process of prokaryotic transcription

3) Describe the process of eukaryotic transcription

4) Description the process of translation.

Unit 6 Mutation M-8

Q 1 – Question for 2 Marks

1) Mutation those occurs without a known cause are called …….. mutation

a) Spontaneous b) Induced c) Somatic d) Germinal

2) Mutation those results from the exposure of organisms to mutagenic agent are called …… mutation.

a) Spontaneous b) Induced c) Somatic d) Germinal

3) 5-B.U is a …… analogue

a) Cytosine b) Thymine c) Uracil d) Guanine

Define /Explain 2 Marks each

1) Mutation 2) spontaneous mutation 3) Induced mutation

4) Somatic mutation 5) Germinal mutation

Q.2 Question for 3 marks

1) Transition types of mutation

2) Tranversion types of mutation

Q.3 Question for 4 marks

1) Write ionizing radiation induced mutation

2) Write types of mutation

3) Write chemical mutagens & their effect on DNA

4) Write short note on Nitrous acid

Q.4 Question for 6 marks

1) Describe physical mutagenic agent & their effects on DNA

2) Describe the chemical mutagenic agent & their effects

3) Explain photorepair with the help of neat diagram

4) Explain dark repair with the help of neat diagram

Unite 7 Techniques in Molecules Biology **M-8**

Q.1 Question for 2 marks

1) Southern blotting Technique is for the identification of ……

a) DNA b) tRNA c) mRNA d) rRNA

2) Northern blotting technique is for the identification of……

a) RNA b) ZDNA c) BDNA d) ADNA

Define /Explain 2 marks

1) Primer 2) Southern blotting

3) Northern blotting 4) Western blotting

Q.2 Question for 3 marks

1) Application of PCR

2) Application of ELISA

3) Application of electrophoresis

Q.3 Question for 4 marks

1) Explain southern blotting
2) Explain Western blotting
3) Explain Northern blotting

Q.4 Question for 6 marks

1) Explain PCR & gives its application
2) Explain ELISA & gives Its application
3) Explain PAGE& gives its application
4) Explain SDS PAGE & gives its application
5) Explain DNA finger printing & gives its application

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MAMMALIAN HISTOLOGY

Q. 1 Define / explain (2 marks each)

Unit 2

i. Three germinal layers

ii. Derivatives of Ectoderm

iii. Derivatives of Mesoderm

iv. Derivatives of Endoderm

v. Types of tissues

vi. Origin of epithelial tissue

vii. Origin of connective tissue

viii. Functions of epithelial tissue

ix. Functions of connective tissue

x. Location of Squamous epithelial tissue

xi. Location of columnar epithelial tissue

xii. Location of cuboidal epithelial tissue

xiii. Location of ciliated epithelial tissue

xiv. Location of stratified epithelial tissue

xv. Locations of connective tissue

xvi. Types of cells of connective tissue

xvii. Types of matrix of connective tissue

xviii. Functions of different types of cells from connective tissue

xix. Functions of Tendon

xx. Functions of Ligament

xxi. Functions of cartilage

xxii. Functions of bones

xxiii. Neuron

xxiv. Types of neurons

Unit 3

i. Functions of skin

ii. Derivatives of skin

Unit 4

i. Functions of tooth

ii. Functions of tongue

iii. Functions of oesophagus

iv. Functions of stomach

v. Functions of duodenum

vi. Functions of ileum

vii. Functions of colon

viii. Functions of rectum

Unit 5

i. Functions of trachea

ii. Functions of lung

Unit 6

i. Functions of R.B.C.

ii. Functions of W.B.C

iii. Functions of platelets

Unit 8

i. Functions of spinal cord

Unit 10

i. Functions of pituitary gland

ii. Functions of thyroid gland

iii. Functions of adrenal gland

Q. 2 Describe / write notes on (questions for 3, 4 and 6 marks) 3=A, 4= B, 6=C

i. Characteristics of tissues (B)

ii. Types of tissues (B)

iii. General structure of epithelial tissue (C)

iv. General structure of connective epithelial tissue (C)

v. General structure of muscular epithelial tissue (C)

vi. General structure of nervous epithelial tissue (C)

vii. General structure of columnar epithelial tissue (A)

viii. General structure of cuboidal epithelial tissue (A)

ix. General structure of ciliated epithelial tissue (A)

x. General structure of pseudo stratified epithelial tissue (A)

xi. General structure of stratified epithelial tissue (A)

xii. General structure of simple tubular glands (C)

xiii. General structure of compound tubular glands (C)

xiv. General structure of simple areolar tissue (B)

xv. General structure of compound alveolar cells (B)

xvi. General structure of holocrine glands (A)

xvii. General structure of apocrine glands (A)

xviii. General structure of merocrine glands (A)

xix. Cells of connective tissue (C)

xx. General structure of loose / areolar tissue (C)

xxi. General structure of dense tissue (B)

xxii. General structure of adipose tissue (B)

xxiii. General structure of tendon (A)

xxiv. General structure of aponeurosis (A)

xxv. General structure of ligaments (A)

xxvi. General structure of cartilage (A)

xxvii. General structure of bone with haverssian canal system (C)

xxviii. General structure of muscular tissue (C)

xxix. General structure of striated muscle (C)

xxx. General structure of smooth muscle (A)

xxxi. General structure of cardiac muscle (A)

xxxii. General structure of unipolar neuron (A)

xxxiii. General structure of bipolar neuron(A)

xxxiv. General structure of multipolar neuron (C)

xxxv. General structure of epidermis of skin (C)

xxxvi. General structure of hypodermis of skin (B)

xxxvii. General structure of derivatives of skin (B)

xxxviii. General structure of hair follicle (A)

xxxix. General structure of sweat gland (B)

Q. 3 Draw the well labeled diagram (Questions for 3, 4 and 6 marks each)

i. Draw neat labeled diagram of T.S. medullated nerve fibre (B)

ii. Draw neat labeled diagram of T.S. non medullated nerve fibre (A)

iii. Draw neat labeled diagram of T.S. of spinal cord (B)

iv. Sketch and label L.S. of tooth (B)

v. Sketch and label L.S. of tongue (B)

vi. Describe taste buds (B)

vii. Types of lingual papillae (A)

viii. Sketch and label – oesophagus (B)

ix. Sketch and label – stomach (B)

x. Sketch and label – duodenum (B)

xi. Sketch and label – ileum (B)

xii. Sketch and label – colon (B)

xiii. Sketch and label – rectum (B)

xiv. Sketch and label – salivary glands (B)

xv. Sketch and label – liver (B)

xvi. Sketch and label – pancreas (B)

xvii. Sketch and label – spleen (B)

xviii. Sketch and label – T.S. of trachea (A)

xix. Sketch and label – T.S. lung (B)

xx. Sketch and label – arteries (A)

xxi. Sketch and label – veins (A)

xxii. Sketch and label – capillary (A)

xxiii. Composition of blood (B)

xxiv. R.B.Cs (A)

xxv. W.B.Cs- agranulocytes (A)

xxvi. W.B.Cs – granulocytes (B)

xxvii. Sketch and label – kidney (Gross structure) (B)

xxviii. Sketch and label – microscopic structure of uriniferous tubules(B)

xxix. Sketch and label – juxta glomerular complex (B)

xxx. Sketch and label – renal ranspose (B)

xxxi. Describe meninges and give significance (B)

xxxii. Sketch and label – t. s. of spinal cord (B)

xxxiii. Sketch and label – t. s. of testis (B)

xxxiv. Sketch and label – gross structure of testis (B)

xxxv. Sketch and label – t. s. of seminiferous tubules (A)

xxxvi. Sketch and label – structure of sperm (B)

xxxvii. T. S. of ovary with graffian follicle (B)

xxxviii. Structure of ovum (B)

xxxix. Structure of pituitary gland (C)

xl. Structure of thyroid gland (C)

xli. Structure of adrenal gland (C)

xlii. Pituitary gland and its hormones (C)

xliii. Thyroid gland and its hormones (C)

xliv. Adrenal gland and its hormones (C)

xlv.

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BIOCHEMISTRY

Unit 2: pH and Buffers (06 marks)

Q. 1. Multiple choice questions (02 marks each)

1. pH scale was suggested by ------

(a) Arrhenius (b) Lewis (c) Bronsted (d) Sorensen

2. The pH of solution is correctly defined as ------

(a) pH = $-\log_e[H^+]$ (b) pH = $1/\log_{10}[H^+]$ (c) pH = $\log_{10} 1/[H^+]$ (d) pH = $\log_{10}[H^+]$

3. pH of an acid buffer is given by ------

(a) pH = log Ka + log [Salt]/[Acid] (b) pH = Ka + log [Salt]/[Acid]

(c) pH = -log Ka – log [Salt]/[Acid] (d) pH = -log Ka + log [Salt]/[Acid]

4. Which of the following is the buffer solution-----

(a) NaOH (b) $Pb(OH)_2$ (c) CH_3COONH_4 (d) NH_4OH+NH_4Cl

5. When a drop of acid is added to water its pH --------

(a) increases (b) decreases (c) remain the same (d) data insufficient

6. H^+ is a ----

(a) Lewis acid (b) Lewis base (c) Bronsted and Lowry base (d) none of these

7. A pH value of 7 indicates ---

(a) Only pure water (b) neutral solution (c) acid solution (d) basic solution

8. For a basic buffer pKb = 14 – pH , then in the buffer -----

(a) [base]=[salt] (b) [base]>[salt] (c) [base]<[salt] (d)[base] =10[salt]

9. Quantitatively the most significant buffer system in plasma is -----

(a) Phosphate buffer system (b) carbonic acid-bicarbonate buffer system

(c) Lactic acid – lactate buffer system (d) Protein buffer system

10. The relation between pH and pOH for an aqueous solution at 298 k is -----

(a) pH x pOH =14 (b) pH + pOH =14 (c) pH x pOH = 10^{-14} (d) pH + pOH = 10^{-14}

Q. 2 and Q. 4: Short Notes / Attempt (04 marks each)

1. Explain ionization of weak acid and weak base
2. What is pH? Give its significance.
3. Explain pH scale.
4. Explain concept of pH and p OH
5. What is buffer? Give its functions.

Q. 3(a). Question for 03 marks

1. Explain strong acid and weak acid
2. Strong base & weak base
3. Dissociation constant of acid (Ka) and base (Kb)
4. Enlist the pH of body fluids
5. Concept of buffer

Q.3 (b) & Q. 5(b) : Define /Explain/ comments (02 marks each)

1. pH	2. pOH	3. Buffer
4. Acidic buffer	5. Basic buffer	6. Strong acid
7. Weak acid	8 Strong base	9 Weak base
10. Hydrolysis		

Q. 5(a) Question for 06 marks

1. Define pH. Derive the Handerson – Hasselbalch equation
2. What is buffer? Mention the commonly used buffers in biological system
3. Prove that pH + pOH = 14
4. Buffer- Define , concept and biological importance

Unit 3: Molecular interactions (06 marks)

Q.1 Multiple choice questions (02 marks each)

1. ------are formed by covalent interactions of –SH group of two Cystein residues

(a) peptide bonds (b) disulphide bonds (c) hydrogen bond (d) electrostatic bonds

2. Primary structure of Protein is formed by –

(a) peptide bonds (b) disulphide bonds (c) hydrogen bond (d) all of above

3. In nucleotides phosphate is attached to sugar by -----

(a) salt bonds (b) ester bonds (c) hydrogen bond (d) glycosidic bonds

4. In quaternary structure of protein subunits are linked by ---

(a) peptide bonds (b) disulphide bonds (c)covalent bond (d) noncovalent bonds

5. Monosaccharide are joined to form compound carbohydrates by----

(a) peptide bonds (b) ester bonds (c)covalent bond (d) glycosidic bonds

6. Alpha helix form by

(a) disulphide bonds (b) electrostatic bonds (c)hydrogen bond (d)hydropbobic bonds

Q. 2 and Q.4. : Short Notes/ Attempt (04 marks each)

1. Explain covalent bonds
2. Explain noncovalent bonds
3. Peptide bonds & hydrogen bonds
4. Ionic bond & disulphide bonds
5. Phosphodiester bond.

Q. 3(b) and Q. 5(b): Define/ explain/ Comment (02 marks each)

1. Peptide bond
2. Disulphide bond
3. Hydrogen bond
4. Ionic bond
4. Hydrophobic bond
6. Glycosidic bonds
7. Phosphodiester bond

Unit 4: Carbohydrates (08 marks)

Q. 1. Multiple choice questions (02 marks each)

1. Carbohydrates is stored in mammals as ------

(a) glucose in live (b) glycogen in muscle in spleen

(c) lactic acid in muscles (d) glycogen in liver and muscles

2. Sucrose is composed of ------

(a) Fructose + galactose (b) Glucose + Fructose

(c) Glucose + glucose (d) Glucose + Galactose

3.Technically carbohydrates are ------

(a) compound of C-H-N (b)polyhydroxy aldehyders or polyhydraoxy ketones (c) cellulose or glycogen (d) cellulose or chitin

4. Beta 1,4glycosidic bond is present in -----

(a) Maltose (b) Lacatose (c) Sucrose (d) none of the above

5. Identical Osazones are formed by --------

(a) glucose and fructose (b) glucose and mannose

(c) Mannose and fructose (d)All of the above

6. Carbohydrates found in DNA is ----

(a)Ribose (b) Deoxyribose (c)Ribulose (d) none of these

7. A disaccharide made of 02 glucose units is ---

(a) maltose (b) sucrose (c) lactose (d) dextrin

8.a carbohydrate is commonly known as dextrose is -----

(a) dextrin (b) D-fructose (c) D-Glucose (d)Glycogen

9. Iodine gives a red colour with -----

(a) Starch (b) Dextrin (c) Glycogen (d) Insulin

10. Amylose is constitute of -----

(a) Starch (b) cellulose(c) glycogen(d) none of the above

Q.2 and Q. 4. Short notes/ Attempt (04 marks each)

1. Explain structural isomerism with examples

2. Stereoisomerism 3. Optic isomerism

4 Geometrical isomerism 5. Optical activity

6. Structure of glucose 7. Mutarotation

8 Osazone formation 9 Maltose and its significance

10. Lactose and its importance 11. Reducing and nonreducing sugars

Q. 3 (a) Question for 03 marks (Short notes / Attempts)

1. Chain and positional isomers 2. Optical and geometrical isomerism

3. Oxidization reduction reaction 4. Ester formation

5. Glycoside formation 6 Isomaltose and its importance

7 Sucrose and its significance 8 Starch and its importance

9 Glycogen and its significance 10. Cellulose and its importance

11. Chitin and its significance

Q. 3(b) and Q. 5(b) Define/ Explain/ Comments (02 Marks each)

1. Carbohydrates 2. Isomerism 3. Monosaccharides

4. Oligosaccharides 5 Polysaccharides 6. Trioses

7. Tetroses 8. Pentoses 9. Hexoses

10.Glycosides 11. Esters 12. Osazone

13. Pyranose 14. Furanose 15. Detrorotatary

16. Laevorotatary 17. Alpha-1-4-glycoside linkage

18. Alpha-1-6-glycoside linkage 19. Amylose 20. Amylopectine

21. Ribose and deoxyribose 22. Isomaltose

Q. 5 (a) Question for 06 marks

1. What are carbohydrates? How they are classified.

2. What are carbohydrates? Illustrate disaccharides.

3. What are Oligo and polysaccharides? Explain its biological imporatance.

4. What is isomerism? Describe structural isomerism with example.

5. Briefly describe stereoisomerism.

6. Explain chemical properties of monosaccharide.

Unit 5: Lipids (08 marks)

Q. 1. Multiple choice questions (02 marks each)

1. Which is derivative of protein and lipid ------

(a) Lipoprotein (b) glycoprotein (c) enzyme (d) lysoenzymes

2. Which are the following lipids are found in largest number in cell membrane ------

(a) glycolipids (b) phospholipids (c) sphingolipids (d) Mucolipids

3. Triglycerides are ------

(a) Heavier than water (b) major constituents of membrane

I nonpolar (d) hydrophil

4. Sphingosine is not present in -----

(a) Cephalin (b) Sphingomyelin

(c) Cerebrosides (d)Sulphatides

5. No. of carbon atoms in cholesterol is --------

(a) 17 (b) 19 (c) 27 (d) 30

6. The major staorage form of lipid is ----

(a) esterified cholesterol (b) Glycerophospholipids

(c) Triglycerides (d) Spingolipids

7. The nitrogen base in lecithin is ---

(a) ethanolamine (b) choline (c) Serine (d) Betaine

8. The nitrogenous base in cephaalin is -----

(a) ethanolamine (b) choline (c) Serine (d) Betaine

9. Hexozamine is present in -----

(a) Cerebrosides (b) Sulphatides (c) Gangliosides (d) Sphingosin

10. A 20 carbon fatty acid among the following is -----

(a) Linoleic acid (b) alpha linoleic acic

(c) gamma linoleinice acid (d) arachidonic acid

Q. 2 and Q. 4: Short notes/ Attempt (04 marks each)

1. Essential (unsaturated) and nonessential (saturated) fatty acids
2. Occurrence and significance of prostaglandins
3. Occurrence and significance of acyl-glycerol
4. Occurrence and significance of waxes
5. Sphingolipids
6. Lipoprotein
7. Isoprenoids

Q.3(a) . Question for 03 marks (Short notes /Attempt)

1. Essential fatty acids(unsaturated)
2. Nonessential fatty acids (saturated)
3. Physical properties of lipids
4. Rancidity
5. Antioxidants
6. Saponification
7. Simple lipids
8. Compound lipids
9. Derived lipids

Q. 3(b) and Q. 5(b): Define / Explain/ comments (02 marks each)

1. Lecithin
2. Cephalin
3. Cholesterols
4. Sex hormones
5. Terpenoids
6. Cerebrosides

7. Gangliosides 8. Carnauba wax

9. Triglycerides

Q. 5(a) Question for 06 marks

1. What are lipids? Classify with examples.
2. Give biological significance of lipids.
3. Give occurrence and significance of steroids
4. Give occurrence and significance of phospholipids
5. Give occurrence and significance of fatty acids

Unit 6: Amino acids (08 marks)

Q. 1. Multiple choice questions (02 marks each)

1. An amino acid having no asymmestrical carbon atom is ------

(a) alanine (b) leonine (c) glycine (d) ranspose

2. All the followingf aminio acids are nonessential, except ------

(a) alanine (b) histidine (c) ranspo (d) ranspo

3. Sulphydril group is present in ------

(a) Cystein (b)methionine (c) both of the above (d) neither of the above

4. At isoelectric pH an aminoacid exist as -----

(a) anion (b) cation (c) Zwitterion (d)none of the aboave

5. Among the following an essential amino acid is --------

(a) phenyl alanine (b) Tyrosine (c) Proline (d) Hydroxyproline

6. An aminoacid having a hydrophilic side chain is ----

(a) Alanine (b) ranspo (c) Methionine (d) Serine

7. An amino acid having a nonpolar side chain is ---

(a) Argenine (b) Valine (c) Glutamine (d) Lysine

8. Following chromatographic separation, aminoacids can be detected by -----

(a) Biuret reacation (b) Ninhydrine reaction

(c) Hopkins-Cole reacation (d) Xantoproteic reaction

Q.2 & Q.4. Short notes / Attempt (04 marks each)

1. Expalin physical properties of amino acids
2. Describe the reaction of amino acids w.r.t. amino groups
3. Describe the reaction of amino acids w.r.t. R groups
4. Describe the reaction of amino acids w.r.t. carboxyl group

Q. 3 (a) Question for 03 marks (Short notes/ Attempt)

1. Essential amino acids
2. Non essential amino acids
3. Nonprotein amino acids
4. Neutral amino acids

5 Acidic amino acids

6. Basic amino acids
7. Amino acids with nonpolar or hydrophobic R groups

8 Ninhydrin reaction of amino acid

9. Sanger's reaction of amino acids.
10. Decarboxylation.

Q. 3(b) and Q. 5(b): Define / Expalin/ Comments (02 marks each)

1. N and C terminals
2. Isoelectric point
3. Electrophoresis
4. Metheonine
5. Amino acid

Q.5 (a) Question for 06 marks

1. What is amino acid? Describe classification of amino acids with examples.
2. Give biological importance of amino acids.
3. Give brief account of chemical properties of amino acids.

Unit 7: Protein (08 marks)

Q. 1. Multiple choice questions (02 marks each)

1. Basic unit of Protein is ------

(a) amide (b) peptone (c) peptide (d) amino acid

2. Conjugated proteins are those proteins ------

(a) which are soluble in water (b) found in body

(c) which have long chains (d) which have some non proteineous substances attached to amino acids

3. Polypeptide chains are folded to form secondary and tertiary structure of protein they are linked by ------

(a) H bonds (b)glycosidic bonds (c) peptide bonds (d)ester bonds

4. The longest proteins amongst the following is -----

(a) fibrinogen (b) ranspos (c) albumen (d) Hb

5. The protein rich cytocine is --------

(a) cholegen (b) keratin (c) Hb (d) gelatin

6. Primary structure of protein is determined by the use of ----

(a) Electrophoresis (b) chromatography (c) Ninhydrin (d) Sanger's reagent

7. The most abundant protein in mammals is ---

(a) Albumen (b) Hb (c) cholegen (d) elastin

8. Quaternary structure is present in -----

(a) Coagulated proteins (b) denatured proteins (c) Hb (d) Myoglobin

9. During denaturation of proteins all the following are disrupted except -----

(a) Primary structure (b) secondary structure

(c) tertiary structure (d) quaternary structure

Q. 2 and Q. 4. Short Notes/ Attempt (04 marks each)

1. Explain quaternary structure of Protein

2. Explain Primary structure of protein

3. Explain secondary structure of Protein

4. Explain tertiary structure of protein

5 Peptides and polypeptides

6. Give biological significance of protein

7. Explain blood protein

Q. 3(a) Question for 03 marks (Short answer question)

1. Fibrous Proteins	2. Globular proteins
3. Simple Proteins	4. Conjugated proteins
5 Derived proteins	6. Beta pleated sheet

Q. 3 (b) and Q. 5(b) Define / Explain/ Comments (02 marks each)

1. Albumens	2. Globulins	3. Glutelins
4. Prolamines	5 Protamines	6. Histones
7. Scleroproteins	8**.** Prosthetic group	9. Peptides
10. keratins	11. Silk	12. Cholegens
13.IgG	14. Insulin	

Q. 5 (a) Question for 06 marks

1. What are proteins? Give biological functions with suitable examples.
2. What are proteins? Explain primary structure of proteins.
3. Describe secondary and tertiary structure of proteins.
4. Describe brief account of classification of proteins with examples

Unit 8: Enzymes (08 marks)

Q. 1. Multiple choice questions (02 marks each)

1. All enzymes are basically ------

(a) carbohydrates (b) proteins (c) lipoproteins (d) steroids

2. The function of enzymes is to ------

(a) Control of equilibrium (b) causes chemical reaction that would not other wise take place (c) change the rate of chemical reaction

(d) change the direction of reaction

3. The nonprotein part of an enzyme necessary for the enzyme activity is called ------

(a) Holoenzyme (b)metalloezyme (c) isoenzyme (d)prosthetic group

4. Enzymes having similar properties but different molecular weight are called -----

(a) isoenzymes (b) apoenzymes (c) coenzymes (d)prosthetic group

5. LDH which catalyses pyruvate to lactate is an example of --------

(a) antienzyme (b) coenzyme (c) isoenzymes (d) apoenzyme

6. Coenzymes combines with ----

(a) proenzymes (b) apoenzymes (c) holoenzymes (d) antienzymes

7. The enzyme hexokinase is a ---

(a) hydrolase (b) oxidoreductase (c) transferase (d) ligase

8. The competitive inhibition, the inhibitor -----

(a) Competes with the enzymes (b) irreversibly binds with the enzymes

(c) Binds with the substrate (d) competes with the substrate

9. Noncompetative inhibitors -----

(a) Increase the Km (b) increase the Vmax

(c) Decrease the Km (d) decrease the Vmax

10. The induced fit model of enzyme action was proposed by -----

(a) Fischer (b) Koshland

(c) Mitchell (d) Markert

Q.2 and Q. 4: Short answer question / Attempt (04 mark each)

1. Effect of substrate on enzyme reaction
2. Effect pH on enzyme activity
3. Effect of temperature on enzyme activity
4. Properties of enzymes
5. Lock and Key model
6. Induced fit model
7. Competitive inhibitors
8. Reversible noncompetitive inhibition
9. Irreversible noncompetitive inhibition
10. Enzyme inhibition

Q. 3(a) Question for 03 marks (Short answer question/ Attempt)

1. Michaelis-Menton constant 2. Effeect of enzyme concentration
3. Concept of active sites 4. Oxidoreductases
5. Transferases 6. Hydrolases
7. Lysases 8. Isomerases
9. Ligases 10. Vitamins as a coenzymes

Q. 3(b) and Q. 5(b) Define /Expain / Comments (02 marks each)

1. Activators
2. Exoenzymes
3. Endoenzymes
4. Induced enzymes
5. Zymogens (Proenzymes)
6. Coenzymes
7 Cofacators
8. Prosthetic groups
9. Enzymes as a biocatalyst
10. Optimum temperature
11. Optimum pH
12. Isoenzymes
13. LDH

Q. 5(a) Question for 06 marks

1. What are enzymes? Give outline classification of enzymes with examples.
2. Give a brief account of completive and noncompetitive inhibition.
3. What are iso-enzymes? Describe LDH with it significance.
4. What are enzymes? Explain mechanism of enzyme activity.
5. Describe the various factor affecting the enzymatic reactions

Unit 9: Vitamins (08 marks)

Q. 1. Multiple choice questions (02 marks each)

1. The function of vitamin is ------

(a) Ca and P regulation in blood (b) carbohydrate metabolism

(c) blood clotting (d) defence

2. Which of the following is the group of water soluble vitamins ------

(a)Vitamins B1,B6, B12, C, H (b) Vit. B complex, A, and C

(c)Vit C, H and E (d) Vit. B6, B12, E, and K

3. Night blindness is cause due to deficiency of ------

(a) Vit A (b) Vit. B

(c)Vit. C (d) Vit. D

4. Ant sterility vitamin is -----

(a) Vit. B12 (b)Vit. D

(c) Vit. E (d)Vit A

5. Deficiency of water soluble vitamins can cause all of the following except -----

(a) Rickets (b) Beriberi (c)Pelagra (d)Scurvy

6. People consuming polished rice as their staple food are prone to ----

(a) Rickets (b) Beriberi (c)Pelagra (d)Scurvy

7. Vit B12 is require to for ---

(a)cobamides (b) Transcobalamin I (c) Transcobalamin II (d)All of the above

8. Dificency of Vit. C causes -----

(a) Beriberi (b)Pelagra (c)Pernicious anemia (d) Scurvy

9. Vit D functions as a -----

(a)Prohormone (b) Modulator of hormone action

(c)Proenzymes (d) Coenzymes

10. About 70 – 80 % of the total pyridoxine (Vit B6) in the body is present in ---

(a)Liver (b) Muscle (c) Adipose tissue (d) Brain

Q.2 and Q. 4 Short answer question/Attempt (04 marks each)

1. Give sources and physiological functions of vit. A
2. Give sources and physiological functions of vit. D
3. Give sources and physiological functions of vit. E
4. Give sources and physiological functions of vit. K
5. Give sources and physiological functions of vit. B1
6. Give sources and physiological functions of vit. B2
7. Give sources and physiological functions of vit. B6
8. Give sources and physiological functions of vit. B12
9. Give sources and physiological functions of vit. C

Q. 3(a) Question for 03 marks (Short answer/ Attempt)

1. Deficincy disease of Vit A
2. Deficincy disease of Vit D
3. Deficincy disease of Vit E
4. Deficincy disease of Vit K

5. Deficincy disease of Vit B1
6. Deficincy disease of Vit B2
7. Deficincy disease of Vit B6
8. Deficincy disease of Vit B12
9. Deficincy disease of Vit C

Q. 3(b) and Q. 5(b) Define/ Expalin/ Comment (02 marks each)

1. Riboflavins (Vit. B2)
2. Daily requirement of vit A
3. Calciferols (Vit D)
4. Tocoferols (Vit. E)
5. antihaemorrhagic ransp (Vit. K)
6. Thiamine (Vit B1)
7. Pyridoxine (Vit B6)
8. Cynocobalmine (Vit. B12)
9. Ascorbic acid (vit B6)

Q. 5 (a) Question for 06 marks

1. What are vitamins? Give the deficiency diseases of fat soluble vitamins.
2. Give difference between fat and water soluble vitamins with examples
3. Give a brief account of fat soluble vitamins
4. Give a brief account of water soluble vitamins
5. What are vitamins? Give the deficiency diseases of water soluble vitamins.

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RESEARCH METHODOLOGY

Uint-1. Introduction.

Q. 1 Multiple Choice Questions. (2 marks each).

1)……..refers to a definite interpretation of a given set of facts, which is put forth as a tentative suggestion and remains partly or wholly unverified

(a) Formulation (b) Hypothesis (c) Identification (d) Research.

2) Pure research is also known as……..…….research.

(a) Experimental (b) Non Experimental (c) Applied (d) Basic

3) Non experimental research is one in which the researcher simply measures the present level of the …….variable.

(a) Dependent (b) Independent (c) Both (d) None of above

4) The research problem should include analysis into…….

(a) Simplest element (b) Scope (c) Limitation (d)All

5) Good research is……

(a) Systematic and logical (b) Systematic & Arithmetic

(c)Logical and arithmetic (d) none of these

6) Research ……..……Consist of a series of actions or steps necessary to effectively carryout research and the desired sequencing of these steps.

(a) Methods (b) Motivation (c) Process (d) methodology.

7) All those methods which are used by the researcher during the course of studding his research problem are termed as research…….

(a) Methods (b) Motivation (c) Process (d) methodology.

8) Research …….is a way to systematically solve the research problem.

(a) Methods (b) Motivation (c) Process (d) methodology.

9) …… are the types of educational research.

(a) Exploratory research (b) Descriptive research (c) Casual research (d) All

Q.1 / Q. 3 (b) / Q. 5 (b) Define / Explain / Comment (2 Marks Each)

(1) Research (2) Research methodology

(3) Criteria of Good Research

Q. 3 (a) Describe (Question for 3 Marks each)

i) Motivation in research

ii) Objectives of research

iii) Meaning of research

Q. 2 and Q. 4 short notes / Comment / Describe (4 Marks each)

1) Comments on research methods & research methodology.

2) Significance of research

3) Research process in flow chart.

Q. 5 (a) Describe in detail.(Question for 6 Marks each)

1) What is research?. Describes various types of research, State significance of it.

2) Describe various steps of research process.

UNIT NO. 2

Q. 1. Multiple choice questions (2 marks each)

1) A research design is the over all …….

(a) Plan or processing (b) Plan or programme (c) Plan or design

(d) none of above

2) A research ……. is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure

(a) Design (b) Method (c) Process (d) Methodology.

Q. 1 / 3 (b) / 5 (b) Define / Explain / Comment (2 Marks each)

1) Research hypothesis

2) Experimental hypothesis.

3) Research design

4) Non Experimental hypothesis

Q. 3 (a) Describe (Questions for 3 marks each)

1) Explain in brief meaning of Research design.

2) Needs of research design.

3) Concept of research design

4) State Features of good design.

Q. 2 and Q. 4 Describe / Short notes (4 Marks each)

1) Discuss Various Features of good Design.

2) Write basic Principles of experimental design.

Q. 5 (a) Describe in detail (Question for 6 marks each)

1) What is meaning of research design? Give need, features, Concept of research design.

UNIT NO. 3

Q. 1 Multiple choice questions (2 marks each)

1) Mean is a measure of central tendency…….

(a) Arithmetic Average (b) Arithmetic sum (c) Arithmetic mean (d) None of these

2) In symbolic form, the null hypothesis is H_o…….

(a) $\mu_A - \mu_B$ (b) $\mu_A + \mu_B$ (c) $\mu_A = \mu_B$ (c) $\mu_A \times \mu_B$

3) ……. is a measure of central tendency, that is the mid point, the value below which half the values in sample fall.

(a) Mode (b) Median (c) Mean (d) Frequency

4) ……is a measure of central tendency. That is the Value that occurs most often.

(a) Mode (b) Median (c) Mean (d) Frequency

Q. 1/ Q. 3 (b) / Q. 5 (b) Define / Explain / Comment (2 Marks Each)

1)	Student " t " test	2)	Standard deviation	3)	Standard error
4)	Sample (Sampling)	5)	Scaling	6)	Mean
7)	Mode	8)	Median	9)	Variable
10)	Frequency distribution.				

Q. 3 (a) Describe (Question for 3 marks)

1) Histogram	2) Pie – Chart	3) Bar Chart
4) What is sampling	5) What is scaling	6) Chi-square test
7) Student " t " Test	8) Standard error	9) Standard deviation

Q. 2 and Q. 4 Short notes / Describe (question for 4 marks each)

1) Give various methods of data presentation.

2) Discuss importance of probability distribution

3) Give important of frequency and variance in statistical analysis

4) What is sampling and scaling

5) Draw a Pie chart by plotting a area of circle showing 50% (Low income people), 15% (Medium income people) and 35% (High income people) and show the above income distribution by Bar chart.

Q. 5(a) Describe in detail (Question for 6 marks each.)

1) Give importance of frequency distribution. How will you determine central tendency median

2) What is sampling and scaling.

3) Solve the example- (1) form a frequency distribution of taking a suitable class interval, for the following data giving the age of 50 workers in a private factory.

4) Solve the example-(1)form a frequency distribution of taking a suitable class interval, for the following data relating to marks of 25 students in zoology paper I exam of 50 marks.

UNIT NO. 4

Q. 1. Multiple choice questions (2 Marks each)

1) An …….. can be defined as a summary of the information in a document.

(a) Title (b) Abstract (c) Summary (d) Conclusion

2) If a author want to publish his research paper he have to write a letter to ……

(a) Editor (b) Principal (c) Teacher (d) None of these

Q. 1 / Q. 3 (b) / Q. 5 (b) Define / Explain / Comments (2 marks Each)

1)	Abstract	2)	Title	3)	Introduction of paper
4)	Review of literature	5)	Result	6)	Discussion
7)	References	8)	cue card	9)	Acknowledgement
10)	Materials and methods				

Q. 3. (a) Describe (Question for 3 marks each)

1) Concept of scientific Writing

2) Meaning of scientific Paper

3) Preparation of Cue card.

4) How do you prepare title and abstract. ?

5) What is scientific writing?.

Q. 2. And Q. 4 Write short notes / describe (Question for 4 marks each)

1) How to write a letter to editor of scientific journal for publishing a research paper ?

2) Comment on scientific Paper

3) IMMRAD(Introduction, Materials, Method, Research and Acknowledgment, Discussion)

4) How to prepare a cue card.

5) Write the features of good scientific paper.

Q. 5 (a) Describe in detail (Question for 6 marks each)

1) Introduction, Materials & Methods , Research and Discussion **(IMMRAD)**

2) Describe various aspects of project writing.

3) Concept of scientific writing and meaning of scientific paper.

Committee

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SERICULTURE

Unit 1: INTRODUCTION

Q.1- Question for 2 marks. (Define/ explain/ MCQ.)

1. Sericulture 2. silkworm

3. The rearing of silkworm for the production of silk is known as ……
   a. Sericulture b. Agriculture c. Ericulture d. Pisciculture.

Q.2- Question for 3 marks.

1. Scope of sericulture.
2. Give the brief history of sericulture.
3. Sericulture in india.

Unit 2: Silkworm species

Q.1 Question for 2 marks. (Define/ explain / MCQ.)

1. Bombyx mori.
2. Tasar silkworm.
3. Muga silkworm.
4. Silk is prepared by the species belonging to family…….
   a. Bombycidae b. Coccidae c. Pandalidae d. Serigestidae.

Q.2 Question for 3 marks.

1. Enlist the domesticated species of silkworm.
2. Give the taxonomy & distribution of Tasar.
3. Give the taxonomy & distribution of Muga.
4. Give the taxonomy & distribution of Eri.
5. Give the taxonomy & distribution of Bombyx mori.

Unit 3: Morphology & Life History

Q.1 Question for 2 marks.

1. Explain habit & habitat of Bombyx mori
2. Sketch & label egg of Bombyx mori.
3. Sketch & label cocoon of Bombyx mori.
4. Bombyx mori is belong to …….. class.
   a. Insecta b. Crustacea c. Pelecypoda d. myaripoda.
5. Bombyx mori is belong to ……. Family.
   a. Bombycidae b. Saturnidae c. Arandae d. None of above.

Q.2 Question for 3 marks.

1. Give the systemic position of Bombyx mori.
2. Sketch & label the larva of Bombyx mori.

Q. 3 Question for 4 marks.

1. Give the Systematic position of Bombyx mori.
2. Explain the life cycle of Bombyx mori.
3. Sketch & label the adult Bombyx mori.
4. Describe the morphology of Bombyx mori.

Unit 4: Internal anatomy of Bombyx mori.

Q.1 Questions for 2 marks. (Define / Explain / MCQ.)

1. Give the location of silk gland.
2. Explain the Spinnerate.
3. Mulbery tree.
4. Cutivation & harvesting of mulberry plant is called……..

a.Moriculture b.Sericulture c.Vermiculture d.Apiculture.

Q.2 Question for 3 marks.

1. Sketch & label silk gland.
2. Sketch & label male reproductive system of B.mori.
3. Sketch & label female reproductive system of B.mori.

Q.3 Question for 4 marks.

1. Explain about the selection of ranspos variety.
2. Explain the propogation of mulberry.
3. Explain the climate for mulberry.
4. Describe the planting of mulberry.
5. Describe the Manuring of mulberry.
6. Give the water management of mulberry.
7. Give the pruning of mulberry.

Q.4 Question for 6 marks.

1). Describe the alimentary canal of moth- B.mori.

2). Explain pest & disease, of mulberry plant.

3). Describe the harvesting methods of mulberry leave.

Unit 5 . Silkworm rearing & applications

Q. 1. Question for 2 marks (Explain /Define / MCQ)

1) Rearing stand

2) Chandrika .

3) Explain silkworm rearing time & season.

4) In silkworm rearing for disinfection -------- is used.

a) Formalin b) Chloroform c) Alcohol d) Hydrogen peroxide

Q .2 Question for 3 marks.

1. Give the choice of silkworm variety.
2. Give the disinfection of rearing room.

Q .3 Question for 4 marks.

1. Draw a model of rearing house.
2. Give in detail applications &disinfection of rearing room .

Q . 4 Question for 6 marks.

1. Describe the rearing applications.
2. Describe the object of silkworm rearing.

Unit 6. Silkworm rearing techniques

Q .1 Question for 2 marks. (Explain / define / MCQ)

1. Procurement of quality seeds.
2. Brushing of rearing
3. Quality food for rearing
4. Transfer of newly hatched larvae from egg sheet card to rearing is called ----------

   a)Brushing b) crushing c) chopping d)clearing

Q .2 Question for 3 marks .

1. Give the advantages of chopped leaves in rearing .
2. Give the disadvantages of chopped leaves in rearing .

Q .3 Question for 4 marks .

1. Explain the shelf rearing method .
2. Explain the floor rearing method .
3. Explain the shoot rearing method .
4. Explain bed cleaning in rearing.
5. Explain the spacing in rearing.

Q .4 Question for 6 marks .

1. Explain in brief the mounting and harvesting of cocoons.
2. Explain environmental conditions & care during cocoon spinning.
3. Explain harvesting of cocoons.

Unit 7. Silk rearing techniques

Q .1 Question for 2 marks.

1. Good quality cocoon.
2. Sorting of cocoon.
3. Reeling.
4. Re-reeling.
5. The unwinding of silk threads from cocoon is called…… process.

   a. Reeling b. Brushing c. Finishing d. Re-reeling.
6. The raw silk is first reeled on small reels and allow to dry and then …… on large reel.

a. Reeling b. Brushing c. Finishing d. Re-reeling.

Q. 2 Question for 3 marks .

1. Give the cocoon drying methods.
2. Explain storing of cocoon.
3. Enlist the reeling methods.

Q .3 Question for 4 marks .

1. Explain cocoon cooking before reeling .
2. Explain brushing of cocoon before reeling.
3. Write a short note on re-reeling.
4. Write a short note on raw silk finishing.

Q .4 Question for 6 marks.

1. Describe chemical composition & uses of silk.
2. Describe the economics of sericulture.

Unit 8 : Silkworm diseases & pest.

Q .1 Question for 2 marks .(Define/ explain/MCQ.)

1. Pebrine .
2. Muscardine.
3. Explain sotto disease.
4. Pebrine is a …….. disease.

a. Bacterial b. Protozoan c. Fungal d. Viral.

5. Muscardine disease is caused by …….. pathogen.

a.Fungal b. Bacterial c. Protozoan d. Viral.

6. Kenchu disease is caused by ……. Pathogen .

a.Fungal b. Bacterial c. Protozoan d. Viral.

Q .2 Question for 3 marks .

1. Enlist the silkworm pests & predators.
2. Enlist the viral diseases of silkworm

Q .3 Question for 4 marks .

1. Give causative agent , symptoms & control pebrine disease.
2. Give causative agent , symptoms & control of white muscardine disease.

Q .4 Question for 6 marks .

1. Give an account of any two viral diseasesof silkworm
2. Give causative agent, symptoms of kenchu disease.
3. Give causative agent, symptoms of sotto disease.
4. Give the pest & predatory of silkworm & their control.

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ECONOMIC ZOOLOGY

Unit – 1. Vermiculture

Q. 1. Define/Multiple choice (02 marks)

1. Vermicuture 2. Vermicompost
2. Vermiwash 4. Biofertilizer
5. Vermicast
6. ------ essentially means the scientific culturing, rearing of earthworms.

a) Verimcuture b) Vermicompost c) Vermiwash d) Sericulture

7. ------- species is popularly known as African night crawler

a) *E. foetida* b) *E. euginae* c) *P. posthuma* d) *P. polypheretima*

Q. 2. Que.for 03 marks

1. Enlist the species of earthworm.
2. Importance of vermiwash.
3. Sketch & label E. foetida.
4. Sketch & label small scale vermicomposting
5. Habit & habitat of E. euginae.
6. Habit & habitat of E. foetida.
7. Habit & habitat of P. posthuma.

Q. 3. Que.for 04 marks

1. Scope of ransposese.
2. Small scale vermicomposting.
3. Precaution during ransposese.
4. Economics of vermicompost.
5. Treatment of kitchen waste by ransposese.
6. Treatment of ranspose waste by ransposese.
7. Sketch & label E. euginae.
8. Sketch & label P. posthuma.
9. Sketch & label large scale vermicompost unit.

Q. 4. Que.for 06 marks

1. Give the characteristic features of earthworm.
2. Explain large scale vermicomposting.
3. Describe ransposese as a biofertilizer.
4. Write a note on economics of vermicompost.

UNIT -2. LAC CULTURE

Q. 1. Define/Multiple choice (02 marks)

1. Lac culture. 2. Inoculation.
3. Lac seed. 4. Shell lac.
5. Rangeeri. 6. Kusmi.
7. The science of commercial culture of ---------- insect is called as Lac culture.

   a)Lac b) Sac c) Silk d) Bombyx

8. The processed product in Lac culture is known as --------

   a) Lac seed b) Shell Lac c) Lac resin d) None.

Q. 2. Que. For 03 marks

1. Distribution of Lac insect.
2. Write a note on care of Lac growth.
3. Write a note on recovery of Lac resin.
4. Write a note on processing of Lac resin.
5. Sketch and label Lac insect.
6. Rangeeri strain of Lac in India.
7. Kusmi strain of Lac in India.
8. Uses of Lac.
9. Any three host plants of Lac

Q. 3. Que.for 04 marks

1. External morphology of Lac insect.
2. Enemies of Lac insect.
3. Natural inoculation of Lac
4. Artificial inoculation of Lac

5. Write a note on Inoculation period.
6. Write a note on Swarming.
7. Uses of Lac.
8. Enemies of Lac cultivation.
9. Lac industry in India.

Q. 4. Que.for 06 marks

1. Describe the life history of Lac insect.
2. Enlist the host plants of Lac insect.
3. Describe the process of cultivation of Lac.
4. Describe the science of Lac culture.
5. Economic importance of Lac cuture.

UNIT – 3. GOATARY

Q. 1. Define/Multiple choice (02 marks)

1. Goatary. 2. Castration. 3. Dehorning

4. Goat meat is commonly called as ------

a) Chevon b) Non-veg c) Meat d) None

5. At present there are ----- breeds of goat in India.

a) 25 b) 30 c) 15 d) 20

Q. 2. (03 marks)

1. Enlist North-Western and Central region breeds of goats.
2. Enlist South Peninsular region breeds of goats.
3. Give the distribution of Jamunapuri
4. Give the distribution of Barbari.
5. Give the distribution of Beetal (Amritsari)
6. Give the distribution of Surti.
7. Give the distribution of Marwari.
8. Give the distribution of Mehasana.
9. Give the distribution of Jhakrana.
10. Give the distribution of Osmanabadi.
11. Give the distribution of Malbari.

12. Give the distribution of Sangamneri.
13. Give the distribution of Bengal.
14. Give the distribution of Ganjam.
15. Give the distribution of Gaddi.

Q. 3. Que.for 04 marks

1. Enlist Indian breeds of goats.
2. Give the breeds characteristics of Jamunapuri
3. Give the breeds characteristics of Barbari.
4. Give the breeds characteristics of of Beetal (Amritsari)
5. Give the breeds characteristics of Surti.
6. Give the breeds characteristics of Marwari.
7. Give the breeds characteristics of Mehasana.
8. Give the breeds characteristics of Jhakrana.
9. Give the breeds characteristics of Osmanabadi.
10. Give the breeds characteristics of Malbari.
11. Give the breeds characteristics of Sangamneri.
12. Give the breeds characteristics of Bengal.
13. Give the breeds characteristics of Ganjam.
14. Give the breeds characteristics of Gaddi.
15. Describe the housing of goats.
16. Nutrient requirements of goat.
17. Feeding of kids.
18. Feeding of pregnant goat.
19. Feeding of lactating goat.

Q. 4. Que.for 06 marks

1. Describe the characteristics of Jamunapuri
2. Describe the characteristics of Barbari.
3. Describe the characteristics of of Beetal (Amritsari)
4. Describe the characteristics of Surti.
5. Describe the characteristics of Marwari.
6 Describe the characteristics of Mehasana.

7. Describe the characteristics of Jhakrana.
8. Describe the characteristics of Osmanabadi.
9. Describe the characteristics of Malbari.
10. Describe the characteristics of Sangamneri.
11. Describe the characteristics of Bengal.
12.Describe the characteristics of Ganjam.
13.Describe the characteristics of Gaddi.
14. Describe the feeding habits of goat.
15. Explain the economic importance of goatary.

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BIOTECHNOLOGY

Unit 1. Biotechnology – Definition, Scope and importance (02 marks)

Q. 1, Q. 3(b) and Q. 5(b). Define / Explain/ Comment / Multiple choice (02 marks each)

1. Biotechnology
2. Scope of biotechnology
3. Importance of biotechnology
4. In biotechnological research, ---------- is done to obtain better and novel results.
   (a) Deletion of genetic material (b) Deletion of an organ from body
   (c) Manipulation of genetic material (d) Addition of an dead organ to body

Unit 2. Animal cell and tissue culture (18 marks)

Q. 1 , Q. 3(b) and Q. 5(b). Define / Explain/ Comment / Multiple choice (02 marks each)

1. Cell line
2. Natural media
3. Defined media
4. Tissue extract
5. BSS
6. MEM
7. Somatic cell fusion
8. Enzymatic disaggregation of tissue
9. Mechanical disaggregation of tissue
10. Continuous cell line
11. Transformation
12. Organ culture
13. Artificial cartilage
14. Artificial skin
15. Explantation
16. Following is one of the natural media for cell and tissue culture.
    (a) Plasma clot (b) DMEM
    (c) BSS (d) Ham’s F12
17. Disaggregation of epithelial tissue for culture is done with the help of following chelating agent—
    (a) EDTA (b) $CuSO_4$ (c) $CaCl_2$ (d) $NaCl_2$

Q.2 and Q. 4. Attempt the following (04 marks each)

1. Explain organ culture and techniques of organ culture.
2. Describe different methods of slide culture of cell or tissue.
3. Diagram of somatic cell fusion
4. Cloning of cell lines
5. Discuss steps involves in maintenance of culture of cell lines
6. Describe enzymatic disaggregation of tissue and primary culture.
7. Describe mechanical disaggregation of tissue and primary culture.
8. Natural media for culture of cell and tissue culture
9. Defined media for culture of cell and tissue culture.
10. Advantages and disadvantages of tissue culture
11. Scope of animal cell and tissue culture
12. Describe briefly the procedures used for animal cell and tissue culture

Q. 3(a). Attempt the following (03 marks each)

1. Artificial skin
2. Artificial cartilage
3. Application of cell and tissue culture
4. Cell lines
5. Maintenance of primary cell culture
6. Diagram of somatic cell fusion
7. BSS
8. Explantation
9. Scope of animal cell and tissue culture
10. Test tube culture
11. Importance of disaggregation of tissue for cell culture.
12. Uses of hybrid cell

Q. 5. (a) Attempt the following (06 marks each)

1. Explain organ culture and techniques used for organ culture.
2. Describe the procedure used for animal tissue culture
3. Describe different methods of disaggregation of animal tissue
4. Describe somatic cell fusion

Unit 3. Genetic engineering (10 marks)

Q. 1, Q. 3(b) and Q. 5(b). Define / Explain/ Comment / Multiple choice (02 marks each)

1. Recombinant DNA technology
2. Genetic engineering
3. Vector
4. DNA probe

5. cDNA library
6. Restriction enzyme
7. Plasmid
8. Cosmid
9. Bacteriophage as a cloning vector
10. Genomic library
11. Chimerical DNA is a result of ----
    (a) rDNA technology (b) Cell culture
    (c) Enzyme technology (d) Tissue engineering
12. DNA probe is nothing but----
    (a) Complementary sequences of bp (b) Metal detector
    (c) Biosensor (d) Plasmid
13. Hybrid of phage DNA and plasmids is called as ------
    (a) Bacteriophage (b) Cosmid
    (c) Hybrid of phage and bacillus (d) None
14. The widely used bacteria in genetic engineering are-----
    (a) Nitrosomonas and nitococcus (b) Rhozobium and Azatobacter
    (c) Nitosomonas and Azatobacater (d) Escherichia and Azatobacter
15. Genetically engineered human insulin is obtained from—
    (a) E. coli (b) Clostridium sp.
    (c) Pseudomonas sp. (d) All of these
16. DNA probe used in fingerprinting are
    (a) DNA from sperm cell (b) UV beam treated segment of DNA
    (c) DNA segment having radioactive isotopes (d) Hybrid DNA
17. Plasmids are widely used in genetic engineering because they are
    (a) easily available (c) able to replicate
    (c) able to integrate with host chromosome (d) inert
18. The recent technique which is used to separate DNA for fingerprinting
    (a) Northern blotting (b) Southern blotting
    (c) Eastern blotting (d) Western blotting

Q.2 and Q. 4. Attempt the following (04 marks each)

1. Describe types of restriction enzymes
2. Construction of cDNA library
3. Role of restriction enzyme

4. Production of human insulin
5. Cloning vectors
6. Molecular probes
7. Application of genetic engineering

Q. 3(a). Attempt the following (03 marks each)

1. Explain restriction enzyme
2. Explain in brief construction of chimerical DNA
3. cDNA library
4. Plasmid
5. Cosmid
6. Recombinant DNA technology
7. Bacteriophage as a cloning vector

Q. 5. (a) Attempt the following (06 marks each)

1. Describe different cloning vector.
2. Describe a outline of DNA recombinant technology
3. What are restriction enzymes? Give a brief account of classification of restriction enzymes.
4. Explain production of human insulin by rDNA technology

Unit 4. Tranfection methods and transgenic animals (04 marks)

Q. 1 , Q. 3(b) and Q. 5(b). Define / Explain/ Comment / Multiple choice (02 marks each)

1. Transfection
2. Gene transfer
3. Differentiate the term transformation and transfecation in animal
4. Targeted gene transfer
5. Knock out mouse
6. Application of transgenesis
7. Transgenic animal
5. Cell fusion can be achieved with the help of -------
   (a) HGPRT (b) PEG
   (c) I BSS (d) HEM
6. Transgenesis is important for ------

(a) Improvement in livestock (b) Deletion of gene sequences

(c) Improvement of gene expression (d) Inhibition of gene sequences

7. GMO means---

a) Genetically modified organism b) genetically modified offspring

c) Genetically manipulated offspring d) genetically mediator organism

8. Which of following is a method gene transfer?

(a) Microinjection (b) Particle gun

(c) Electroporation (d) All of these

Q.2 and Q. 4. Attempt the following (04 marks each)

1. Write an account on different methods of gene transfer
2. What is targeted gene transfer
3. Explain knock out mouse as an example of transgenic animal model.
4. Importance of retrovirus in gene transfer

Unit 5. Immunotechnology (10 marks)

Q. 1 , Q. 3(b) and Q. 5(b). Define / Explain/ Comment / Multiple choice (02 marks each)

1. Immunity
2. Types of immunoglobins
3. Immunization
4. HGPRT
4. Hybridoma technology
6. PEG
7. Mabs
8. Polyclonal antibodies
9. Vaccine
10. Vaccinia virus
11. IgG
12. Different types antibodies are produced in the cell by process of -----

(a) DNA rearrangement (b) Spleen enlargement

(c) Lymphatic nodes (d) RNA synthesis

Q.2 and Q. 4. Attempt the following (04 marks each)

1. Uses of Mabs.
2. Describe vaccine development
3. Structure of IgG
4. Diagram of IgG

5. Diagram of hybridoma technology for production of Mabs

Q. 3(a). Attempt the following (03 marks each)

1. Enlist the uses of Mabs
2. Significance of Mabs
3. Alternatives to hybridoma technology
4. Vaccinia virus

Q. 5. (a) Attempt the following (06 marks each)

1. Explain the genetics and molecular biology of production of antibodies.
2. Describe hybridoma technology for production of monoclonal antibodies.

Unit 6. Enzyme biotechnology (06 marks)

Q. 1, Q. 3(b) and Q. 5(b). Define / Explain/ Comment / Multiple choice (02 marks each)

1. Enzyme biotechnology
2. Biological sources of enzymes
3. Immobilization of enzyme
4. Micro-encapsulation
5. Application of immobilized enzymes
6. Enzyme modeling
7. The restriction enzymes were discovered by
   (a) L. Pasteur
   (b) Robert Koch
   (c) Arber, Smith and Nathan
   (d) Kary Mullis

Q.2 and Q. 4. Attempt the following (04 marks each)

1. Enlist the uses of immobilized enzymes
2. Adsorption method for immobilization of enzyme
3. Covalent bonding method for immobilization of enzyme
4. Entrapping method for immobilization of enzyme
5. Enzyme immobilization with the help of entrapping by microencapsulating

Q. 3(a). Attempt the following (03 marks each)

1. Application of immobilized enzymes
2. Cross binding method for immobilization of enzyme
3. Adsorption method for immobilization of enzyme
4. Covalent bonding method for immobilization of enzyme
5. Entrapping method for immobilization of enzyme
6. Enzyme immobilization with the help of entrapping by microencapsulating

Q. 5. (a) Attempt the following (06 marks each)

1. Describe immobilization of enzymes and different techniques used for it.

Unit 7. Medical biotechnology (04 marks)

Q. 1 , Q. 3(b) and Q. 5(b). Define / Explain/ Comment / Multiple choice (02 marks each)

1. Genetic counseling
2. Fertility control
3. Centchroman (Saheli)
4. Gene Therapy
5. DNA fingerprinting
6. Hormone hCG
7. DNA fingerprinting used in
   (a) Identification of suspected criminal (b) formation of clones
   (c) Identification of original parents (d) both a and c
8. The basis used for DNA fingerprinting needs—
   (a) availability of cloned DNA (b) availability of VNTR's
   (c) availability of human genome (d) variation in the offspring
9. VNTR means

(a) variable no. of tandem repeats (b) very narrow tandem repeats
(c) variable noncistronic ransposes regions (d) valuable noncistronic ransposes regions

10. The sequences which are matched in DNA fingerprinting ---
    (a) minisatellite DNA (b) moderately repetitive sequences
    (c) microsatellite DNA (d) satellite DNA

Q.2 and Q. 4. Attempt the following (04 marks each)

1. Explain the role of biotechnology in providing immunity, diagnosis and treatment of diseases.
2. Fertility control
3. Genetic counseling
4. How forensic medicine helps to identify the suspect of murder or rape?

Unit 8. Environmental biotechnology (06 marks)

Q. 1 , Q. 3(b) and Q. 5(b). Define / Explain/ Comment / Multiple choice (02 marks each)

1. Bio-fuel
2. Bio-diesel

3. Cleaner technology for reducing pollutants 4. Biosensor

5. Bio-ethanol

Q. 2 and Q. 4. Attempt the following (04 marks each)

1. Concept of bio-fuel.
2. Discuss any two cleaner technologies for reducing environmental pollution.
3. Bio-ethanol
4. Bio-diesel
5. Biosensor

Q. 3(a). Attempt the following (03 marks each)

1. Bio-Diesel 2. Bio-ethanol
3. Bio-fuel 4. Biosensor

Q. 5. (a) Attempt the following (06 marks each)

1. How biosensor detect the environmental pollutant.
2. Explain concept of bio-fuel with example.
3. Describe the different cleaner technologies for reducing environmental pollution.

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FUNCTIONAL ANATOMY OF CHORDATES

Unit No.1 Systematic position, Habits, Habitat and External characters.

Q.1. Multiple choice questions (2 marks each)

1. The Rat belongs to the highest group of vertebrates the----------

a) Mammals b) Reptiles

c) Aves d) Amphibia

2. *Rattus rattus* is a---------- Rat.

a) White b) Black

c) Brown d)Yellow

3. The body of Rat is divisible into ----------

a) Head,neck,trunk and tail b) Head,neck and trunk

c) Head,neck and tail d) Head and trunk

4. Lying below the eye of Rat is a single vibrassa known as ----------

a) Mystical b) Submental

c) Genal d) Superciliary

5. In the female Rat the ventral surface bears ----------nipples or teats.

a) 2-4 b) 4-6

c) 6-8 d) 10-12

6. The tail of Rat is covered over by overlapping epidermal scales arranged in ---------- rings.

a) 90 b)112

c) 150 d) 210

Q.2 & Q.4 Short notes/sketch and label (4 marks each)

1. Systematic position,habits and habitat of rat
2. External characters of Rat
3. Sexual dimorphism in Rat
4. Functions of the skin of Rat

5. Sketch and label-Male Rat

6. Sketch and label female Rat

Q.3. a) Questions (3marks)

1. Sketch and label head of Rat showing vibrissae

Q.3.b) & Q.5 b) (2 marks each)

1. Fore limb of Rat

2. Hind limb of Rat

Functional anatomy-

a) Digestive system

Q.1 Multiple choice questions (2 marks each)

1. In Rat there are ----------teeth on the upper jaw

a) 4 b) 6 c) 8 d) 10

2. In Rat there are ---------- teeth on the lower jaw

a) 4 b) 6 c) 8 d) 10

3. The dental formula of Rat is ----------

a) 1,0,0,3 b) 1,1,0,4

c) 1,0,1,3 d) 2,0,0,4

4. There are ----------pairs of salivary glands in Rat

a) One b) Three c) Four d) Five

5. Saliva of Rat contains an enzyme----------

a) Pepsin b) Ptyalin c) Renin d) Trypsin

6. The large intestine of Rat shows two parts: ----------

a) Colon and rectum b) Stomach and ileum

c) Ileum and duodenum d) Stomach and duodenum

7. The small intestine of Rat is about----------times the length of its body

a) One b) Three c) Four d) Six

8. The mucosa of the small intestine of Rat is raised into numerous, delicate finger-like Projections called----------

a) Villi b) Bundle of His c) Bronchi d) Palate

9. Between the bases of the villi are the openings of the tubular intestinal glands called----

a) Alveoli b) Kypts of Lieberkuhn

c) Urethra d) islets of Langerhans

10). In the submucosa of the duodenum lie the----------gland

a) Prostate b) Brunner's c) Salivary d) Thyroid

11. Rat often eats its own faeces; it is therefore called the----------

-

a) Carnivorous b) Corpophagus

c) Sanguivorous d) Omnivorous

Q.2. & 4. Short notes /Sketch and label(4 marks each)

1. Salivary glands of Rat
2. Stucture of tooth of Rat
3. Functions of liver of rat
4. Structure of tooth of Rat

Q.3 .a) Questions for 3 marks (3 marks each)

1. Sketch and label-Digestive system of Rat

Q.5. a) Questions for 6 marks

1. Alimentary canal of Rat
2. Digestive glands of Rat

Q.3 b) & Q.5 b) (2 maks each)

1. Assimilation 2 .Succus entericus
3. Bile 4 .Dental formula
5. Ingestion

b) Respiratory system

Q.1. Multiple choice questions (2 marks each)

1. Larynx is the anterior enlarged part of the ----------

a) Stomach b) Trachea

c) Intestine d) Right bronchus

2. The right lung of rat is divided into ----------lobes

a) Two b) Three

c) Four d) Six

3. ----------serves as an organ of sound production

a) Pharynx b)Trachea

c) Larynx d) Left bronchus

Q.2. & Q.4. Short notes/Sketch and label (4 marks each)

1. Gaseous exchange in the lungs of rat

2. External respiration in rat

3 a) Questions for three marks (3 marks each)

1. Sketch and label the respiratory system of rat

Q.5. a Questions for 6 marks

1. Describe the respiratory system of rat

Q.3. b) & Q.5. b) (2 marks each)

1. Larynx 2.Bronchi

c) Circulatory system

Q.1. Multiple choice questions

1. The heart in Rat consists of is----------chambered

a) Single b) Two c) Three d) Four

2. The heart of Rat is differentiated into----------

a) Two auricles and two ventricles b) One auricle and two ventricles

c) Two auricles and one ventricle d) Three auricles and one ventricle

3. The two pulmonary veins join together and open into the ----------

a) Right auricle b) Right ventricle

c) Left ventricle d) Left auricle

4. The period of relaxation of the ventricles is called ----------

a) Diastole b) Systole

c) Pulmonary circulation c) Systemic circulation

5. The systemic aorta arises from the----------

a) Right ventricle b) Left auricle

c) Right auricle d) Left ventricle

6) The systemic veins are----------

a) Two postcavals and a precaval b) A precaval and a postcaval

c) A precaval and two postcavals d) two precavals and a postcaval

7. The external jugular is the principal vein of the----------

a) Head b) Neck

c) Trunk d) Tail

8. Hepatic veins bring the blood from the----------

a) Duodenum b) Lungs

c) Kidneys d) Liver

Q.2. & Q.4.Short notes /sketch and label (4 marks)

1. Working of the heart of rat
2. Sketch and label the.internal structure of the heart of Rat
3. Functions of blood of rat
3. Sketch and label the Arterial system of Rat
4. Sketch and label the venous system of Rat

Q.3a) Questions for three marks (3 marks each)

1. Heart of Rat
2. Sketch and label the Dorsal view of Rat
3. Sketch and label the ventral view of Rat

Q.5a) Questions for 6 marks

1. Describe the Arterial system of Rat
2. Describe the Venous system of Rat
3. Describe the internal structure of heart of Rat

Q.3 b &Q.5 b) (2 marks each)

1. Pace maker 2. Cordae tendinae
3. Bundle of His 4. Double circulation

d) Excretory system

Q.1. Multiple choice Questions

1. A renal tubule is dilated at its inner blind end forming the----------

a) Urethra b) Bowman’s capsule

c) Ureter d) Pyramids

2. The kidney contains a vast number of----------

a) Seminiferous tubules b) Graffian follicles

c) Uriniferous tubules d) Vasa deferentia

3. The Bowman's capsule together with the contained glomerulus's constitutes the--------

a) Pyramid b) loops of Henle

c) Calyx d) Malpighian body

Q.2 &Q.4 Short notes/sketch and label(4 marks each)

1. Sructure of the kidney of Rat
2. Working of the kidney of Rat

Q.3a) Questions for three marks (3 marks each)

1. Sketch and label the excretory system of Rat
2. Sketch and label the renal tubule of Rat

Q.5.a) Questions for 6 marks

1. Describe the Excretory system of Rat

Q.3 b) & Q .5 b) (2 marks each)

1. Malpighian body 2. Ultrafiltration
3. Selective reabsorption 4. Osmoregulation

e) Nervous system and sense organs

Q.1. Multiple choice questions(2 marks each)

1. The cavity of the midbrain is the----------

a) Lateral ventricles b) Third ventricle

c) Fourth ventricle d) Iter

2. The hind brain comprises two parts mainly:the cerebellum and ----------

a) Optic lobes b) Olfactory lobes

c) Medulla oblongata d) Cerebral hemispheres

3. Olfactory lobes are concerned with sense of----------

a) Smell b) Balance and equilibrium

c) Sight d) Coordination and intelligence

4. There are ----------pairs of cranial nerves in Rat

a) 9 b) 10

c) 11 d) 15

5. The eyeball of Rat id formed of ----------distinct layers

a) Two b) Three

c) Four d) Five

6. The inner ear of Rat is often called----------

a) Retina b) Jacobson's organ

c) Cornea d) Membranous labyrinth

Q.2. & Q.4. Short notes/sketch and label (4 marks each)

1. Membranous labyrinth

Q.3.a) Questios for 3 marks(3 marks)

1. Sketch and label v.s. of eye of Rat

Q.5.a) Questions for 6 marks

1. Describe the membranous labyrinth. Give the functions of ear

Q.3.b) &Q.5.b) (2 marks each)

1. Phonoreceptor
2. Membranous labyrinth
3. Jacobson's organs

f) Reproductive system and development

Q.1. Multiple choice questions (2 marks each)

1. Attached to each testis on its inner side is a mass of coiled tubules called the----------

a) Malpighian tubules b) Cowper's gland

c) Prostate glands d) Epididymis

2. Attached to the inner concave surface of the seminal vesicle is the----------

a) Cowper's gland b) Prostate gland

c) Coagulating gland d) Thymus gland

3. The vagina and urethra together form a common short passage called the----------

a) Uterus b) Fallopian tube

c) Vestibule d) Stroma

4. Copulation in Rat occurs about----------hours before ovulation

a) 1-3 b) 2-4 c) 5-7 d) 8-20

5. The period of gestationin Rat is about---------- days

a) 5-8 b) 10-14 c) 15-18 d) 20-21

6) The act of sexual union is known as----------

a) Fertilization b) Ovulation

c) Circulation d) Copulation

7. Two small flask –shaped----------open into the urethra where it enters the penis

a) Prostate glands b) Coagulating glands

c) Preputial glands d) Cowper's glands

8. The graffian follicle ruptures and releases the contained ovum,this is known as----------

a) Fertilization b) Ovulation

c) Copulation d) Zygote

Q.2. & Q.4. Short notes/sketch and label(4 marks each)

1. Development in Rat

Q.3 a) Questions for three marks (3 marks each)

1. Sketch and label the male reproductive system of Rat
2. Sketch and label the female reproductive system of Rat

Q.5a) Questions for 6 marks

1. Describe the male reoproductive system of Rat
2. Describe the female reproductive system of Rat

Q.3.b) & Q.5.b) (2 marks each)

1. Oestrous period 2. Ovulation

Unit No. 2.Study of following classes with reference to prescribed topics

2.1 Urochordates

Q.1.Multiple choice Questions (2 marks each)

1. The entire Ascidians tadpole is covered by a thin test secreted by----------

a) Ectoderm b) Mesoderm

c) Endoderm d) Mesoderm and endoderm

2. The Ascidian tadpole larva after about ----------hours of non-feeding and free swimming existence it sinks to the bottom

a) Two b) Three

c) Four d) Five

Q.2. & Q.4. Short notes/sketch and label (4 marks each)

1. Ascidian tadpole larva
2. Sexual reproduction in Doliolum
3. Retrogrssive metamorphosis
4. Sketch and label the stages showing retrogressive metamorphosis

Q.3. a) Questions for3 marks (3 marks each)

1. Sketch and label the Ascidian larva

2.2 Cyclostomata

1. General primitive and specialized characters and Ammocoetous larva

Q.3.a) Questions for three marks(3 marks each)

1. Give the general characters of Cyclostomata
2. Give the primitive characters of Cyclostomata
3. Give the specialized characters of Cyclostomata
4. Ammocoetous larva

2.3 Pisces

Q.1. Multiple choice questions.

1. Pelvic fins in fishes are called thoracic when----------

a) They are situated anterior to pectoral fins

b) They are situated to just above the pectoral fins

c) They are situated just below the pectoral fins

d) They are situated just in front of anus

2. Lateral and median fins are used as----------

a) Swimming organs b) Defensive organs

c) Sound producing organs d) Steering devices

Q.2. & Q.4. Short notes/sketch and label(4 marks each)

1. General characters of Dipnoi fishes
2. Scales in fishes

Q.3. a) Questions for three marks (3 marks each)

1. Describe the fins in Fishes

2.4 Amphibia

Q.2.&Q.4.Short notes/sketch and labe(4marks)

1. Post-emrionic changes in Frog

2.5 Reptiles

Q.1. Multiple choice questions (2 marks each)

1. Tuatarta belongs to the order----------

a) Chelonia b) Rhynchocephalia

c) Squamata d) Crocodilia

Q.2 & Q.4. Sort notes/sketch and label(4 marks each)

1. Rhynchocephalia.

Q.3 b) & Q.5b) Questions for two marks (2 marks each)

1. Temporal vacuities

2.6 Aves

Q.1 Multiple choice questions(2 marks each)

1. Exoskeleton in birds is epidermal and horney, represented by----------

a) Feathers, forming a body covering b) Scales, similar to those of fishes

c) Claws, on wings d) Sheats on toes

2. The flight muscles of birds are attached with ----------

a) Coracoids b) Scapula

c) Keel of sternum d) Clavicle

Q.2. & Q.4. Short notes/sketch and lable (4 marks each)

1. Types of feathers in birds
2. Flight muscles

2.7 Mammals

Q.3. b) & Q.5.b) Questions for two marks (2 marks each)

1. Origin of mammals

Unit 3: Comparative anatomy:

Q.1. Multiple choice questions (2 marks each)

1. Mandibular aortic arch is the----------aortic arch

a) First b) Second

c) Third d) Fifth

2. In Petromyzon----------pairs of aortic arches are found

a) 7 b) 10 c) 12 d) 15

3. The primitive elasmo-branches (*Heptanchus*) show ----------pairs of aortic arches

a) 4 b) 7 c) 10 d) 13

4. ----------arches totally disappear in all tetrapods

a) I and II b) III and IV c) V and VI d) VII and VIII

5. Reptiles show only ----------functional arches

a) Two b) Three c) Four d) Five

6. In birds the III, IV and---------- aortic arches are present

a) V b) VI c) VII d) VIII

7. In mammals III, IV and----------aortic arches are present

a) V b) VI c) VII d) VIII

8. In Siren ----------arch is much reduced or absent

a) I b) II c) IV d) V

Q.5.a) Questions for 6 marks

1. Give comparative account of skin of Frog and Rat
2. Give comparative account of skin of Calotes and Pigeon
3. Give comparative account of skin of Scoliodon and Frog
4. Give comparative account of Heart of Scoliodon and Frog
5. Give comparative account of heart of Scoliodon and Rat
6. Give comparative account of heart of Calotes and Pigeon
7. Give comparative account of brain of Scoliodon and Rat
8. Give comparative accont of brain of Calotes and Pigeon
9. Give comparative accont of brain of Frog and Rat

Q.3.b) & Q.5.b) Questions for two marks (2 marks each)

1. Archinephros kidney
2. Pronephros kidney
3. Mesonephros kidney
4. Metanephros kidney

Committee Members:

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2. Prof. R. D. Patil, V. N. College, Shahada.

DEVELOPMENTAL BIOLOGY

Unit 1: Introduction

Q. 1 Define / Explain / Comment on (2 marks each)

1. Embryo 2. Developmental biology

Q. 2 Short notes (4 mark each)

1. Give the scope of developmental biology in human welfare

Unit 2: Basic phase of embryonic development

Q. 1 Define / Explain / Comment on (2 marks each)

1. Gametogenesis. 2. Spermtogenesis. 3. Oogenesis
4. Spermiogenesis. 5. Previtellogenesis 6. Vitellogenesis

Q. 2 Multiple choice (2 marks each)

1. The middle piece of sperm contains ……
   a) Golgi complex. b) Centriole
   c) Mitochondria d) Endoplasmic reticulum
2. The process of formation of ova is called ……
   a) Spermatogenesis b) Organogenesis
   c) Oogenesis d) Morphogenesis
3. In Oogenesis ……polar bodies are formed at the end of the meiotic cell division
   a) 2 b) 3 c) 4 d) 5.
4. …….. is essential for the motility of the sperm.
   a) Head b) Middle piece c) Tail d) Acrosome.
5. …….numbers of sperms and ova will be produced from 25 primary spermatocyte and 25 primary Oocyte.
   a) 100 sperms and 50 ova b) 100 sperms and 100 ova
   c) 50 sperms and 25 ova d) 100 sperms and 25 ova
6. …….. cell organelle forms the acrosome of the sperm.
   a) Golgi bodies b) Mitochondria c) Centriole d) Ribosome

Q. 3 Short notes (4 mark each)

1. Describe phase of spermatogenesis
2. Describe phase of Oogenesis
3. Describe structure of Sperm
4. Distinguish between spermatogenesis and oogenesis
5. Give the significance of gametogenesis
6. Describe types of sperms.

Q. 4 Sketch and label (4 marks each)

i. Give a schematic diagram showing spermatogenesis
ii. Give a schematic diagram showing Oogenesis
iii. Draw an electron micrograph of a mature mammalian sperm.

Unit 3: Eggs.

Q. 1 Define / Explain / Comment on (2 marks each)

i. Centrolecithal ii. Telolecithal iii. Alecithal
iv. Microlecithal v. Significance of egg membrane vi. Ovulation.

Q. 2 Multiple choice (2 marks each)

1. The egg having a large amount of yolk is termed ……..
   a) alecithal b) mesolecithal
   c) microlecithal d) macrolecithal
2. In mammals, the surface of the oocyte is drawn out into numerous microvilli. This area is called …….
   a) Corona radiata b) Zona radiata
   c) Zona pellucida d) Zona opeca
3. Vitelline membrane is a ……..
   a) Primary egg membrane b) Secondary egg membrane
   c) Tertiary egg membrane d) Quaternary egg membrane.

Q. 3 Short notes (4 mark each)

1. Describe structure of mature mammalian egg.
2. Describe egg membranes and give its significance
3. Describe types of eggs on the basis of amount of yolk with examples
4. Give the various types of eggs with regard to the distribution of yolk in them.
5. Describe various factors affecting on ovulation.

Q. 4 Sketch and label (4 marks each)

i. Architecture of mature mammalian egg.

ii. Centrolecithal egg.

Unit 4: Fertilization- Beginning new origin.

Q. 1 Define / Explain / Comment on (2 marks each)

i. Monospermy ii. Polyspermy iii. Parthenogenesis

iv. Antifertilizin v. Capacitation vi. Acrosome reaction

vii. Cortical reaction viii. Fertilizin.

Q. 2 Multiple choice (2 marks each)

1. One of the fundamental requirements for the encounter of spermatozoa and egg during fertilization is ……

a) Fluid medium b) Dry medium

c) Jelly like medium d) None of these.

2. Chemical nature of fertilizing is ……..

a) Protein b) Lipid

c) Glycoprotein d) Carbohydrates

3. In case of egg with very thick membrane, the sperm reach the egg through a special canal known as ……

a) Fertilization canal b) Micropyle

c) Fertilization cone d) Fertilization point.

4. Sperm head penetrates the corona radiata with the help of a substance is called ……

a) Ligase b) Glucorionidase

c) Hyaluronidase d) urease

5. The function of fertilization membrane is …….

a) to protect the egg b) to protect the sperm head

c) favours fusion of egg and sperm d) prevent the entry of late arriving spermatozoa.

6. If many spermatozoa succeed in penetrating the ovum, the condition is ……

a) Polyspermy b) Monospermy

c) twin formation d) Multiple birth

7. In hymenoptera ……

a) Males diploid, females' haploid b) Males haploid, female's diploid

c) Males and females haploid d) Males and females diploid

8. In bees and wasps, males are produced by ……..

a) haploid egg b) diploid egg

c) both a & b d) None.

Q. 3 Short notes (4 mark each)

1. Define fertilization. Explain the sites of fertilization giving examples.
2. Explain the role of fertilizing and antifertilizin in fertilization.
3. Explain sperm penetration mechanism with suitable diagrams.
4. Explain acrosomal reactions with suitable illustrations.
5. What is polyspermy? Describe its different types.
6. Define fertilization and give its significance.
7. Write a note on fertilizin and antifertilizin
8. Write a note on artificial parthenogenesis
9. Give the significance of parthenogenesis.

Unit 5: Cleavage

Q. 1 Define / Explain / Comment on (2 marks each)

i. Cleavage ii. Determinate cleavage

iii. Indeterminate cleavage iv. Discoidal cleavage

v. Superficial cleavage.

Q. 2 Multiple choice (2 marks each)

1. Spiral cleavage usually occurs in ……

a) Nematodes b) Insects

c) Coelenterates d) Chordates

2. If the cleavage furrow divides the animal pole but does not extend up to the vegetal pole, the type of cleavage is known as ……

a) Holoblatic b) Superficial

c) Meroblatic d) Discoidal

3. In centrolecithal egg, the usual type of cleavage is ……

a) Holoblatic b) Meroblatic

c) Spiral d) Superficial

Q. 3 Short notes (4 mark each)

1. Give the characteristics of cleavage.
2. Holoblastic cleavage and its types
3. Meroblatic cleavage and its types
4. Describe various patterns of cleavage
5. Describe determinate and indeterminate types of cleavage with examples.

Unit 6: Blatulation and Gastrulation

Q. 1 Define / Explain / Comment on (2 marks each)

i. Blastula ii. Blatulation iii. Gastrula

iv. Gastrulation v. Coeloblastula vi. Discoblastula

vii. Morphogentic movements.

Q. 2 Multiple choice (2 marks each)

1. The blastula of amphioxus is ……

a) coeloblatula b) stereoblatula

c) amphiblatula d) discoblatula

2. Superficial blastula is found in ……..

a) echinoderms b) coelenterates

c) insects d) birds

3. Rolling of surface cells of the embryo into the interior in called …….

a) Invagination b) Ingression

c) Involution d) Delamination

4. The fluid filled space in the centre of the blastula is called …….

a) enteron b) enterocoel

c) blastocoel d) archenteron

5. Epiblic morphogenetic movements occur only in the prospective …….

a) mesodermal blastomeres b) endodermal blastomeres

c) ectodermal blastomeres d) all these

6. In frog mesoderm is formed by the process of ……

a) Invagination b) involution

c) delamination d) concrescence

7. In Amphioxus single walled blastula becomes a double walled gastrula by the

process of ……

a) Involution b) Invagination

c) evagination d) delamination

Q. 3 Short notes (4 mark each)

1. Give an account of the movement of cells during gastrulation in frog.
2. Blastula of frog
3. Blastula of Amphioxus
4. Describe different types of blastulae with examples
5. Give an account of the movement of cells during gastrulation in Amphioxus .

Q. 4 Sketch and label (4 marks each)

i. Gastrula of Amphioxus ii. Gastrula of frog

Unit 7: Development of Chick

Q. 1 Define / Explain / Comment on (2 marks each)

i. Chalazae ii. Primitive streak iii. Somite

iv. Hensen's node v. Torsion vi. Flexure

vii. Foetal membranes viii. Yolk sac ix. Allantois

x. Neuromeres.

Q. 2 Multiple choice (2 marks each)

1. A well developed primitive streak is formed after incubation for …….

a) 18 – 19 hrs b) 21 – 22 hrs

c) 5 – 6 hrs d) 6 – 11 hrs

2. After 24 hrs of incubation, the numbers of somites is ……..

a) 2 pairs b) 4 pairs

c) 6 pairs d) 8 pairs

3. At each end of the egg, the chalaziferous membrane is twisted in to cord is called ...

a) Chalzae b) Vitelline membrane

c) plasmamembrane d) shell membrane

4. In chick the cleavage is …….

a) discoidal b) spiral

c) Superficial d) radial

5. In chick …… neuromeres are formed.

a) 15 b) 25

c) 11 d) 5

Q. 3 Short notes (4 mark each)

1. with labeled diagram, expain the structure of primitive streak in chick
2. Write a note on 24 hrs chick embryo with a diagram
3. Give the structure of 48 hrs 9W. M.) of chick embryo.
4. Write a note on 33 hrs chick embryo with diagram
5. Describe the structure of freshly laid hen's egg.
6. Give the significance of primitive streak.
7. What are extra-embryonic membranes? Enlist extra- embryonic membranes and give their functions.
8. Write a note on yolk sac
9. Give the structure and functions of allantois
10. Give in detail formation of five part brain in chick embryo.

Q. 4 Sketch and label (4 marks each)

i. Hen's egg

ii. 24 hrs (W. M.) of chick embryo

iii. 33 hrs (W. M.) of chick embryo

iv. 48 hrs (W. M.) of chick embryo

Unit 8: Embryonic Nutrition

Q. 1 Define / Explain / Comment on (2 marks each)

i. Embryonic nutrition ii. Placenta

iii. Cotyledonary placenta iv. Zonary placenta

v. Discoidal placenta vi. Deciduate placenta

Q. 2 Multiple choice (2 marks each)

1. Yolk composed of …….

a) Proteins and fats b) Proteins and phospholipids

c) Fats and glycogen d) Protiens, phospholipids, neutral fats and glycogen

2. Human foetus is implanted in the wall of …….

a) Fallopian tube b) Vagina

c) Uterus d) Ovary

3. Human placenta is of ……..

a) Yolk sac type b) Chronic type

c) Allantoic type d) None of these

4. In human placenta, exchange of materials occurs between maternal and foetal Blood through ……

a) Five tissue layers b) three tissue layers

c) Four tissue layers d) one tissue layer.

5. Syndesmochorial placenta is found in …….

a) Horse b) Cow

c) Rabbit d) Dog.

Q. 3 Short notes (4 mark each)

1. Enlist the types of placenta on the basis of histological peculiarities and enumerate their functions.
2. Classify placenta based on foetal and maternal tissues involved. Give example for each type
3. Name three foetal and maternal layers of placenta
4. Give the functions of placenta
5. Give the structure and one example of the following

a. Epitheliochorial b. Syndesmochorial

c. Endotheliochorial d. Haemochorial

e. Haemo-endotheliochorial.

6. Give methods by which a developing embryo gets nourishment
7. What are the sources of energy during the development of an embryo?
8. How does mother supply nutritive materials to the developing embryo
9. Give the importance of mother diet during pregnancy

10. How does mother health and foetus affect during pregnancy.

Q. 4 Sketch and label (4 marks each)

i. Epitheliochorial placenta

ii. Syndesmochorial placenta

iv. Iii. Endotheliochorial placenta

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PHYSIOLOGY OF MAMALS

Unit- 1 Thermoregulation and Control

Que. 1 Multiple choice (2 marks each)

1. Thermo biologically the animals in the nature are classified in to ----- classes.
   a) two b) three c) four d) five
2. Thermoregulation means-----
   a) Temperature regulation b) salt regulation c) water regulation d) None
3. Cold blooded animals are also called as -----
   a) Poikilothermic b) Homoeothermic c) Isothermic d) None
4. Mammals are -----
   a) Poikilothermic b) Homoeothermic c) Isothermic d) None
5. The normal body temp. of man is ----- degree celcious
   a) 37.5 b) 98 c) 100 d) None

Que. 2 / Que.4 Short note (04 marks each)

1. Poikilothermic animals.
2. Homoeothermic animals.
3. Thermoregulatory centre – Hypothalamus

Que. 3 a) Short questions for 03 marks each

1. Body temperature 2. Regional heterothermy

Que. 5a) Long questions for 06 marks each

1. What is thermoregulation? Describe thermoregulatory phenomenon in homoeothermic animals.

Que. 3 b)/ Que. 5 b) Define/explain (02 marks each)

1. Thermoregulation 2. Poikilotherms
3. Homoeotherms. 4. Biokinetic zone

Unit- 2 Respiratory System-

Que. 1 Multiple choice (2 marks each)

1. Moving of air in out of the lungs is called as --------

   a) Conduction b) Ventilation c) Circulation d) None

2. Thoracic cavity is separated from abdominal cavity by-------

   a) Diaphragm b) Ribs c) Pericardium d) None

3. The most respiratory pigment in animal kingdom is -------

   a) Haemocyanin b) Haemoglobin c) Haemerythrin d) Myoglobin

4. Carbon dioxide is mainly transported in the form of ------

   a) Carbamino compounds b) Carbonic acid c) Bicarbonates d) None

5. The total capacity of the lungs in man is ------- liter.

   a) 2.5 b) 3.5 c) 4.5 d) 5.5

6. The normal content of Hemoglobin in human male is ----- gm/100 ml of blood.

   a) 8-12 gm b) 10-14 gm c) 12-16 gm d) None

7. The normal content of Hemoglobin in human female is ----- gm/100 ml of blood.

   a) 8-12 gm b) 10-14 gm c) 12-16 gm d) None

8. Hemoglobin is present -------

   a) In plasma b) on WBC c) on RBC d) None

9. Respiratory centers are located in ------

   a) Medulla Oblongata b) Cerebral hemispheres c) Diencephalon d) None

Que. 2 / Que.4 Short note (04 marks each)

1. Hemoglobin.
2. Myoglobin.
3. Oxygen dissociation curves.
4. Nervous control of respiration.
5. Respiratory quotient.
6. Intercostal muscles.
7. Respiratory pigments.

Que. 3 a) Short questions for 03 marks each

1. Transport of Oxygen from lungs to tissue
2. Transport of Carbon dioxide from tissue to lungs

Que. 5 a) Long question for 06 marks each

1. Explain the mechanism of ventilation. 2. Describe chloride shift

3. Gaseous exchange during respiration.

Que. 3 b)/ Que. 5 b) Define/explain (02 marks each)

1. Respiration. 2. Inspiration. 3. Expiration.
4. Intercostals muscles. 5. Respiratory quotient. 6. Internal respiration.
7. External respiration.

UNIT- 3 CIRCULATORY SYSTEMS

Que. 1 Multiple choice (2 marks each)

1. The average heart frequency (Heart beat) in human is --------
   a) 70 b) 72 c) 80 d) 120
2. Contraction of heart is called as ----------
   a) Systole b) Diastole c) Stroke d) None
3. Relaxation of auricle is called as -----
   a) Auricular Diastole b) Auricular Systole c) Pause d) None
4. Asculatory method of Blood pressure is use to determine ------
   a) Systolic B. P. b) Diastolic B. P. c) Both a) & b) d) None
5. Pacemaker is located in ------
   a) Rt. Auricle b) Rt. Ventricle c) Lt. auricle d) Lt. ventricle
6. The average blood volume of normal adult is -------- lit.
   a) 2 b) 3 c) 4 d) 5
7. In human cardiac cycle is completed within --------
   a) 0.5 sec. b) 0.6 sec. c) 0.7 sec. d) 0.8 sec
8. To record graphical and electrical variations in heart,----- is used.
   a) EEG b) ECG c) USG d) MRI
9. -------- is essential for blood clotting.
   a) Vit.A b) Vit. D c) Vit.E d) Vit.K

Que. 2 / Que.4 Short note (04 marks each)

1. Blood pressure.
2. Hormonal control of blood pressure.
3. Pace maker.
4. Diagrammatic representation of blood clotting.

Que. 3 a) Short questions for 03 marks each

1. Asculatory method. 2. Palpatory method.
3. Intrinsic pathway of blood clotting. 4. Extrinsic pathway of blood clotting.

Que. 5 a) Long question for 06 marks each

1. Describe the mechanism of blood clotting.
2. Explain the various events of cardiac cycle.

Que. 3 b)/ Que. 5 b) Define/explain (02 marks each)

1. Cardiac cycle. 2. Heart beat. 3. Pace maker.
4. ECG 5. Color Doppler. 6. Angina pectoris.
7. Angiography 8. Angioplasty. 9. Heart attacks
10. Blood pressure.

UNIT- 4 MUSCLE PHYSIOLOGIES

Que. 1 Multiple choice (2 marks each)

1. Striated muscle are also known as ---------
   a) Involuntary muscles b) Voluntary muscles
   c) Smooth muscles d) Cardiac muscles.
2. The ultimate contractile unit of striated muscle is -------
   a) Micromere b) Megamere c) Sarcomere d) Telomere
3. Region between two Z-lines is ---------
   a) I – Band b) A- band c)H – zone d) Sarcomere
4. A – bands are ------- and made of ------
   a) Dark, myosin b) Light, actins c) Dark, actins d) Light, myosin
5. During muscle contraction,
   a) Z- line disappears b) A- band disappears
   c)I – band disappears d) H- zone disappears
6. Functional unit of skeletal muscle in higher chordates is-------
   a) Motor unit b) Sarcoplasm c) Myofibril d) None
7. Muscle contraction results in ----
   a) Movement of body b) Digestion c) Absorption d) None

Que. 2 / Que. 4 Short note (04 marks each)

1. Muscle twitch.
2. Neuromuscular junction.
3. Chemical changes during muscle contraction.
4. Sliding filament theory.

Que. 3 a) Short questions for 03 marks each

1. Tetanus.
2. Staircase phenomenon.
3. Muscle fatigue.
4. Summation.

Que. 5 a) Long question for 06 marks each

1. Ultra structure of striated muscle.
2. Sliding filament theory.
3. Physical-chemical changes during muscle contraction.
4. Muscle stimulation.

Que. 3 b)/ Que. 5 b) Define/explain (02 marks each)

1. Sliding filament theory.
2. Stimulus.
2. Refractory period.
4. Summation.
5. Tetanus.

UNIT- 5 NERVOUS PHYSIOLOGY

Que. 1 Multiple choice (2 marks each)

1. In resting (non-stimulated) nerve fibre the out side of the fibre there is ------ and inside there is ------- charge.

   a) Positive, Negative b) Negative, Positive

   c) Neutral, Positive d) Neutral, Negative

2. In human nerve fibre, the resting membrane potential (RMP) is ------

   a) – 85 mv b) + 85 mv c) -85 ev d) +85 ev

3. Action potential is measured with---------

   a) Oscillograph b) Chymograph c) Micrograph d) Cardiograph

4. Ultimate area of contact between two neurons is ----------

   a) Generator area b) Receptor area c) Junction d) Synapse

5. Synaptic cleft is filled with --------

a) Gelatinous fluid b) Cerebrospinal fluid c) Pericardial fluid d) None

6. Which of the following is not neurotransmitter substance-----

a) Adrenalin b) Acetylcholine c) Serotonin d) Dopamine

Que. 2 / Que. 4 Short note (04 marks each)

1. Effects of neurotransmitter 2. Epilepsy

Que. 3 a) Short questions for 03 marks each

1. Sketch and label sypase
2. Acetylcholine
3. Resting Membrane Potential
4. Action potential

Que. 5 a) Long question for 06 marks each

1. Explain origin and conduction of nerve impulse
2. Details about synapse with transmission.
3. Give the types and properties of neurotransmitters.

Que. 3 b)/ Que. 5 b) Define/explain (02 marks each)

1. Impulse 2. Reflex action 3. EEG.

UNIT- 6 SENSE ORGANS

Que. 1 Multiple choice (2 marks each)

1. Rod cells contains --------

a) Rhodopsin b) Iodopsin c) Elastin d) None

2. Cone cells are responsible for--------

a) Bright light vision b) Dim light vision c) Both a) & b) d) None

3. Light enters the eye first through---------

a) Pupil b) Iris c) Cornea d) Conjunctiva.

4. Colour vision is possible due to---------

a) Rods b) Cones c) Choroid d) None

Que. 2 / Que. 4 Short note (04 marks each)

1. Stimulation of rods and cones. 2. Visual pigments.

3. Middle ear. 4. Organ of corti.

Que. 3 a) Short questions for 03 marks each

1. Blind spot. 2. Tympanic membrane
3. Choroid 4. Cornea

Que. 5 a) Long question for 06 marks each

1. Describe visual pathway.
2. Describe the structure of internal ear.
3. Describe auditory pathway.

Que. 3 b)/ Que. 5 b) Define/explain (02 marks each)

1. Eustachian tube 2. Binocular vision. 3. Pinna

UNIT- 7 EXCRETION

Que. 1 Multiple choice (2 marks each)

1. In mammals, the main excretory organ is ------
   a) Heart b) Brain c) Kidneys d) None
2. Excretion removes ---------- wastes from the body
   a) Carbohydrates b) Nitrogenous c) fat d) None
3. In the glomerulus, the diameter of afferent arterioles is ----- than efferent arterioles.
   a) Greater b) Smaller c) same d) None
4. Glomerular membrane acts as ----------
   a) Biological filter b) Chemical filter c) Physical filter d) None
5. Kidney perform the function of--------
   a) Reapiration b) Filtration c) Thermoregulation d) None
6. Reabsorption in kidney tubules is facilitated by -------
   a) ACTH b) ADH c) Androgen d) Oestrogen
7. Daily ---------- ml of glomerular filtrate if produced by human kidneys.
   a) 170 lit. b) 180 lit c) 190 lit d) 200 lit

Que. 2 / Que. 4 Short note (04 marks each)

1. Structure of uriniferous tubule. 2. Selective reabsorption

Que. 3 a) Short questions for 03 marks each

1. Ultra filtration 2. Tubular secretion.

Que. 5 a) Long question for 06 marks each

1. Describe the phenomenon of urine formation.
2. Describe counter current theory of urine concentration.

Que. 3 b)/ Que. 5 b) Define/explain (02 marks each)

1. Excretion. 2. Glomerular filtrate.
3. ADH. 4. Loop of Henle

UNIT- 8 REPRODUCTION

Que. 1 Multiple choice (2 marks each)

1. Testis perform following function--------

a) Production of sperm b) Production of egg c) Production of RBC d) None

2. Testosterone is secreted by -------

a) Interstitial cells of Leydig b) Graafian follicle c) Sertoli cells d) None

3. The main ovarian hormone -------

a) Androgens b) Testosterone c) Oestrogen-Porgesterones d) None

4. Granulosa cells of ovary secrets --------

a) Androgen b) Oestroen c) Progesterone d) None

5. Progesterone is secreted by ----

a) Follicular cells b) Corpus luteum c) Corona radiate d) None

6. Oestrous cycle is operated in ----

a) Primates b) Non-primates c) Nonchordates d) None

Que. 2 / Que. 4 Short note (04 marks each)

1. Oestrous cycle
2. Functions of Androgens.
3. Functions of Progesterone.

Que. 3 a) Short questions for 03 marks each

1. Hormonal control Oestrous cycle.

2. Hormonal control of menstrual cycle.
3. Testicular hormones.
4. Ovarian Hormones.
5. Secondary sexual characters

Que. 5 a) Long question for 06 marks each

1. Describe male sex hormones and their physiological role.
2. Describe female sex hormones and their physiological role.
3. Menstrual cycle.

Que. 3 b)/ Que. 5 b) Define/explain (02 marks each)

1. Relaxin
2. Spermatogenesis.
3. Oogenesis
4. Primary sexual characters
5. Castration

UNIT- 9 ENDOCRINE GLANDS

Que. 1 Multiple choice (2 marks each)

1. Mammalian pituitary gland has ------ lobes.
   a) Two b) Three c) Four d) None
2. Endocrine glands -------
   a) Do not have ducts b) Have many ducts c) Have one duct d) None
3. Which of the following is not endocrine gland?
   a) Pancreas b) Pituitary c) Thyroid d) Salivary gland
4. Secretion of endocrine gland is called --------
   a) Enzyme b) Hormone c) Mucous d) None
5. Cushing's disease is mostly occurs in -----
   a) Males b) Females c) Children d) None
6. Hyper secretion of growth hormone(GH) causes---------
   a) Dwarfism b) Gigantism c) Myxoedema d) None
7. Which of the following is concern with Iodine metabolism?
   a) Thyroxin b) Insulin c) Adrenalin d) None

8. Lactogenic hormone is concern with ------

   a) Milk ejection b) Spermatogenesis c) Growth d) None

9. -------- is act as dual organ (endocrine as well as exocrine).

   a) Pituitary b) Adrenal c) Thyroid d) Pancreas

Que. 2 / Que. 4 Short note (04 marks each)

1. Physiology of endocrine pancreas.
2. Feed back mechanism
3. Adenohypophysis

Que. 3 a) Short questions for 03 marks each

1. Give the names of hormones of pituitary gland
2. Neruohypophysis.
3. Disorders of ACTH
4. Disorders of GH

Que. 5 a) Long question for 06 marks each

1. Physiological role of Pituitary gland
2. Interrelationship between thyroid, Parathyroid and adrenal glands.

Que. 3 b)/ Que. 5 b) Define/explain (02 marks each)

1. Cushing's disease
2. Gigantism.
3. Dwarfism.
4. Myxoedema
5. Vasopressin.

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FOOD AND NUTRITION

Unit 1

Q. 1. Define/ Explain (2 marks each)

3. Balanced diet
2. Respiratory quotient
3. five food group plan
4. SPS
5. BMR
6. Calorimetry
7. What is the unit of measuring energy
8. What is SDA ?

Q. 1. Multiple choices (2 marks each)

1. Food groups includes …….
   a) Cereals and vegetables b) Honey, Jaggary
   c) Sugar and crops d) All
2. ……. Is the unit of measuring energy
   a) Kilocalories b) K gm
   c) Joules d) m gm
3. SDA means ……
   a) Specific dynamic action b) Simple dynamic action
   c) Single dynamic action d) Superior dynamic action

Questions for 3 marks each

1. Give the components of food
2. What is the average calories need for a normal healthy person?
3. What are the daily requirement of carbohydrates , fats and proteins is determined ?
4. How is the caloric value of carbohydrates, fats and proteins?
5. What is the caloric value of carbohydrates, fats and proteins?
6. What are the factors for measuring BMR ?
7. Mention the factors for high and low BMR

Questions for 4 marks each

1. Fuel value of food 2. BMR
3. Indirect Calorimetry 4. Biological value

Questions for 6 marks each

1. Basic food groups
2. Respiratory quotient
3. Factors affecting BMR
4. Direct Calorimetry

Unit 2

Define/ explain (2 marks each)

1. Carbohydrates
2. What is RQ for carbohydrates?
3. What is RQ for proteins?
4. What are first class proteins?
5. What are second class proteins?
6. Why animal proteins are preferred?

Multiple choices (2 marks each)

1. RQ for Carbohydrates is …….
   a) 2 b) 4
   c) 6 d) 1
2. ……. Amino acid is deficient in pulses
   a) Lysine b) Tyrosine
   c) Tryptophan d) Glycine
3. The enzymes are …….. in nature
   a) Lipids b) Proteins
   c) Fats d) Nucleic acids

Questions for 3 marks each

1. What does the caloric value for carbohydrates suggests?
2. What does the biological value of proteins suggests?
3. Give the biological value of proteins

Questions for 4 marks each

1. Protein food
2. What is the protein efficiency ratio?
3. Describe the significance of milk proteins

4. Describe the significance of protein from legumes

Questions for 6 marks each

1. Describe the classification of proteins.

Unit 3

Define/ explain (2 marks each)

1. Fats
2. Enlist the functions of essential fatty acids
3. Lipids
4. Sources of water soluble vitamins
5. Oils
6. Enlist the unsaturated fatty acids
7. Arteriosclerosis
8. Enlist the saturated fatty acids
9. What are lipids
10. Enlist the fat soluble vitamins
11. Vitamins
12. What are the sources of Vit. A
13. Minerals
14. Metabolism
15. Trace elements
16. Cations and anions
17. Essential trace element
18. Non-essential trace elements.
19. Give the effect of dehydration on the body
20. Which trace elements does the body need?
21. Which are the principle minerals needed by the body
22. What are the Na^+ and K^+ level in the serum?
23. Which is principle Cations of extra and intracellular fluid?

Multiple choices (2 marks each)

1. Obesity is the abnormal increase in body weight due to excessive deposition of …..

    a) Carbohydrates b) Fats

    c) Proteins d) All

2. Arteriosclerosis is a complex disease characterized by thickening of arteries due to

    Accumulation of ……

    a) Lipids b) Proteins

    c) Carbohydrates d) All of above

3. The lipids are broadly divided in to ……. Types

    a) four b) three

    c) two d) five

4. The fatty acids contain …….. …… with hydrocarbon as side chain

    a) triglycerides b) Carboxylic acid

    c) Carbonyl group d) All of above

5. The simple lipids are ……

    a) Esters of fatty acids with glycerol b) esters of fatty acids with alcohol

    c) Esters of fatty acids without glycerol d) esters of fatty acids without alcohol

6. Lipids are …….

    a) Soluble in organic solvents b) insoluble in water

    c) insoluble in oraganic solvents d) soluble in water

7. …… is an abnormal increase in the body weight due to excessive fat deposition

    a) Cancer b) Diabetes

    c) Obesity d) Hypertension

8. The …… mineral is abundantly found in human body

    a) Mg b) P

    c) Zn d) Ca

9. The total of calcium in an adult man is about …… Kg.

    a) 2-3 b) 3-4

    c) 1-1.5 d) 0.5- 1.0

10. The ……. is the principle cation of extra cellular fluid

    a) Cl b) I

    c) Na d) Zn

11. The ……. is the principle cation in intracellular fluid

    a) Cl b) I

    c) Na d) K

Questions for 3 marks each

1. State the functions of lipids
2. What are essential fatty acids?
3. What are saturated fatty acids?
4. What are unsaturated fatty acids?
5. What are compound lipids?
6. Give the classification of lipid
7. What are the functions of Sodium?
8. What are the functions of Calcium?
9. What are the functions of Iodine?

Questions for 4 marks each

1. What are lipids? Give their composition and sources
2. What is obesity? Give its etiology
3. Give the prevention and treatment for obesity
4. Mention the deficiencies of fats
5. Write the complications of obesity
6. Distinguish between fats and oils
7. Vitamins as accessory factor of food.
8. Iodine metabolism
9. Sources of iodine
10. Sources of phosphorus
11. Sources of Calcium

Questions for 6 marks each

1. Describe the daily allowances and deficiencies of fats
2. State the role of cholesterol in lipid nutrition
3. What do you mean by arteriosclerosis?
4. What are the functions of potassium?
5. What are the conditions in which serum potassium level is increased?
6. What are the general functions of minerals

7. What are the conditions in which serum potassium level is decreased?

Unit 4.

Define/ explain (2 marks each)

1. Diet
2. Meal planning

i. Food adulterations

Questions for 4 marks each

1. Alcoholism
2. Diabetes mellitus
3. Anaemia
4. Obesity
5. Arteriosclerosis

Questions for 6 marks each

6. Cardiovascular diseases
7. methods of cooking
8. Effects of food adulteration
9. Gastro-intestinal diseases
10. Kidney diseases
11. Peptic ulcers
12. Therapeutic diet and its types.

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MICROTECHNIQUES

Unit No. 1 Introduction.

Q. 1. Multiple choice questions (2 Marks each)

1) _ _ _ _ _ _ _ _ is used to obtain histological sections.

a) Macro technique, b) Micro technique,

c) Poly technique, d) Mono technique,

2) Micro technique is of great importance to the researchers of _ _ _ _ _ _ _ _ _ _ _

a) Mathematical Science, b) Computer Science,

c) Biological Science, d) Physics

Q. 1./Q.3(b)/Q.5(b) Define / Explain / Comment (2 Marks Each)

1. Micro technique

Q. 3 (a) Describe (Question for 3 marks each)

1) Applications of micro technique.

2) Collection of materials..

3) Fixatives.

Unit No. 2 Collection and Fixatives.

Q. 1. Multiple choice questions (2 marks each)

1) In micro technique before dissection of organism _ _ _ _ _ _ _ _ process is of prime-Importance.

a) Narcotization , b) Organization,

c) Civilization, d) Industrialization,

2) _ _ _ _ _ _ _ _ _ _ _ _ is the initial step in the permanent microscopic preparation

a) Dehydration, b) Dealcoholization,

c) Fixation, d) Clearing

3) The materials which are used for fixation are know as_ _ _ _ _ _ _ _ _ _ _ _

a) Fixatives b) Derivatives c) Mordents d) Paraffin.

4) _ _ _ _ _ _ _ _ _ _ is called as compound fixative.

a) Formalin b) Methanol

c) Ethanol d) Bouins fluid

5) _ _ _ _ _ _ _ _ _ _ _ Fixative is known as simple fixative

a) Ethanol, b) Bouins fluid

c) Zenker's fluid d) Carnoy's fluid

Q. 1/ Q. 3(b)/ Q. 5 (b) Define/Explain / Comment (2 marks each)

1) Fixation 2) Fixatives 3) Simple Fixatives

4) Compound Fixatives 5) Primary Fixatives 6) Bouin's fluid

7) Specific Fixatives 8) Acetone 9) Whole – mounts

Q. 2. & 4 Short notes / Describe (4 Marks each)

1) Importance of Fixation

2) Theory of Fixation

3) Qualities of good fixatives

4) Types of Fixatives

5) Bouin's Fluid

Q. 3. (a) Describe in brief (3 marks each)

1) Zenker's Fluid 4) Ethanol

2) Bouin's Fluid 5) Formalin

3) Carnoy's Fluid 6) Specific Fixatives for whole mounts

Q. 5 (a) Describe in details (6 Marks each)

1) Types of Fixatives

2) Importance of Fixation

Unit. No. 3 Washing,

Q. 1. Multiple choice questions (2 marks each)

1) _ _ _ _ _ _ _ is called as post fixation treatment.

a) Clearing b) Washing

c) Staining d) Embedding

Q. 1/ 3 (b)/ Q. 5(b) Define / Explain / Comment. (2 marks each)

1) Washing

Q. 3 (a) Write short notes / Describe.(each for 3 marks)

1) Washing 2) Theory & Significance of washing.

Unit. No. 4 Dehydration.

Q. 1. Multiple choice questions (2 marks each)

1) Dehydration means replacement of _ _ _ _ _ _ _ _ _ from tissue.

1) Water 2) Xylene

3) Ethanol 4) methanol

2)_ _ _ _ _ _ _ _ _ _ is the commonest reagent used for dehydration of tissue.

1) Water 2) Alcohol

3) paraffin 4) DPX

Q. 1/ Q. 3(b)/ Q. 5 (b) Define/Explain / Comment (2 marks each)

1) Dehydration

2) Dehydrating agents.

Q. 3 (b) Describe (3 mark each)

1) Describe dehydrating agents, and its uses

2) Significance of dehydration.

3) Significance of using graded alcohol

Unit. 5 Clearing

Q.1 Multiple choice questions (2marks each)

1) In the process of clearing _ _ _ _ _ _ _ _ _ is removed form the tissue.

a) Paraffin b) Canada balsum.

c) Alcohol d) Eosin.

Q.1/Q.3 (b) /Q.5 (b) Define/Explain/Comment (2marks each) .

1) Clearing 2) Xylene 3) Benzene

4) Chloroform 5) Cedar wood Oil 6) Toluene

Q. 2. and Q. 4 : Short notes / Describe(4 marks each)

1) Describe Clearing agents, their merits & demerits

2) Describe Clearing procedure

Q. 3 (a) Question for 3 marks each.

1) Define clearing and give its importance

2) Describe in brief clearing agents.

Unit. No. 6:- Embedding

Q. 1. Multiple choice question (2 marks each)

1) The most commonly used material for the infiltration is _ _ _ _ _ _ _ _ _

a) Alcohol b) Water c) Paraffin d) DPX

2) Cold Impregnation involves use of _ _ _ _ _ _ _ _ _ _ materials.

a) Xylene + Powdered wax b) Alcohol + wax

c) Water + wax d) Formalin + wax

3) Hot Impregnation is done at _ _ _ _ _ _ _ _ _ _ temperature

a) $58 – 60^0$c b) $40 – 50^0$c

c) $70 – 80^0$c d) $80 – 90^0$c

4) Hot Impregnation is done in _ _ _ _ _ _ _ _ _ _ _ _

a) Water bath b) Refrigerator c) Oven d) Aquarium

5) _ _ _ _ _ _ _ type of embedding containers are also used for block making

a) Funnel b) Glass- dishes c) Flask d) Pipette

6) Paper boats are cheap and convenient for _ _ _ _ _ _ _ _ _ _ _ _ _

a) Embedding b) Clearing c) Staining d) Mounting

7) _ _ _ _ _ _ _ _ _ _ _ is called as embedding medium

a) Glycerine b) Canada balsum c) DPX d) Paraffin

8) Oven is useful for _ _ _ _ _ _ _ _ _ _

a) Melting b) Cooling c) Freezing d) None of above

Q. No. 1/ Q. 3 (b) Q. 5 (b) Define / explain / coment (2 marks each.)

i) Embeding ii) L-Shaped Metal Pieces iii) Oven

iv) Cold – Impregnation v) Hot-Infiltration vi) Paraffin

vii) Orientation viii) Paper Trays ix) Glass-dishes.

Q. 3 (a) Describe / sketch and lable (3 marks each)

1) Hot and Cold Infiltration 2) Use of paraffin

3) Sketch and label Oven 4) Multiple embedding.

Q. 2. and Q. 4 : Short notes / Sketch and label (4 marks each)

1) Advantages and disadvantages of paraffin embedding.

2) Block-making.

3) Orientation of tissue in the block.

4) Embedding containers.

5) Embedding procedure.

6) Types of paraffin

7) Hot and cold impregnation

8) Oven and its uses

Q. 5. Describe in details (questions for 6 marks each)

1) Embedding containers.

2) Embedding procedure & embedding faults.

3) Block making .

4) Give importance of oven and incubator.

5) Cold and Hot Infiltration.

Unit. No. 7 :- Trimming

Q. 1. Multiple choice question (2 marks each)

1) Removal of excess paraffin form the block is known as _ _ _ _ _ _ _ _ _

a) Mounting b) moulding c) Trimming d) Embedding.

Q. 1/ Q.3 (b) Q. 5 (b) Define / Explain (questions for 2 marks each)

1) Trimming

Q. 3 (a) Describe (questions for 3 marks each)

1) Procedure of Trimming

Unit. No. 8 :- Section cutting and Affixing.

1) The machine which is used for section cutting is knows as _ _ _ _ _ _ _

a) Centrifuge b) Microtome

c) Microscope d) None of above

2) The mechanical device which rotates during section cutting is knows as_ _ _ _

a) Rotary microtome b) ultra microtome

c) Freezing microtome d) Sliding microtome

3) While sectioning, the angle of knife of microtome should be at_ _ _ _ _ _ _ _ _

a) 1 – 2 Micron b) 7 – 8 Micron c) 20 – 30 Micron d) None of above

4) The part of microtome which carry the knife at anterior and is knows as _ _ _ _

a) Handle b) Wheel c) Base d) Knife Carriage.

5) The Plano-concave knife is _ _ _ _ _ _ on one side

a) Hollow b) Curved c) plane d) None of above

6) Wedge shaped knife has _ _ _ _ _ _ _ _ surface on both sides

a) Curve b) Plane d) Rounded d) None of above

7) To make cutting edge of knife sharp on oil stones is knows as_ _ _ _ _ _ _ _ _ _

a) Bending b) Honing c) Stropping d) None of above

8) After honing refinement of knife is knows as_ _ _ _ _ _ _ _ _ _ _ _ _

a) Bending b) Stropping c) Welding d) None of above

9) Stropping is done on _ _ _ _ _ _ _ _ _ _ _ _ belt

a) Rubber belt b) Plastic belt c) Leather belt d) Cotton belt

Q. 1/ Q.3 (b) Q. 5 (b) Define / explain / comment (questions for 2 marks each)

i) Honing ii) Stropping iii) Rotary microtome

iv) Knife v) Rotating Wheel vi) Micron adjuster

vii) Knife carriage viii) Slide warmer ix) Mayer,s Fixative

x) Affixation xi) Microtome peg xii) Ratchet wheel

xiii) Return wheel xiv) Advance shaft

Q. 3 (a) Describe (questions for 3 marks each)

i) Metal Pegs ii) Honing And Stropping

iii) Block holder iv) Trimming of block

v) Microtome knives

Q. 2. and Q. 4 : Short notes / Sketch and label (4 marks each)

i) Describe types of knives

ii) Orientation of block on microtome peg

iii) Preparation and use of affixative

iv) Care of microtome

v) Mounting of block on microtome peg. vi) Microtome

Q. 5. Describe in details (questions for 6 marks each)

i) Describe in brief detects and their possible causes and remedies during section cutting.

ii) Describe uses and precaution of handling of microtome.

iii) Describe Rotary microtome.

iv) Sketch and label microtome.

v) Describe different types of microtome knifes.

vi) Describe affixation.

vii) Describe slide warmer method.

viii) Describe faults and their remedies during section cutting.

Unit. No. 9 :- Staining

Q. 1. Multiple choice question (2 marks each)

i)_ _ _ _ is colored substance used to dye the tissues, for microscopic observation.

a) Ink b) Oil paint c) Iodine d) Stain

ii)_ _ _ _ _ _ _ is a nuclear stain.

a) Eosine b) Acid fuschin c) Haematoxylene d) None of above

iii) _ _ _ _ _ _ _is a nuclear stain.

a) Acid fuschin b) Aceto carmine c) Eosine d) None of these

iv)_ _ _ _ _ _ _ _ _ is a cytoplasmic stain

a) Acetocarmine b) Haematoxylene c) Eosine d) None of above

v) _ _ _ _ _ _ _ _ _ _the stains which are generally used to stain the living organisms are knows as.

a) Vital stains b) Alizarin red c) Blue ink d) None of above

vi) Double staining method is used to stain_ _ _ _ _ _ _ _ _ _ _ _ _ _ _

a) Nucleus b) Nucleus and cytoplasm

c) Cytoplasm d) None of above

vii) Deparafinization is done in_ _ _ _ _ _ _ _ _ _

a) Xylene b) Acidic c) Basic Stain d) None of above

viii) Carmine obtained from dried bodies of _ _ _ _ _ _ _ _ _ _ bug.

a) Bed bug b) Red Cotton bug

c) Cochineal bug d) None of above

ix) Haematoxylene is obtained from south American_ _ _ _ _ _ _ _ _ _ _ tree

a) Bonayan tree b) Teak wood

c) Log wood tree d) Ashoka tree

x) Acid fuschin is primary stain used in _ _ _ _ _ _ _ _

a) Single Staining b) Double staining

c) Tripple staining d) None of above

Q.1/Q.3 (b) /Q.5 (b) Define/Explain/Comment (2marks each).

1) Stain 2) Vital stain 3) Mordants

4) Haematoxylene 5) Eosine 6) Neutral stain

7) Aqueous stain 8) Acidic Stain.

Q. 3 (a) Describe (questions for 3 marks each)

1) Types of stains

2) Describe common types of mordents

3) Importance of Mordants.

Q. 2. and Q. 4 : Short notes / Sketch and label (4 marks each)

1) Describe the theory of staining.

2) Describe types of stains.

3) Progressive and regressive staining.

4) Give common types of mordents & their importance.

5) Precautions during staining.

Q. 5. Describe in details (questions for 6 marks each)

i) Describe double staining method

ii) Processing of paraffin section during staining.

iii) Describe the theory of stainging.

Unit. No. 10 :- Clearing, mounting and camera Lucida

Q. 1. Multiple choice question (2 marks each)

1) To obtain the magnification of camera lucida drawing a stage _ _ _ _ _ _ _ is used

a) Calorimeter b) Macrometer c) Micrometer d) Galvanometer

2) Complete Dealcoholization from the tissue section is followed by _ _ _ _ _ _ _

a) Xylene b) Conada balsum d) Water c) None of above

3) _ _ _ _ _ _ _ _ _ is important as a mounting medium.

a) DPX c) Xylene c) Paraffin d) Benzene

4) To obtain proportionately accurate and magnifiled drawings_ _ _ _ _ _ _ is used

a) Camera b) Camera lucida c) magnifying lens d) None of these

5) The micrometer Scale is discovered by __ _ _ _ _ _ _ _

a) D Robert b) M. Nobert c) Darwin d) Alexander

6) The Coulometer is a round disc of glass with a scale divided into _ _ _ _ _ division.

a) 10 b) 1000 c) 100 d)10000

Q.1/Q.3 (b) /Q.5 (b) Define/Explain/Comment (2marks each).

1) DPX 2) Canada Bal sum 3) Clearing

4) Camera Lucida 5) Micrometer scale 6) Permanent slide

7) Oculometer Scale

Q. 3 (a) Describe (questions for 3 marks each)

a) Sketch & label Camera lucida

b) Sketch & label micrometer scale

Q. 2. and Q. 4 : Short notes / Sketch and label (4 marks each)

1) Describe use of camera Lucida

2) Importance of micrometer scale

3) Types & uses of mounting media.

Q. 5. (a) Describe in details (questions for 6 marks each)

1) Describe use of camera Lucida

2) Describe measurement of micrometer scale

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ANIMAL HUSBANDRY

Unit 1 Poultry

Q.1 - Question for 2 marks. Define /Explain /Multiple choice.

1) Poultry 2) Broiler 3) Layer
4) Desi Breed 5) Imported breed 6) Breeding
7) Nutrition 8) Feed additives 9) Aspergillosis
10) Whole mash feeding 11) Grain mash feeding 12) Pellet feeding
13) Ranikhet disease 14) Pullorum disease 15) Coccidiasis
16) Whole grain feeding

1) Poultry provides us ……
a) Egg & meat b) milk & oil c) water d) none up above

2) …… poultry breed having fighting quality
a) White leghorn b) Assel c) White cornish d) Brahma

3) …… disease is the viral poultry disease
a) Pullorum b) Aspergillosis c) Ranikhet d) Coccidiasis

4) …… disease is the bacterial poultry disease
a) Pullorum b) Ranikhet c) Coccidiasis d) Aspergillosis

5) …… disease is the fungal poultry disease
a) Pullorum b) Ranikhet c) Coccidiasis d) Aspergillosis

6) The term ……refers to early period of growth after hatching into young chicks
a) Brooding b) hatching c) Spawning d) None of above

Q.2 Question for 3 marks.

1) Importance of poultry farming
2) Systematic position of *Gallus gallus domesticus*
3) Enlist the types of poultry breeds
4) Give the important characteristic features of Aseel for fighting
5) Enlist the names of feeding equipment
6) Enlist the names of watering equipment

7) Enlist the names of the different poultry diseases

Q.3 Questions for 4 Marks.

1) External morphology of *Gallus gallus domesticus*
2) Habit & Habitat of *Gallus gallus domesticus*
3) Give morphological characters & importance of white Plymouth Rock
4) Give morphological characters & importance of White leghorn
5) Give morphological characters & importance of white Cornish
6) Give morphological characters & importance of Brahma
7) Give morphological characters & importance of Assel
8) Write a note on natural brooding
9) Enlist the poultry equipment
10) Explain free range housing system
11) Explain semi intensive housing system
12) Explain folding unit system.
13) Write a note on food additives.
14) Short note on ectoparasites of poultry
15) Write nutritive value of poultry egg
16) Write nutritive value of poultry meat
17) Give the reasons for loss of poultry
18) Give reason for making poultry as a profitable business
19) Give importance of vitamins in the diet of chick

Q.4 Question for 6 marks.

1) What is brooding? Describe the method of brooding?
2) Explain the salient features of poultry house
3) Explain the different types of watering equipment
4) Explain the different types of feeding equipment
5) Describe the housing system in poultry
6) Give the importance of fats, proteins & vitamins in the diet of chicks
7) Give the different methods of feeding in chicks
8) Write causative agent, symptoms, prevention & control of Ranikhet disease

9) Write causative agent symptoms, prevention & control of pullorum disease

10) Write causative agent symptoms, prevention & control of Aspergillosis

11) Write causative agent symptoms, prevention & control of Coccidiasis

12) Explain the nutritive value of poultry egg

13) Explain the nutritive value of poultry meat

14) Give the economics of poultry

Unit 2 Fisheries

Q.1 Question for 2 marks. Define / Explain / Multiple choice

1) Fishery	2) Monoculture	3) Polyculture
4) Inland Fishery	5) Estuarine fishery	6) Marine fishery
7) Spawn	8) Finger lings	9) Chilling
10) Freezing	11) Smoke drying	12) Salting
13) Canning	14) Spoilage of fish	15) Fish meal
16) Fish flour	17) Fish liver	18) Isinglass
19) Fish manure	20) Fish glue	

21) …….. fish is surface feeder

a) *Catla Catla* b) *Cirrhina mrigala* c) *Labeo rohita* d) none of above

22) …… fish is bottom feeder & omnivorous

a) *Catla Catla* b) *Cirrhina mrigala* c) *Labeo rohita* d) none of above

23)…… is the oldest method for fish preservation

a) Freezing b) Salting c) Chilling d) Smoke drying

24) The system of mixed culture of carps is called ……..

a) Agriculture b) Polyculture c) Monoculture d) Sericulture

25) The culture of single species of fish at time is called ……

a) Polyculture b) Monoculture c) Agriculture d) Sericulture

26) Fish liver oil is rich in …….. Vitamin

a) Vit D. B) Vit K. c) Vit B. d) Vit B_{12}

Q.2 . Question for 3 marks.

1) Write the scope of fishery. 2) Enlist types of fisheries.

3) Explain chilling. 4) Explain salting.

5) Explain smoke drying. 6) Explain canning.

7) Sketch & label *Catla catla.* 8) Sketch & label *Labeo rohita.*

9) Sketch & label *Cirrhina mrigala* 10) Write note on fish meal.

11) Short note on Fish body oil. 12) Short note on fish glue.

Q.3 Question for 4 marks.

1) Short note on Inland fishery 2) Short note on estuarine fishery

3) Short note on Marine fishery 4) Describe the management of nursery pond.

5) Describe the management of Rearing pond.

6) Write a note on Mannuring.

7) Write a note on supplementary feed for fish.

8) Write a note on spoilage of fish.

9) Give charlatanistic features of *Catla catla.*

10) Give charlatanistic features of *Labeo rohit*.

11) Give charlatanistic features of *Cirrhina mrigala*

12) Give charlatanistic features of *Cyprinus carpio*

13) Write a note on fish flour. 14) Write a note on fish oil.

15) Write a note on fish liver oil. 16) Write a note on Isinglass.

17) Write a note on fish manure

Q.4 Question for 6 marks.

1) Describe the types of fisheries.

2) Describe the Chinese hatchery.

3) Describe the preparation & management of nursery pond.

4) Describe the preparation & management of Rearing pond.

5) Describe the method of fish preservation.

6) Explain the economics of fisheries.

7) Name fishery by products? And mention there uses.

……

Committee Members:

a. Prof. S. P. Khodke, A. M. Patil College, Pimpalner
b. Dr. B. C. More, A. M. Patil College, Pimpalner.

TOXICOLOGY

Unit 1: Introduction

Q. 1 Define / Explain / Comment on (2 marks each)

i. Poison ii. Toxicology

iii. Forensic toxicology iv. Clinical toxicology.

Q. 2 Multiple choice (2 marks each)

1. Detection of causes of mortality due to any toxicant through medical examination is referred as …….

a) Forensic toxicology b) Economic toxicology

c) Clinical toxicology d) Genetic toxicology.

2. Clinical toxicology is closely related to ……..

a) Environmental toxicology b) Forensic toxicology

c) Economic toxicology d) systemic toxicology

3. The first Industrial Toxicology Research Centre (ITRC) in India is established in ...

a) Mumbai b) Delhi

c) Kolkata d) Lucknow

Q. 3 Short notes (4 mark each)

1. What is toxicology? Give its various branches.
2. Define toxicology and give its scope.
3. Forensic toxicology
4. Environmental toxicology.

Unit 2: Toxicants

Q. 1 Define / Explain / Comment on (2 marks each)

i. Toxicant ii. Toxic agents

iii. Teratogens iv. Hepatotoxicants

v. Mutagenic toxicants vi. Cardiotoxicants

vii. Carcinogens

Q. 2 Multiple choice (2 marks each)

1. ……is a mutagenic toxicant.

   a) Arsenic b) Copper c) DDT d) Ethanol.

2. Cirrhosis is produced by ……..

   a) Teratogens b) Mutagenic toxicants

   c) Hepatotoxicants d) Cardiotoxicants

3. Toxicants causing teratogenesis is the formation of ……..

   a) heart damage b) respiratory tract defect

   c) immune system defect d) congenital defect

4. Any toxicant affecting the immune system is called ……..

   a) immuno-toxicant b) teratogens

   c) Carcinogens d) mutagenic toxicant

5. Of the following chemicals, which is a mutagenic toxicant……

   a) Arsenic b) nitrogen oxide

   c) Organophosphates d) Carbon monoxide

6. Of the following elements, which one is a carcinogenic

   a) Gold b) Calcium

   c) Arsenic d) Carbon

Q. 3 Short notes (4 mark each)

1. What are toxicants? Classify toxicants on the basis of human organ/ system affected
2. Write short note on environmental carcinogens and their hazards
3. What are teratogens ? Give the teratogenic agents, which cause teratogenesis.
4. Define carcinogen. Mention the carcinogenic agents and their hazards.
5. Define mutagens and describe mutagenic agents
6. Give the types of mutagens and add a note on mutagenic agents,
7. What are immunotoxicants ? Give the examples and effects.
8. Give the acute and chronic effects of toxicants.

Unit 3: Absorption, Translocation and Excretion

Q. 1 Define / Explain / Comment on (2 marks each)

i. Translocation
ii. Storage depots
iii. Biliary excretion of toxicants
iv. Urinary excretion of toxicants

Q. 2 Multiple choice (2 marks each)

1. The ……forms the major route of absorption of toxicants.

a) Gastrointestinal tract
b) Skin
c) Lungs
d) subcutaneous

2. Volatile substances are absorbed by the ……

a) Skin
b) Lungs
c) Gastrointestinal tract
d) intravenous

3. A drug diethyl dithioliosophthale used for leprosy is largely excreted in ……

a) Sweat
b) Saliva
c) Milk
d) Vagina

Q. 3 Short notes (4 mark each)

1. Define storage depots and give their types.
2. Give in detail various routes of absorption of toxicants.
3. Explain three major routes of absorption of toxicants
4. Enumerate important elimination routes of toxicants.
5. Give a brief account of renal excretion and biliary excretion of toxicant.

Q. 4 Sketch and label (4 marks each)

i. Give schematic diagram of biliary excretion route for toxicants

Unit 4: Toxicity tests

Q. 1 Define / Explain / Comment on (2 marks each)

i. Toxicity test
ii. Acute toxicity test
iii. LC_{50} value
iv. LD_{50} value
v. EC_{50} value

Q. 2 Multiple choice (2 marks each)

1. Acute toxicity test is based on ……

a) Length of exposure
b) Exposure of toxicants

c) Number and conditions of species d) None of these

2. ……is the lethal concentration which would kill 50 % of treated individuals

a) LD_{50} b) LC_{50}

c) EC_{50} d) None of these.

3. ……is the lethal dose which would kill 50 % of the population of terrestrial

a) EC_{50} b) LC_{50}

c) LD_{50} d) None of these.

Q. 3 Short notes (4 mark each)

1. Define acute toxicity and add a note on the factors affecting acute toxicity.
2. Give a detailed account of sub-acute toxicity
3. What is toxicity ? Explain the factors which affect the toxicity of chemicals.
4. Define toxicity test. Classify toxicity tests on the basis of time duration.

Unit 5: Selective and Sub cellular Toxicity

Q. 1 Define / Explain / Comment on (2 marks each)

i. Selective toxicity ii. Direct cell injury

iii. Indirect cell injury

Q. 3 Short notes (4 / 6 mark each)

1. Define selective toxicity and give its advantages.
2. Give the need convincing demonstration of selective toxicity in man
3. Uses of selectively toxic agents in controlling weeds.
4. Uses of selectively toxic agents in controlling insect pests.
5. Give the various causes of cell injury.
6. Describe in detail the main sub cellular targets of toxicity.

Unit 6: Toxicants of Public health hazards

Q. 1 Define / Explain / Comment on (2 marks each)

i. Carboxyhaemoglobin ii. Food additives

iii. Psychoactive substances iv. Methemoglobinemia

v. Minamata disease vi. Itai-Itai disease

Q. 2 Multiple choice (2 marks each)

1. Carboxyhaemoglobin is causes due to inhalation of …….

a) Carbon dioxide b) Sulphur dioxide

c) Carbon monoxide d) Nitrogen oxide

2. Methaemoglobinemia cause due to …….. in water.

a) Nitrates b) Sodium

c) Potassium d) Superphosphate

3. Cadmium, a heavy toxic metal causes ……. Disease

a) Minamata b) anemia

c) Itai-Itai d) Chronic rhinitis

Q. 3 Short notes (4 / 6 mark each)

1. Give the effects of pesticides on human health.
2. Effects of carbon monoxide on human health
3. Give the adverse effects of sulphur dioxide on human health
4. What are the effects of fertilizers on public health.
5. What are food additives? Give its effects on human health.

Q. 4 Notes (3 marks each)

i. Effects of arsenic on humans and other animals

ii. Effects of Lead on human and other animals.

iii. Effects of mercury on humans and other animals

iv. Toxic effects of cadmium on humans and other animals.

Unit 7: Tissues and systems level Toxicity

Q. 1 Define / Explain / Comment on (2 marks each)

i. Hyperplasia ii. Emphysema

iii. Pneumoconiosis iv. Myelin toxicants

v. Haematotoxicity vi. Hepatotoxicity

vii. Neurotoxicty viii. Nephrotoxicty.

Q. 2 Multiple choice (2 marks each)

1. The lesions caused by a substance in the nerve cell body is called ……

a) axonopathy b) Neuronopathy

c) Synaptopathy d) Myelinopathy

2. The toxicants cause direct injury to the liver is called …….

a) hepatotoxicty b) Nephrotoxicity

c) immunotoxiocity d) haematotoxicity

Q. 3 Short notes (4 / 6 mark each)

1. Explain the reactions of toxic effects on the skin.
2. Describe the impact of toxic substances on the respiratory tract
3. Give the effects of toxicants on the gastroinstestinal tract
4. Explain the effects of toxic substances on the kidney.

Q. 4 Notes (3 marks each)

i. Give the impact of toxicants on the circulatory system.

ii. Explain the effects of toxicants on the endocrine system.

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BIOINFORMATICS

Unit 1. Bioinformatics (06 marks)

Q. 1, Q. 3(b) and Q. 5(b). Define / Explain/ Comment (02 marks each)

1. Bioinformatics
2. Chemoinformatics
3. Pharmainformatics
4. Glycomics

Q.2 and Q. 4. Attempt the following (04 marks each)

1. Objectives of bioinformatics
2. Development of bioinformatics
3. Applications of bioinformatics
4. Scope of bioinformatics

Q. 3(a). Attempt the following (03 marks each)

1. Objectives of bioinformatics
2. Applications of bioinformatics
3. Scope of bioinformatics

Q. 5. (a) Attempt the following (06 marks each)

1. Chronological history events of bioinformatics
2. Applications of bioinformatics

Unit 2. Computer generations (08 marks)

Q. 1 , Q. 3(b) and Q. 5(b). Define / Explain/ Comment (02 marks each)

1. Operating sytems
2. e-mail
3. Windows
4. WYSIWYG
5. Practical extraction reporting language
6. WWW
7. Web browser
8. Domain
9. HTTP
10. Web server
11. HTML
12. JAVA
13. XML
14. CGI
15. Search engine
16. Indexing
17. Super computer
18. Minicomputer
19. Microcomputer

Q.2 and Q. 4. Attempt the following (04 marks each)

1. Types of computer.
2. Internet.
3. Electronic mail
4. Web browsers
5. HTTP
6. PERL.
7. Super computer.
8. Main frame computer

Q. 3(a). Attempt the following (03 marks each)

1. WWW
2. e-mai
3. Web browser
4. Netscape navigator
5. Mosaic
6. Lynx
7. Internet explorer
8. Main frame computer

Q. 5. (a) Attempt the following (06 marks each)

1. Describe various generations of computer.
2. Describe different types of computer
3. What is web browser? Add a note on various available web browsers.
4. What is search engine? Explain the steps to search a biochemical or biotechnological information on WWW using PubMed.
5. What is operating system? Describe the characteristics of WINDOWS.
6. Describe different types of computer.

Unit 3. Databases (10 marks)

Q. 1, Q. 3(b) and Q. 5(b). Define / Explain/ Comment (02 marks each)

1. Database
2. Biological database
3. NCBI
4. EMBL
5. EBI
6. ENTREZ
7. SRS
8. Database management

Q.2 and Q. 4. Attempt the following (04 marks each)

1. Protein sequence databases
2. Nucleic acid sequence databases
3. Classes of biological databases
4. NCBI
5. EMBL
6. EBI
7. ENTREZ
8. Explain data retrieval with SRS
9. Database management system

Q. 3(a). Attempt the following (03 marks each)

1. Concept of database
2. NCBI
3. EMBL
4. EBI
5. ENTREZ

Q. 5. (a) Attempt the following (06 marks each)

1. Protein sequence databases
2. Nucleic acid sequence databases
3. Give an account of different classes of biological databases along with their URL
4. Give an account of various biological databases retrieval gateway sites on WWW.
5. Explain data retrieval with SRS

Unit 4. Proteomics (10 marks)

Q. 1, Q. 3(b) and Q. 5(b). Define / Explain/ Comment (02 marks each)

1. Proteomics
2. TrEMBL
3. SWISS-Prot
4. PIR database
5. Protein folding problem
6. UniProtKB

Q.2 and Q. 4. Attempt the following (04 marks each)

1. Amino acid folding propensity parameters
2. Flow chart of Proteomics analysis
3. Protein folding kinetics method.
4. Evolutionary trends in protein structure.
5. Different methods of studying the Protein.
6. SWISS-Prot
7. TrEMBL
8. PIR database
9. Applications of Proteomics

Q. 3(a). Attempt the following (03 marks each)

1. Flow chart of Proteomics analysis
2. Evolutionary trends of Protein structure
3. SWISS-Prot
4. TrEMBL
5. PIR database
6. Applications of Proteomics

Q. 5. (a) Attempt the following (06 marks each)

1. Explain in brief Proteomics analysis to solve protein folding problem.
2. Explain phylogenetic methods to address protein folding problem.
3. Give an account of different methods of studying Protein.
4. Give an account of Protein databases.

Unit 5. Basic concept of visualization of protein (06 marks)

Q. 1 , Q. 3(b) and Q. 5(b). Define / Explain/ Comment (02 marks each)

1. RasMOl
2. Swiss Pdb Viewer
3. Chime
4. CATH
4. Concept of visualization of protein structure
6. SCOP

Q.2 and Q. 4. Attempt the following (04 marks each)

1. Concept of visualization of protein structure
2. Protein structure visualization with the help of RasMol
3. Protein structure visualization with the help of Swiss Pdb Veiwer
4. Protein structure visualization with the help of Chime

Q. 3(a). Attempt the following (03 marks each)

1. CATH
2. SCOP
3. Concept of visualization of protein structure

Q. 5. (a) Attempt the following (06 marks each)

1. Why classify protein structure? Give examples of protein structure classification.

Unit 6. Gene (10 marks)

Q. 1, Q. 3(b) and Q. 5(b). Define / Explain/ Comment (02 marks each)

1. Gene
2. Genome
3. Genome project
4. Human genome project
5. Genome assembly
6. Single nucleotide polymorphism
7. GenBank
8. Genomics
9. Comparative genomics
10. Structural genomics
11. Functional genomics

Q.2 and Q. 4. Attempt the following (04 marks each)

1. Flow chart of methodologies used for sequence a genome
2. Flow chart of shortgun DNA sequencing
3. Flow chart of genomic analysis
4. Methods of gene sequence analysis
5. Diseases related to single nucleotide polymorphism
6. Comparative genomics
7. Structural genomics

8. Functional genomics
9. Genome map
10. Growth of GenBank
11. GenBank search

Q. 3(a). Attempt the following (03 marks each)

1. Flow chart of methodologies used for sequence a genome
2. Flow chart of shortgun DNA sequencing
3. Flow chart of genomic analysis
4. Enlist the methods of gene sequence analysis
5. Diseases related to single nucleotide polymorphism
6. Comparative genomics
7. Structural genomics
8. Functional genomics
9. Genome map
10. LOCUS and ORGANISM fields of GenBank databases

Q. 5. (a) Attempt the following (06 marks each)

1. Describe strategies for sequencing genomics
3. Describe methods of gene sequence analysis
4. Give an account of different classes of genomics
5. Enlist the different web tools on genomics and give important area cover by them
6. Explain GenBank search.

Unit 7. DNA (10 marks)

Q. 1 , Q. 3(b) and Q. 5(b). Define / Explain/ Comment (02 marks each)

1. DDBJ
2. TIGR
3. KEGG
4. Drug discovery
5. Drug design

Q.2 and Q. 4. Attempt the following (04 marks each)

1. Explain resource available with DDBJ.
2. Explain resource available with TIGR
3. Explain resource available with KEGG
4. Give genomic status of *Escherichia coli.*
5. Give genomic status of *Sacchromyces cervisiae.*
6. Give genomic status of *Caenorhabitis elegans.*
7. Give genomic status of *Homo sapience sapience*
8. Principles of genome annotation

Q. 3(a). Attempt the following (03 marks each)

1. Explain resource available with DDBJ.
2. Explain resource available with TIGR
3. Explain resource available with KEGG

Q. 5. (a) Attempt the following (06 marks each)

1. Write an account on The Institute for Genomic Research (TIGR)
2. Write an account on Kyoto Encyclopedia of Genes and Genome (KEGG)
3. Write an account of human genome project
4. Explain the role of Proteomics and genomics in drug discovery, design and diagnosis of diseases.

Committee Members:

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