

Bajaj College of Science, Wardha

Practice Sheet During Lockdown

M.Sc._Zoology Sem IV

Paper XIII Biotechniques, Biostatistics, Ethology, Toxicology and Bioinformatics

UNIT 1

Long Questions---

1. Describe Sterilization techniques for microbial culture.
2. Describe media for microbial culture and inoculation methods.
3. Describe cell lines and cryopreservation of cells.
4. Describe Basic principle of centrifugation.
5. Describe Radioactive isotopes.
6. Describe Thin layer chromatography and gas chromatography.
7. Describe Electrophoretic separation techniques.

Short Questions---write an account on --

1. Sterilization techniques.
2. media for microbial culture.
3. inoculation methods.
4. primary cell culture.
5. cell lines.
6. growth kinetics of cells in culture.
7. cryopreservation of cells .
8. principle of centrifugation.
9. Radioactive isotopes.
Thin layer chromatography.
10. gas chromatography.
11. Electrophoretic separation techniques.

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UNIT 2-Long answer questions (16marks)

- 1) Give detailed account on basic theory & types probability distribution with examples
- 2) Give detailed account on animals ethics –introduction concept and there functions
- 3) Give detailed account on sampling types , standard error (SE) & standard daviation (SD)
- 4) Give detailed account on neuronal control , genetic & environment of animal behavior

Unit 2- write notes on (8marks)

- 1) T-test , chi square test
- 2) Mean,mode,median
- 3) Dispersion & variance
- 4) Basic theory & types of probability
- 5) Types of sampling
- 6) Z-test
- 7) Standard deviation
- 8) Standard error
- 9) Concept of animal ethics and there functions

Unit 2- short answer question (4marks)

- 1) Median
- 2) Probablity distribution
- 3) Standered error
- 4) Standered deviation
- 5) Mean
- 6) Mode
- 7) Importance of chi square test
- 8) Binomial distribution
- 9) Poison distribution

UNIT 3

Long questions --

1. Describe scope of toxicology
2. Write an account on Classification of environmental toxicants with examples.
3. Describe Translocation of toxicants.
4. Describe Toxicity tests- Types (Acute and Chronic) and calculation of LC50 and LD 50
5. Describe Antidotal therapy - Antidotes, type of antidotes and antidotal procedure.

Short answer type questions –write an account on --

1. Classification of environmental toxicants
2. Pesticides as environmental toxicants.
3. Fertilizers as environmental toxicants.
4. Heavy and trace metals as an environmental toxicants.
5. radioactive substances as an environmental toxicants.
6. food additives as environmental toxicants
7. automobile emission as environmental toxicants.
8. absorption of toxicants
9. distribution of toxicants
10. biotransformation of toxicants
11. excretion of toxicants .
12. Types of toxicity.
13. calculation of LC50 and LD 50
14. Antidotes.
15. Antidotal procedure.

UNIT 4

Long questions-

1. Give detailed account on history and scope of Bioinformatics in India.

2. Write detailed account on Sequence alignment- Pair wise sequence alignment and multiple sequence alignment.
3. Write detailed account on Biological database– Basic local alignment search tool (BLAST) and Variants of BLAST.
4. Write detailed account on Biological database– FASTA.
5. Give detailed account on phylogenetic analysis tree building methods .
6. Give detailed account on phylogenetic analysis tree style.

Short questions-

1. scope of bioinformatics
2. Pair wise sequence alignment
3. multiple sequence alignment.
4. BLAST
5. FASTA
6. Variants of BLAST
7. PSI-BLAST.
8. Phylogenetic analysis- Tree style
9. Phylogenetic analysis tree building methods

Paper XIV Special Group – Animal Physiology , Physiology of Brain Nerve and Muscles

Unit I

Long Questions

1. Draw and explain different lobes of human brain? Add a note on their functions.
2. State overview of structures and function of major components of the Brain.
3. Describe overview of Central Nervous System in Humans?. Add a note on their functions.
4. Draw and explain different parts of Cerebrum of Human brain?. Highlights is function.
5. Draw and explain limbic system of Human brain?. Highlights is function.
6. Draw and explain different parts of Cerebellum of Human brain?. Highlights is function.
7. Explain Brain Stem and discuss its functions in detail?
8. Explain Cerebellum and discuss its function in detail?
9. Describe Physiology of Learning in Human Brain?
10. Describe Physiology of Memory in Humans?
11. Describe Physiology of Sleep in Humans?

Short Questions

1. Cerebral Cortex in Humans
2. Motor Cortex system of Cerebrum
3. Sensory Cortex system of Cerebrum
4. Relay station
5. Mid brain in Humans
6. Medulla in Humans
7. Pons in Humans
8. Limbic System in Humans
9. Thalamus in Humans
10. Hypothalamus in Humans
11. Pineal Body in Humans

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12. Basal Ganglia in Humans
13. Spinocerebellum in Humans
14. Vestibulocerebellum in Humans
15. Cerebrocerebellum in Humans
16. Ventricles of Brain in Humans

UNIT 2

Long questions -

1. Describe Types and functional properties of neurons.
2. Describe Ultrastructure of neuron and properties of neurons.
3. Describe Ultrastructure of synapse and molecular mechanism of synaptic transmission
4. Describe Bioelectrical properties of neurons.
5. Describe propagation of nerve impulses.

Short questions – write an account on--

1. Types of neurons
2. properties of neurons
3. Ultrastructure of neuron
4. Ultrastructure of synapse
5. mechanism of synaptic transmission
6. Bioelectrical properties of neurons
7. resting membrane potential
8. Nernst equation
9. sodium and potassium pump

Unit III

Long questions --

1. Describe Biosynthesis, storage and release of neurotransmitters Acetylcholine
2. Describe Biosynthesis, storage and release of neurotransmitters GABA.
3. Describe Biosynthesis, storage and release of neurotransmitters Epinephrine.

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4. Describe Biosynthesis, storage and release of neurotransmitters Nor-epinephrine.
5. Describe Biosynthesis, storage and release of neurotransmitters Serotonin.
6. Describe structure and function of Neuropeptides- oxytocin.
7. Describe structure and function of Neuropeptides Neuropeptides- Vasopression.
8. Describe structure and function of Neuropeptides - thyrotropin releasing hormone.
9. Describe structure and function of Neuropeptides - Cholecystokinin
10. Describe Mechanoreception.
11. Describe photoreception.
12. Describe phonoreception.
13. Describe chemoreception.
14. Describe Disorders of nervous system: Alzheimer's disease.
15. Describe Disorders of nervous system: Parkinson's disease.

Short questions – write an account on-

1. release of neurotransmitters Acetylcholine
2. Describe neurotransmitters GABA.
3. Describe Biosynthesis of Epinephrine.
4. Describe Biosynthesis of Nor-epinephrine.
5. Describe Biosynthesis of Serotonin.
6. Describe oxytocin.
7. Describe mechanism of working of Vasopression.
8. Describe Neuropeptides - thyrotropin releasing hormone.
9. Describe Neuropeptides - Cholecystokinin
10. Describe Mechanoreceptors .
11. Describe photoreceptor.
12. Describe phonoreceptor.
13. Describe chemoreceptor.
14. Physiology of Alzheimer's disease.
15. Physiology of Parkinson's disease.

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Unit-IV

Long questions --

1. Describe Ultrastructure of skeletal muscle.
2. Describe Molecular mechanism of muscle contraction
3. Describe sliding filament theory.
4. Describe Ultrastructure of skeletal muscle and sliding filament theory.
5. Describe Properties of muscle .
6. Describe Ultrastructure of Neuromuscular Junction.

Short questions- write an account on --

1. muscle proteins
2. Calcium receptors
3. Calmodulin
4. Calcium pump
5. sliding filament theory
6. role of ATP in muscle contraction
7. twitch
8. tetanus
9. summation
10. tonus
11. all or none principle
12. fatigue
13. muscular disorders.
14. Neuromuscular Junction

Paper XV Special Group – Animal Physiology, Physiology of Respiration and Reproduction

Unit 1- Long answer questions (16 marks)

1. Give detailed account on mechanism of respiration – mechanism of breathing and exchange of respiratory gases at pulmonary surface.
2. Give detailed account on mechanism of transport of respiratory gases by blood.
3. Write an account on respiratory organs among vertebrates.
4. Describe partial pressure of gases and its importance in gaseous exchange.

OR

Unit 1-Write notes on (8 marks)

1. Lung volume and capacities
2. Partial pressure of O_2
3. Anatomy of respiratory system
4. Structure of lungs
5. Haemoglobin
6. CO_2 transport in blood

Unit 1. Short answer question (4 Marks)

1. Tidal volume
2. Counter current mechanism
3. Alveoli structure
4. Partial pressure

Unit 2 -Long answer questions (16 marks)

1. Give detailed account on neural and chemical regulation of respiration.
2. Give detailed account on carbonic anhydride and chloride shift .
3. Describe hypoxia , effects and management
4. Explain oxygen dissociation curve and its importance

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OR

Unit 2- Write notes on (8 marks)

- 1.Oxygen dissociation curve
- 2.Carbon – dissociation curve
- 3.Types of Hypoxia
- 4.Cynosis
- 5.Chloride shift
- 6.PH regulation
- 7.Compare fetal and adult hemoglobin
- 8.Describe the principles of carbon dioxide transport

Unit 2. Short answer question (4 Marks)

- 1.Stagnant hypoxia
- 2.Hypemic hypoxia
- 3.Porphyrin
- 4.Metahemoglobin
- 5.Cooperativity
- 6.Myoglobin

Unit 3- Long answer questions (16 marks)

- 1.Give detailed account on endocrine control of spermatogenesis .
- 2.Give detailed account on endocrine control of Oogenesis
- 3.Describe structure and functions of corpus luteum
- 4.Describe development of graffian follicle and its hormones

OR

Unit 3-Write notes on (8 marks)

- 1.Leydig cells
- 2.Sertoli cells

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- 3.Follicular cells
- 4.Luteal cells
- 5.Progesterone
- 6.Testosterone

Unit 3. Short answer question (4 Marks)

- 1.GnRH
- 2.Antrum cavity
- 3.Polar body
- 4.LH surge

Unit 4- Long answer questions (16 marks)

- 1.Give detailed account on physiology of lactation
- 2.Give detailed account on reproductive hormones
- 3.Role of pheromones in reproduction
- 4.Principle and application of test tube baby
- 5.Mechanism of lactation
- 6.Write an account on structure and function of placenta

Unit 4-Write notes on (8 marks)

- 1.Causes of infertility in male and female
- 2.Test tube baby applications
- 3.Placenta hormones
- 4.IVF
- 5.GnRH
- 6.Oxytocin

Unit 4. Short answer question (4 Marks)

- 1.Azoospermia
- 2.Aesthenozoospermia

3. Progesterone

4. Ampulla

5. prolactin

Paper XVI Radiation and chronobiology

UNIT 1 : Radiation Biology

Long questions

1. Describe Definition, scope and significance of radiation biology.
2. Describe General classification of radiation.
3. Ionizing radiation, linear energy transfer, radiation dose and units.
4. Describe Principles of radiation dosimetry and its direct and indirect effects.
5. Describe Radiation lesions in DNA and radiobiological effect on cell.
6. Describe Radiation sensitizers and protectors.

Short questions – write an account on ----

1. significance of radiation biology.
2. classification of radiation.
3. Ionizing radiation
4. radiation dose and units.
5. Principles of radiation dosimetry
6. direct and indirect effects of radiation dosimetry.
7. radiobiological effect on cell.
8. Radiation sensitizers
9. Radiation protectors.

Unit II: Effect of Radiation on Human Health

Long questions

1. Describe Health consequences after total body irradiation from radiation accidents.
2. Describe Long term radiation risks from low radiations doses.
3. Describe Radiation induced cancer.
4. Describe Radiation effects in the developing embryo and fetus.
5. Describe radiation induced heritable diseases.

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Short questions- write an account on --

1. Health consequences after total body irradiation from radiation accidents.
2. Long term radiation risks from low radiations doses.
3. Radiation induced cancer.
4. Radiation effects in the developing embryo and fetus
5. radiation induced heritable diseases.

Unit- III: Circadian cycle

Long questions

1. Describe Organization of circadian system in multicellular animals.
2. Describe Concept of central and peripheral clock system.
3. Describe Circadian pacemaker system in invertebrates *Drosophila*.
4. Describe Circadian pacemaker system in rodents.

Short questions – write an account on --

1. Organization of circadian system .
2. central clock system.
3. peripheral clock system.
4. Circadian pacemaker system in invertebrates
5. Circadian pacemaker system in rodents.

Unit- IV: Biological clock

Long questions –

1. Describe Centers of biological clock – Supra chiasmatic nuclei,
2. Describe Centers of biological clock – pineal gland
3. Describe Centers of biological clock – optic lobes.
4. Describe biological clock function and dysfunction.
5. Describe Depression and sleep disorders.

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6. Describe Chronopharmacology, chronomedicine, chronotherapy.

Short questions – write an account on –

1. Supra chiasmatic nuclei.
2. pineal gland.
3. optic lobes.
4. Depression.
5. insomnia.
6. Chronopharmacology.
7. Chronomedicine.
8. chronotherapy.

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