UNIVERSITY OF THE PUNJAB

Roll No. .....

First Semester 2017

Examination: B.S. 4 Years Programme

PAPER: Zoology-I (Invertebrate Diversity) **TIME ALLOWED: 30 mins.**

Course Code: ZOOL-101 / ZOL-11302 **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

(OBJECTIVE)

(10x1=10)

Q No. 1: Choose the correct option for the statements from the multiple choices given below.

I. Gordian worms belong to the phylum

A. Nematoda B. Nematomorpha

C. Acanthocephala D. Kinorhyncha

II. The segmental arrangement of body parts in an animal is called

A. Metamorphosis B. Metamerism

C. Torsion D. Tagmatization

III. Sea lilies belong to the class

A. Crinoidea B. Ophiuroidea

C. Echinoidea D. Holothuroidea

IV. Open circulatory system is present in

A. Porifera B. Mollusca

C. Arthropoda D. Annelida

V. In rotifers, the cuticle thickens to form an encasement called

A. Cyst B. Testa

C. Lorica D. Mastax

VI. Fleas belong to the order

A. Lepidoptera B. Coleoptera

C. Siphonaptera D. Hymenoptera

VII. Which one of the following are not social

A. Bees B. Ants

C. Mites D. Termites

VIII. The characters individually tested by Mendel by crossing a variety carrying a particular trait of a character were:

A. 5 B. 6

C. 7 D. 8

IX. In determing the phenotype for the ABO blood system

A. O is dominant over A B. B is dominant over A

C. O is recessive D. All of the above

X. The ratio of WBC and RBC is

A. 1:600 B. 1:6000

C. 1:60 D. 1:60000

UNIVERSITY OF THE PUNJAB

First Semester 2017
Examination: B.S. 4 Years Programme

Roll No. .....

PAPER: Zoology-I (Invertebrate Diversity) **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: ZOOL-101 / ZOL-11302 **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

(Short Questions)

Question No. 2: **Write short answer of the following questions** **(2X10=20)**

I. What is Binary Fission?
II. What is medusa?
III. What are book gills?
IV. What are the main morphological features of Mollusca?
V. What is Pentaradial symmetry?
VI. What are Inversions?
VII. What is Heterosis?
VIII. What is Ecdysis?
IX. What is crossing over and linkage?
X. What is Commensalism?

(Long Questions)

Question No. 3. **Explain the following questions?** **(10X3=30)**

I. Write a note on Phylum Arthropoda? (10)
II. Write a detailed note on Mendelian Law of Independent Assortment ?(10)
III. Explain in detail the chromosomal variations in number? (10)

UNIVERSITY OF THE PUNJAB

Roll No. .....

Second Semester - 2017
Examination: B.S. 4 Years Programme

PAPER: Zoology-II (Chordate Diversity) **TIME ALLOWED: 30 mins.**
Course Code: ZOOL-103, ZOL-12302 **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

OBJECTIVE

Q1: Multiple choice questions: Four possible answers to each statement have been given below. Encircle the correct answer. Cutting, erasing and overwriting is strictly prohibited. (10)

I. Ciliated larva of Enteropneusts is called

(a) Bipinaria (b) Brachiolaria (c) Tornaria (d) Ammocoete

II. Conodonts are known from fossils date back about.....million years

(a) 510 (b) 511 (c) 512 (d) 513

III. Ostracoderms are bottom dwellers which can be long up to

(a) 15mm (b) 15cm (c) 15nm (d) 15m

IV. Enteropneusts can be long up to

(a) 1m (b) 2m (c) 3m (d) 4m

V. Amphibians store water in

(a) Lymph sac (b) skin (c) urinary bladder (d) kidney

VI. In amphibians amplexus may lasts for hours

(a) 1-12 (b) 1-18 (c)1-24 (d) 1-36

VII. Chuckwalla survives during late summer when temperatures exceed

(a) 30°C (b) 40°C (c) 50°C (d) 55°C

VIII. Eoalulavis had wingspan of

(a) 17nm (b) 17mm (c) 17cm (d) 17m

IX. Most obvious feathers are

(a) Contour (b) down (c) filoplume (d) All

X. Musk glands are present around on.....of many mammals.

(a) Face (b) Feet (c) Anus (d) All

UNIVERSITY OF THE PUNJAB

Second Semester - 2017
Examination: B.S. 4 Years Programme

Roll No. .....

PAPER: Zoology-II (Chordate Diversity) **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: ZOOL-103, ZOL-12302 **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

SUBJECTIVE

Question No 2: Shortly answer the following questions. **(2x10=20)**

I. What is electroreception?
II. What is urostyle?
III. What is annuli?
IV. What is apnea?
V. What is jacobson's organ?
VI. What are auriculars?
VII. What is dead air?
VIII. Give the functions of mammalian skin.
IX. Define homodont and heterodont?
X. What is diasteema?

Question No 3: Explain the following questions. **(10x3=30)**

I. Give detailed explanation of reproduction and development in birds.
II. Write a detailed note on order squamata.
III. Give detailed description of nervous and sensory functions in amphibians.

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Roll No. .....

Third Semester 2017
Examination: B.S. 4 Years Programme

PAPER: Zoology-III (Biochemistry) **TIME ALLOWED: 30 mins.**
Course Code: ZOOL-201/ZOL-21302 **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

OBJECTIVE

Q. 1 Multiple choice questions: Four possible answers to each statement have been given below. Encircle the correct answer. Cutting, erasing and overwriting is strictly prohibited.

1. The Zwitter ion is one which has in aqueous solution
   A) One positive charge and one negative charge
   B) Two positive charges and one negative charge
   C) Two negative charges and one positive charge
   D) No electrical charges at all
2. Insulin is made up of
   A) A single polypeptide chain having 51 amino acid residues
   B) A single polypeptide chain having 84 amino acid residues
   C) A-chain having 21 and B-chain having 30 amino acid residues
   D) A-chain having 30 and B-chain having 21 amino acid residues
3. Lipid stores are mainly present in
   A) Liver
   B) Brain
   C) Muscles
   D) Adipose tissue
4. The optically inactive amino acid is
   A) Glycine
   B) Serine
   C) Threonine
   D) Valine
5. Cellulose is made up of the molecules of
   A) α-glucose
   B) β-glucose
   C) Both of aboveShape
   D) None of these
6. Polysaccharides
   A) Contain many monosaccharide units which may or may not be of the same kind
   B) Function mainly a storage or structural compounds
   C) Are present in large amounts in connective tissue
   D) All of these
7. What is true of ecosystem?
   A) Primary consumers are least dependent upon producers
   B) Primary consumers out number producers
   C) Producers are more than primary consumers
   D) Secondary consumers are the largest and most powerful
8. The homologous organs are those that show similarity in
   A) Appearance
   B) Function
   C) Origin
   D) Size
9. Study of inter- relationships between organisms and their environment is
   A) Ecology
   B) Ecosystem
   C) Phytogeography
   D) Ethology
10. Which one is used for knowing whether or not a population is evolving
    A) Degree of evolution
    B) Genetic drift
    C) Proportion between acquired variations
    D) Hardy Weinberg Equation

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Third Semester 2017
Examination: B.S. 4 Years Programme

Roll No. .....

PAPER: Zoology-III (Biochemistry) **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: ZOOL-201/ZOL-21302 **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

SUBJECTIVE

Q.2 Give short answer of the following **2x10=20**

i. Write the two embryological evidences about Evolution?
ii. What is meant by biome and community?
iii. State first law of thermodynamics. Briefly explain with example.
iv. Discuss briefly energy variation in different trophic levels
v. Write the names of standard amino acids
vi. What is meant by isozyme and cofactor
vii. Write the difference in glycogen and starch structurally.
viii. What is meant by kinetics of Bisubstrate reaction?
ix. Write briefly about steroids.
x. What are the major types of fatty acids?

Q. 3 Long questions. **3x10=30**

I What is meant by carbohydrates? Write in detail about disaccharides with structure and function.

II Write a comprehensive note on mutation pressure and selection pressure.

III Discuss population ecology with emphasis on growth and growth curve

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Roll No. .....

Fourth Semester - 2017
Examination: B.S. 4 Years Programme

PAPER: Zoology-IV (Physiology) **TIME ALLOWED: 30 mins.**
Course Code: ZOOL-203 / ZOL-22302 **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

OBJECTIVE TYPE

(1x10=10)

QUESTION NO 1: ENCIRCLE THE BEST OPTION. CUTTING, OVERWRITTING AND ERASING IS NOT ALLOWED.

I. The chemical agent that reaches the target tissue through blood circulation

a) Neuromodulator c) Neurohormone
b) Neurotransmitter d) Hormone

II. The simplest form of nervous organization exists in

a) Porifera c) Cnidaria
b) Protozoa d) Platyhelminthes

III. The receptors that respond to changes in pressure

a) Georeceptors c) Phonoreceptors
b) Proprioceptors d) Baroreceptors

IV. The structure in mammalian inner ear that possess receptors for sound perception

a) Cochlea c) Tympanum
b) Semicircular canal d) External auditory meatus

V. In polychaetes, a hormone that stimulates the development of eggs

a) Molt inhibiting hormone c) Juvenile hormone
b) Gonadotrophin d) Ecdysone

VI. The hormone that promotes calcium reabsorption from kidney tubules

a) Parathyroid hormone c) Somatostatin
b) Thyroxin d) Calcitonin

VII. In mammals, the hormone that promotes sodium reabsorption in the kidneys

a) Cortisol c) Aldosterone
b) Epinephrine d) Glucagon

VIII. The site of storage and secretion of bile

a) Gall bladder c) Pancreas
b) Liver d) Duodenum

IX. The cellular components that are absent in a prokaryotic cell

a) Mitochondria c) Ribosomes
b) Vacuoles d) Vesicles

X. The structures that contain enzymes called acid hydrolases

a) Ribosomes c) Mitochondria
b) Peroxisomes d) Lysosomes

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Fourth Semester - 2017
Examination: B.S. 4 Years Programme

Roll No. .....

PAPER: Zoology-IV (Physiology) **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: ZOOL-203 / ZOL-22302 **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

SUBJECTIVE TYPE

QUESTION NO 2. SHORTLY ANSWER THE FOLLOWING QUESTIONS. (2X10=20)

I. Diagrammatically, only, differentiate the nervous organization of a cephalopod and a crustacean.

II. Describe the location and function of phonoreceptors in invertebrates.

III. What do you know about skin sensors of damaging stimuli?

IV. Describe the endocrine system of molluscs.

V. Compare three forms of endocytosis..

VI. With the help of labeled figures only, compare the heart and circulatory system of reptiles and mammals. Indicate the direction of blood flow as well.

VII. Give four basic physiological principles that apply to lung ventilation.

VIII. Differentiate hemerythrin and clorocruorin..

IX. Give a comparison of suspension feeders and deposit feeders.

X. Describe, briefly, the role of pancreas in digestion.

QUESTION NO 3. EXTENSIVE QUESTIONS.

BREIFLY ANSWER THE FOLLOWING QUESTIONS. ALL QUESTIONS CARRY EQUAL MARKS. (10X3=30)

I. Give an account of the structure and function of golgi apparatus, lysosomes and mitochondria .

II. Discuss, very briefly, five general evolutionary trends in nervous system development of invertebrates

III. Account, in detail, the hormones of adenohypophysis, in mammals.

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Roll No. .....

Fifth Semester 2017

Examination: B.S. 4 Years Programme

PAPER: Cell and Molecular Biology-II **TIME ALLOWED: 30 mins.**

Course Code: ZOOL-301 **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

OBJECTIVE TYPE

SECTION-I

Q1: Select the most appropriate answer from the given choices **(0.5x20=10)**

1. Region of highly repeated DNA is called as
   a. Template DNA
   b. Satellite DNA
   c. Sense DNA
   d. Antisense DNA
2. The chromosomes with unequal arms is known as
   a. Metacentric
   b. Sub-metacentric
   c. Acrocentric
   d. Acentric
3. Histones are basic proteins because they have high content of
   a. Arginine
   b. Lysine
   c. Histidine
   d. Both a and b
4. RNA molecule that exhibits catalytic activity are called
   a. mRNA
   b. ribonucleases
   c. ribosomes
   d. ribozymes
   e. ribonucleotides
5. When tryptophan is present in the environment of E. coli, the tryptophan binds to the
   a. Trp operon
   b. Trp promoter
   c. Trp operator
   d. Trp repressor
6. Trp operon consists of
   a. Three genes
   b. Four genes
   c. Five genes
   d. Two genes
7. In the absence of glucose, E. coli can import lactose to change into glucose and galactose because CAP binds to the
   a. cAMP
   b. Lac operon
   c. Promoter
   d. Repressor
8. The process of translation requires the presence of:
   a. mRNA, tRNA and ribosomes
   b. mRNA, ribosomes and RNA polymerase
   c. DNA, mRNA and RNA polymerase
   d. chromatin, DNA and amino acids
9. Codons are composed of:
   a. triplet sequences of nucleotide bases in mRNA
   b. triplet sequences of nucleotide bases in DNA
   c. triplet sequences of amino acids in polypeptide chains
   d. triplet sequences of deoxyribose sugars in DNA
10. During the process of translation (polypeptide synthesis), _____ matches an mRNA codon with the proper amino acid.
    a. DNA polymerase
    b. Transfer RNA
    c. A ribosome
    d. Messenger RNA

(P.T.O.)

11. When all or a piece of a chromosome becomes attached to another chromosome the aberration is call as
    a. Inversion
    b. Translocation
    c. Deletion
    d. Duplication
12. In prokaryotes, the major DNA replication enzyme is
    a. POL I
    b. POL II
    c. POL III
    d. POL I&III
13. The DNA of a certain organism has guanine as 40% of its bases. What percentage of its bases would be adenine?
    a. 0%
    b. 10%
    c. 20%
    d. 30%
14. The transcription of DNA to a molecule of messenger RNA occurs (in prokaryotes):
    a. on the ribosomes
    b. in the cytoplasm
    c. in the nucleus
    d. only during cell division
15. What are the coding segments of a stretch of eukaryotic DNA called?
    a. introns
    b. exons
    c. codons
    d. replicons
16. UGA codes for
    a. Serine
    b. Proline
    c. Alanine
    d. Termination
17. In ribosomal RNA genes the failsafe terminator is at _____ position
    a. -225
    b. +225
    c. -125
    d. -70
18. The Conserved sequences at the 5` end of the intron and 3` end of the intron are
    a. GU and AG
    b. AT and TC
    c. TG and AA
    d. None of the above
19. To stimulate transcription, enhancer sequence:
    a. Must be with in a few base pairs of the gene they enhance.
    b. Must be with in few hundred base pairs of the gene they enhance
    c. Can be tens of thousands of base pairs away from the genes they enhance.
    d. Will not function if they are moved experimentally.
20. After the translation is completed the smaller and larger ribosomal subunits are detached due to
    a. IF1 factor
    b. IF2 factor
    c. IF3 factor
    d. EFTU factor

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Fifth Semester 2017
Examination: B.S. 4 Years Programme

Roll No. .....

PAPER: Cell and Molecular Biology-II **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: ZOOL-301 **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

SUBJECTIVE TYPE

SECTION 2

Q2: Give short answers of following questions. **2x10=20**

i) What is a NUCLEOSOME

ii) What is a LARIAT? Define SPLICING.

iii) What kind of linkage is present between the 7 Methyl G cap and 5` end mRNA.

iv) Enlist the enzymes involved in the process of replication in eukaryotes and their function.

v) What is the difference between A, B and Z DNA.

vi) What are Vaccines.

vii) What tools are required to produce recombinant DNA

viii) Draw a labelled diagram of Lactose OPERON

ix) Define SUPERCOILING

x) What are TELOMERS

SECTION 3

Q-3 Give brief answers of the following questions 30

a. Describe the process of 5SRNA transcription.

b. Define polycistronic mRNA. Briefly discuss the expression of Lactose operon

c. Briefly discuss the process of protein synthesis

UNIVERSITY OF THE PUNJAB

Roll No. .....

Fifth Semester 2017
Examination: B.S. 4 Years Programme

PAPER: Biochemistry-II **TIME ALLOWED: 30 mins.**
Course Code: ZOOL-303 **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

OBJECTIVE TYPE

Q. 1 Multiple choice questions: Four possible answers to each statement have been given below. Encircle the correct answer. Cutting, erasing and overwriting is strictly prohibited.

i. Synthesis of Inosine monophosphate take steps
   A. 14
   B. 11
   C. 9
   D. 6

ii. Carbamoyl phosphate synthetase-I present
   A. cytoplasm
   B. ribosomes
   C. mitochondria
   D. None of these

iii. Synthesis of urea will consume .....ATP
   A. 3
   B. 1
   C 6
   D. None of these

iv. The ammonia transport from muscle to liver for urea formation through
   A. Aspartate
   B. Alanine glucose cycle
   C. Both A and B
   D. None

v. The formation of urea take place in ..... liver
   A. cytoplasm
   B. mitochondria
   C. –NH linkage
   D. Both A and B

vi. The optimum amount of cholesterol in human is
   A. 300 mg/day
   B. 1g/day
   C. 0.3g/day
   D. None of these

vii. The cholesterol synthesis occur in cytoplasm with
   A. cytosolic enzymes
   B. endoplasmic reticulum enzymes
   C. Both A and B
   D. None of these

viii. Intermediates in fatty acid synthesis are covalently linked to the sulfhydryl groups of
   A. acyl carrier protein
   B. coenzyme A
   C. malony ACP
   D. Vary from cell to cell

ix. Synthesis of glucose from amino acids is termed as
   A. Glycolysis
   B. Gluconeogenesis
   C. Lipogenesis
   D. Glycogenesis

x. Under anaerobic condition the glycolysis of one mole of glucose yields ..... moles of ATP
   A. One
   B. Two
   C. Three
   D. None of these

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Fifth Semester 2017
Examination: B.S. 4 Years Programme

Roll No. .....

PAPER: Biochemistry-II **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: ZOOL-303 **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

SUBJECTIVE TYPE

Q.2 Give short answer of the following **2x10=20**

1. What you know about phosphate ester and glycosidic bond?
2. Briefly discuss transmethylation with example
3. What is meant by Chiral and isoelectric point?
4. Write names and abbreviations of amino acids.
5. How fatty acid transported into mitochondria?
6. What is meant by omega-3 and Omega-6 fatty acid?
7. Which amino acids can influence the rate of purine nucleotides?
8. What is meant by nucleoside and nucleotide?
9. Distinguish between glycogenesis and glycogenolysis
10. Calculate the ATPs produce during conversion of glucose into carbon dioxide and water.

Q. 3 Long questions. **3x10=30**

I Draw a citric acid cycle with structural formulae and labeling.

II Give a comprehensive note on Pentose phosphate Pathway

III Discuss biosynthesis of pyrimidine in detail.

UNIVERSITY OF THE PUNJAB

Roll No. .....

Fifth Semester 2017

Examination: B.S. 4 Years Programme

PAPER: Animal Physiology – II **TIME ALLOWED: 30 mins.**

Course Code: ZOOL-305 **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

OBJECTIVE TYPE

Encircle the correct answer: **(10)**

1. **Actin filaments are composed of :**

(a) actin (b) tropomyosin (c) troponin (d) all of the above

2. **Sarcoplasm reticulum on arrival of action potential releases::**

(a) Calcium ions (b) Potassium ions (c) Sodium ions (d) all of the above

3. **RESTING MEMBRANE POTENTIAL measures:**

(a) -90mV (b) -61mV (c) -86mV (d) +61mV

4. **Target cells of THYROID STIMULATING HORMONES are on:**

(a) nerve cells (b) all body tissues (c) kidney tubules (d) thyroid gland

5. **It is due to deficiency of iodine:**

(a) Endemic goiter (b) thyroiditis (c) adenoma (d) Both b and c

6. **Ovulation in females is under the influence of:**

(a) ADH (b) LH (c) TSH (d) SOMATOTROPHIN

7. **A person with loss of red colour cones is called:**

(a) PROTANOPE (b) DEUTERANOPE (c) BLUE WEAKNESS (d) both a & b

8. **One common example of neurotransmitter is:**

(a) oxytocin (b) acetylcholine (c) glucagon (d) all of the above

9. **Bitter taste is caused by:**

(a) acids (b) alkaloids (c) alcohols (d) salts

10. **One of the following is not the symptom of hyperthyroidism:**

(a) weight loss (b) increased sweating (c) muscle weakness (d) mental sluggishness

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Fifth Semester 2017
Examination: B.S. 4 Years Programme

Roll No. .....

PAPER: Animal Physiology – II **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: ZOOL-305 **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.
SUBJECTIVE TYPE

Answer the following short questions: **10×2=20**

1. Differentiate between co-transport and counter transport of substances:
2. Briefly describe the function of rods and cones?
3. Enlist the hormones of pituitary gland?
4. Differentiate between GIGANTISM and DWARFISM:
5. What is the role of taste buds for sense of taste?
6. What is OVULATION?
7. How CHOLECALCIFEROL is formed in the skin?
8. What are different hormones secreted from PLACENTA?
9. What is the function of THYROXIN?
10. Define sarcolemma:

Answer the following questions, in detail:

1. **Describe the structure of human ear:** **(10)**
2. **Give a detailed account on ACTION MEMBRANE POTENTIAL:** **(10**
3. **Write a note on the functions of GROWTH HORMONE?** **(10**

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Roll No. .....

Fifth Semester 2017

Examination: B.S. 4 Years Programme

PAPER: Biostatistics **TIME ALLOWED: 30 mins.**

Course Code: ZOOL-307 **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

OBJECTIVE TYPE

Q. 1 Choose/Fill the best possible option (1x10=10)

i. A statement that can be true and can be false is called _____.

A. Prediction B. Observation C. Hypothesis D. Theory

ii. For sample analysis data values should be

A. n>30 B. n<30 C. n<40 D. n>40

iii. The mode of 1,3,6,4,2,4,6,3,5,3 data is.

A. 1 B. 3 C. 4 D. 6

iv. Circle is drawn in the case of

A. bar charts B. histogram C. polygon D. pie charts

v. Eye color is an example of _____ type of data.

A. Binary B. Categorical C. Numerical D. Nominal

vi. The ages in days of mice are (4,5,8,6,2,9,1,5). Determine the MEAN age of mouse

A. 3 B. 4 C. 5 D. 6

vii. The formula of standard error is S.E=_____.

A. S/√n B. √S2/n C. S/n D. Both a and b

viii. In a set of data, the difference between the largest and smallest value is called _____.

A. Mean B. Median C. Mode D. Range

ix. Most frequent data values is known as

A. Mean B. Median C. Mode D. Range

x. An equation used to predict the value of one parameter on basis of other parameter is called _____.

A. Variance B. Standard Deviation C. Correlation D. Regression

UNIVERSITY OF THE PUNJAB

Fifth Semester 2017
Examination: B.S. 4 Years Programme

Roll No. .....

PAPER: Biostatistics **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: ZOOL-307 **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

SUBJECTIVE TYPE

Q. 2 Give short answers of following questions. **(2 x 10=20)**

i. Differentiate between NULL and ALTERNATIVE HYPOTHESIS

ii. Calculate mean of following data?

Observations	13	11	12	10	3
Frequency	1	4	2	3	1

iii. Calculate the range of following data?

Classes	1-5	6-10	11-15	16-20	21-25
Observation	1	3	5	2	1

iv. Find out the value of standard deviation when

SEM = 1.95 and n=9

v. Give formula of unpaired t-test.

vi. Calculate the relative frequency of the following data

Age of Albino rats (months) classes	1-3	4-6	7-9	10-12	13-15
Frequency	7	8	12	10	6

vii. Define Bionomial and Nominal Distribution

viii. Define Correlation.

ix. What are the steps involved in research designing?

x. Differentiate between SAMPLE and POPULATION.

BRIEF ANSWERS OF THE FOLLOWING

Q. 3. a) Prepare a frequency table showing Absolute, Relative and Cumulative frequency of the data provided. **(6)**

100,87,73,55,57,96,83,50,51,44,42,45,57,75,42,49,92,88,47,40

b) Draw a PASCAL triangle upto 6^{th} level? **(4)**

Q. 4. The following data shows the performance of boys and girls. Is there any difference between performance of boys and girls? **(10)**

Students	Pass	Fail
Males	15	5
Females	25	7

Q. 5. The survey report of a hospital showed that out of 1000 patients 432 were men and 568 were women. The report further revealed that 305 of men and 355 of the women suffered from high blood pressure. Test the hypothesis that blood pressure was equally frequent in men and women using a 2x2 contingency table. **(10)**

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Fifth Semester 2017

Examination: B.S. 4 Years Programme

PAPER: Evolution **TIME ALLOWED: 30 mins.**

Course Code: ZOOL-308 **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

SECTION I. OBJECTIVE TYPE

Q1. Select the most appropriate answer from the given options. (1 x 10)

1. According to modern theory of evolution, main mechanism of change is _____.
   a. Natural selection
   b. founder effect
   c. migration
   d. special creation

2. In which model of selection both alleles maintained in the population
   a. Selection against one allele
   b. Selection against both homozygotel
   c. Selection against recessive homozygote
   d. None

3. What's the difference between genetic drift and change due to natural selection?
   a. Genetic drift does not require the presence of variation
   b. Genetic drift does not involve competition between members of a species
   c. Genetic drift never occurs in nature, natural selection does
   d. There is no difference.

4. Evolution
   a. is change in allele frequencies over time
   b. only occurs if there is natural selection
   c. only occurs if there is heritable genetic variation
   d. a & c
   e. b & c

5. Of the following, which does NOT characterize a population in Hardy-Weinberg equilibrium?
   (a) large population size
   (b) no mutation
   (c) differential reproduction
   (d) absence of gene flow

6. Primitive atmosphere was ____ with no free molecular oxygen.
   a. Oxidizing
   b. Reducing
   c. Dry
   d. mild

7. Fitness is
   a. Natural selection
   b. Relative reproductive success
   c. Adaptation
   d. survival

8. Traits acquired by parents during their life time are passed to their offsprings was proposed by _____.
   a. Darwin
   b. Lamarck
   c. Oparin
   d. Hugo

9. Gene pool of _____ may not be representative of their parent population.
   a. founder members
   b. inbreeders
   c. homozygous individuals
   d. All above

10. If selection coefficient (S) is 0.1 then individual have fitness
    a. 50%
    b. 100 %
    c. 90%
    d. 40 %

UNIVERSITY OF THE PUNJAB

Fifth Semester 2017
Examination: B.S. 4 Years Programme

Roll No. .....

PAPER: Evolution | **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: ZOOL-308 | **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.
SUBJECTIVE TYPE

SECTION II

Q2. Write short and precise answers of following questions. (2x10)

i. Define Panspermia
ii. What Is shifting balance theory?
iii. Define Kin selection.
iv. Differentiate between stabilizing selection and disruptive selection.
v. Define fitness.
vi. What is Heritability?
vii. Define density dependent selection.
viii. Define theory of Punctuated Equilibrium
ix. Define rate of Evolution.
x. What is Genetic Load?

SECTION III

Q3. Answers these questions. (10 x3)

Q.1 Describe Fisher's Theory of Sexual Selection in detail. (10)

Q.2 How Natural selection maintain Polymorphism in population? Discuss in detail. (10)

Q.3 What is unit of Selection? Discuss in detail (10)

UNIVERSITY OF THE PUNJAB

Sixth Semester - 2017
Examination: B.S. 4 Years Programme

Roll No. .....

PAPER: Molecular Genetics II | **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: ZOOL-310 | **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

Q. 2. Answer the following Short Questions: (2x10=20)

(i). Differentiate between introns and exons.

(ii). What is the function Histone proteins?

(iii). Differentiate between facultative and constitutive DNA.

(iv). What do you mean by Repressor?

(v). Define Spliceosome.

(vi). Define c DNA.

(vii). Define Telomeric sequence.

(viii). What is the role of trailer sequence in gene expression?

(ix) What are the effects of mutation on various ara-genes?

(x) Define Chromosomal scaffold proteins.

Long Questions (30 marks)

Attempt the followingquestions and draw the labelled diagrams where necessary (5x6=30)

Q. 3. (a) Explain rolling circle model of replication in prokaryotes. (5)

(b) Explain the Role of Conjugation in Bacterial Genetics. (5)

Q. 4. (a) Describe the mechanism of PCR (Polymerase Chain Reaction). (5)

(b) Describe the role of promoter and repressor in eukaryotic gene regulation. (5)

Q. 5. (a) Explain the steps involved in construction of cDNA libraries. (5)

(b) Write a note on DNA Topology. (5)

UNIVERSITY OF THE PUNJAB

Roll No. .....

Sixth Semester - 2017
Examination: B.S. 4 Years Programme

PAPER: Molecular Genetics II **TIME ALLOWED: 30 mins.**
Course Code: ZOOL-310 **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

OBJECTIVE TYPE

Q. 1.Multiple Choice Questions (MCQs)

Each question is followed by four options. Encircle the most suitable one: (1x10=10)

(i).fMet-tRNAfMet is positioned over

(a) AUG (b) UAA (c) UAC (d) UCA

(ii) Western Blotting is used for

(a) protein(b)DNA (c)RNA(d) All above

(iii). ---------- joins the ends to make another molecule of double stranded circular DNA

(a) RNA polymerase (b) DNA polymerase (c) DNA ligase (d)both (a) and (b)

(iv). Transmission genetics (transmission of genes) was founded by

(a) Gregor Mendel (b) Watson and Crick (c) Franklin and Wilkins (d) None of these

(v). Fragile X syndrome is caused by repeats of

(a) CGG (b) CAG (c) GCA (d) All of these

(vi) There are protein molecules, of which some bind to enhancer sequences, others to promoter sequences that exert transcriptional control over the genome and they are known as--------

(a) Transposons (b) Transcriptional factors (c) Repressors (d) Operators

(vii) ----------is a phenomenon in which certain genes are rapidly copied by the organism, so that multiple copies of these genes exist within the genome.

(a) Gene amplification (b) Genomic imprinting (c) Gene cloning (d) None of these

(viii) The process during which bacterial genes are carried from a donor cell to recipient cell by a bacteriophage is called

(a) Transduction (b) Transformation (c) Conjugation (d) Gene manipulation

(ix)Annnealingtemperature is about

(a) 94-98 °C (b) 50-56 °C (c)40-45°C (d) none of these

(x) Interphase chromosomes have areas that remain highly condensed are called

(a) Nucleosomes (b)heterochromatin (c) Replisomes (d) euchromatin

UNIVERSITY OF THE PUNJAB

Roll No. .....

Sixth Semester - 2017
Examination: B.S. 4 Years Programme

PAPER: Analysis of Development | **TIME ALLOWED: 30 mins.**
Course Code: ZOOL-312 | **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

Q. 1 Encricle the correct option **[10]**

1. Cadherins are anchored in the cell by a complex of proteins
   a) Catenins b) Noggin
   c) Myosin d) Fibrinogen

2. In amphibians germ cell moves with the help of a protein
   a) Fibronectin b) Fibrinogen
   c) Chordin d) Activin

3. Nervous system is formed from.
   a). Mesoderm b). Ectoderm
   c). Endoderm d) All of above

4. N-cadherins are found in.
   a) Epidermis b) Placenta
   c) Neural ectoderm d) eye

5. wolfian ducts degenerate in
   a) Male b) Female
   c) Both d) None of them

6. Kidney developed from
   a) Ectoderm b) Mesoderm
   c) Endoderm d) All of these

7. Basic gene for eye development
   a) Chordin b) six3
   c) Pax6 d) Shh

8. hormone involved in metamorphosis.
   a) Adrenaline b) T3 and T4
   c) Norepinephrine d) Non of these

9. In amphibians GSK-3 degrade.
   a) Chordin b) follistatin
   c) β-caternin d) Disheveled protein

10. Liver regeneration in mammals is called
   a) Morphallaxis b) Epimorphic regeneration
   c) Compensatory regeneration d) Non of these

UNIVERSITY OF THE PUNJAB

Sixth Semester - 2017
Examination: B.S. 4 Years Programme

Roll No. .....

PAPER: Analysis of Development | **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: ZOOL-312 | **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

SECTION II

Answer the following short questions. **[10x2=20]**

1. What are cadherins?
2. Define autonomous cell specification.
3. Draw fate map of amphibians.
4. What is holometabolus development?
5. Give name of different types of spelicing
6. Define different cell affinity.
7. What are oncogenes?
8. Define teratogens.
9. What are primordial germ cells?
10. What is neurulation?

SECTION III

Answer the following questions. **[3x10=30]**

Q.1 What is metamorphosis? Describe amphibian metamorphosis in detail.

Q.2 Discuss the environmental factors involved in teratogenisis.

Q.3 Define morphogenesis, Give a comprehensive note on role of cell adhesion molecules in morphogenesis.

UNIVERSITY OF THE PUNJAB

Roll No. .....

Sixth Semester - 2017

Examination: B.S. 4 Years Programme

PAPER: Wildlife | **TIME ALLOWED: 30 mins.**

Course Code: ZOOL-314 | **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

Question No.1: Choose the right options

01. Large scale cutting down of forests is one of the major causes of resource depletion:
a) Afforestation
b) Deforestation
c) Reforestation
d) Desertification

02. AN area where wild indigenous animals are kept in protection for breeding and preservation:
a) Game reserve
b) Wildlife sanctuary
c) Protected area
d) National park

03. An area where hunting and shooting of wild animals is regulated under a special permit:
a) Game reserve
b) Wildlife sanctuary
c) Protected area
d) National park

04. An animal that existed in past but is no longer present:
a) Endemic
b) Extinct
c) Exotic
d) Feral

05. A big park where animals are kept in the open for visitors to see from their cars as they drive around:
a) Protected area
b) Wildlife sanctuary
c) Safari park
d) National park

06. A wetland of international importance declared as conservation site:
a) Protected site
b) Ramsar site
c) Lagoon
d) None of the above

07. Animals found in all parts of the world are known as:
a. Endangered
b. Cosmopolitan
c. Endemic
d. Vulnerable

08. Wetland is considered to be of international importance if it regularly supports waterfowl:
a. 10,000
b. 20,000
c. 30,000
d. 40,000

09. World's largest non-governmental voluntary organization working for conservation:
a. WWF
b. IUCN
c. WPA
d. None of the above

10. Pakistan has how many Ramsar Sites:
a. 5
b. 9
c. 19
d. 29

UNIVERSITY OF THE PUNJAB

Sixth Semester - 2017
Examination: B.S. 4 Years Programme

Roll No. .....

PAPER: Wildlife | **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: ZOOL-314 | **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

Q. Shortly answers the following questions each questions. **(2 x 10 = 20)**

- Define extinct species?
- Types of biodiversity?
- Define national Park?
- Define Ecological Nich?
- Define wetland?
- What is WWF-P?
- Define endangered species?
- What is Ramsar site?
- What is IUCN?
- What is Game Reserve?

Q. Answer in detail the following questions. **(10 x 03 = 30)**

Q. Define and explain in detail zoo rules.

Q. What is the philosophy and significance of wild life?

Q. Describe in detail iucn catagories of wild life status.

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Sixth Semester - 2017
Examination: B.S. 4 Years Programme

Roll No. .....

PAPER: Environmental Biology | **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: ZOOL-316 | **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

SUBJECTIVE TYPE

Question No 2. Question with Short Answer (2×10=20)

I. Define PANs.
II. How Noise Pollution can be reduced?
III. Define Eutrophication.
IV. What are the different Patterns of Distribution?
V. Define Thermal Pollution.
VI. What are Dioxins?
VII. What are the sources of Radioactive Pollution?
VIII. Define Ozone Depletion.
IX. Define MTBE.
X. Define Deforestation.

Question No 3. Question with brief Answers (10×3=30)

1. Write a note on Mechanism of population regulation.
2. Write a note on Synthetic Organic Pollutant.
3. Write a note on Acid Rain.

UNIVERSITY OF THE PUNJAB

Roll No. .....

Sixth Semester - 2017

Examination: B.S. 4 Years Programme

PAPER: Environmental Biology | **TIME ALLOWED: 30 mins.**

Course Code: ZOOL-316 | **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

OBJECTIVE TYPE

1. Green House gases include

(a) CO_2 (b) CH_4

(c) CFCs (d) All Above

2. Biological Ware Fares include

(a) Bacteria (b) Viruses

(c) NO_2 (d) both a &b

3. Steps in Water Purification in Nature include

(a) Sedimentation (b) Chlorination

(c) Aeration (d) both a &c

4. 95% U.V radiations from reaching earth's surface present in

(a) Stratosphere (b) Troposphere

(c) Mesosphere (d) Thermosphere

5. Anthropocentrism deals with

(a) Environment (b) Humans

(c) Plants (d) Animals

6. Which of the following is Secondary Pollutant?

(a) PANs (b) H

(c) SO_2 (d) CO_2

7. Photochemical Smog is also called Brown-Air Smog due to

(a) NO_2 (b) HO_2

(c) SO_2 (d) O_3

8. Non-Point Sources of Water Pollution are

(a) Industries (b) Agriculture

(c) Domestic Wastes (d) All Above

9. Primary Succession occurs at

(a) Bare Rock (b) Newly Cooled Lava

(c) Previously Inhabited Area (d) Both a&b

10. PCBs stand for

(a) Polychlorinated Biphenyls (b) Polycarbon Biphenyl

(c) Parachlorinated Biphenyl (d) None

UNIVERSITY OF THE PUNJAB

Sixth Semester - 2017
Examination: B.S. 4 Years Programme

Roll No. .....

PAPER: Animal Behavior | **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: ZOOL-318 | **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

SECTION II

Note: Attempt All Questions.

Q2. Write short notes on the following? [2×10=20]

1. Anthropomorphism
2. Migration
3. Polygamy
4. Appetitive stimulus
5. Latent learning
6. Communication
7. Mimicry
8. Zeitgebers
9. Pheromones
10. Foraging behavior

Q3. Briefly explain the following? [10×3=30]

a. Write a detailed note on Pavlovian (Classical) conditioning?

b. Describe the role of hormones in the development of behaviour with the help of examples?

c. Define Biorhythms? Write a detailed not on Circannual Rhythms in detail?

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Roll No. .....

Sixth Semester - 2017
Examination: B.S. 4 Years Programme

PAPER: Animal Behavior | **TIME ALLOWED: 30 mins.**
Course Code: ZOOL-318 | **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

SECTION I

Q1. Encircle the suitable answer of the following multiple choice questions (MCQs)

1. Care soliciting behavior is also known as
   a. Eating
   b. Epimeletic
   c. Et-epimeletic
   d. Ingestive
2. The repetitive occurrence of same behavior is called
   a. Bout
   b. Event
   c. State
   d. Behaviour
3. Easily locatable signals are called
   a. Agonistic
   b. Acoustic
   c. Visual
   d. Auditary
4. Classical conditioning is also called as
   a. Condition Reflex I
   b. Conditioned Reflex III
   c. Conditioned Reflex II
   d. Conditioned Reflex V
5. The colour which insects cannot differentiate is
   a. Blue
   b. White
   c. Red
   d. Green
6. Automeris bears large circular patches on their wings giving it view of snake although Automeris is
   a. Butterfly
   b. Cobra
   c. Bat
   d. Moth
7. The branch of biology which deals with the study of behavior is called
   a. Biology
   b. Ecology
   c. Ethology
   d. Entomology
8. Animal behavior was described in Historia Animalia for the 1st time by
   a. Aristotle
   b. Karl Von
   c. Darwin
   d. Gregor Mendel
9. A great need for food is called
   a. hyperphagia
   b. Appetite
   c. starvation
   d. hunger
10. Synthesis of early development and findings were due to
    a. Konrad Lorenz
    b. Karl Von Frish
    c. I.P. Pavlov
    d. Parasad

UNIVERSITY OF THE PUNJAB

Roll No. .....

Seventh Semester 2017
Examination: B.S. 4 Years Programme

PAPER: Principal of Systematics | **TIME ALLOWED: 30 mins.**
Course Code: ZOOL-401 | **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

SECTION 1. OBJECTIVE

Q1. Select the most appropriate answer from the given options. Cutting and overwriting is not allowed. No mark will be awarded in case of cutting /overwriting (1 x 10)

i. According to cladistics classification, a branch of **cladogram is known as**
A) Population B) Clade C) Lineage D) taxon

ii. **The scientific name of a species should be in ---------- language**
A) french B) Italian C) Latin D) Roman

iii. **What is not present on the lable of a collected specimen**
A) Date of collection B) Sex C) Name of Museum D) Exact Locality

iv. The component species of a super species is known as
A) subspecies B) species C) Allospecies D) Incipient species

v. **Different names of a taxon are known as**
A) synonyms B) homonyms C) type D) none

vi. **If the name of the species based on a series of syntype, subsequent zoologist may designate one of these as**
A) holotype B) lectotype C) neotype D) paratype

vii. Species can be typified by
A) statistics of population B) Interbreeding C) dispersal D) All of the above

viii. A group whose members are all descended from the nearest common ancestors is known as
A) Monogenic B) Monotypic C) Monophyletic D) polyphyletic

ix. **Categoery is a**
A) name B) rank C) group of organisms D) species

x. . Superspecies have characteristics like
A) Monophyletic B) Allopatric C) Reproductive isolated D) All

UNIVERSITY OF THE PUNJAB

Seventh Semester 2017
Examination: B.S. 4 Years Programme

Roll No. .....

PAPER: Principal of Systematics | **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: ZOOL-401 | **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

SECTION II

Q2. Write short and precise answers of following questions. 2x10

i. **Define NOMINALISTIC SPECIES CONCEPT.**
ii. **Differentiate between CLADOGRAM and PHYLOGRAM.**
iii. **Differentiate between HOLOTYPE and LECTOTYPE.**
iv. **Define SUBSPECIES.**
v. **Differentiate between MICRO and MACRO TAXONOMY.**
vi. **What is BINOMIAL NOMENCLATURE?**
vii. **What is TAXONOMIC KEY?**
viii. **Define TAXON.**
ix. **Describe problems related with PHENETIC CLASSIFICATION.**
x. **Describe problems related with BIOLOGICAL SPECIES CONCEPT.**

SECTION III

Q3. Write a detail note on the TYPES OF INTRA POPULATION VARIATIONS. (10)

Q4. What is PHENETIC CLSSIFICATION? Discuss in detail (10)

Q5. Write a detail note on SPECIATIONS. (10)

UNIVERSITY OF THE PUNJAB

Roll No. .....

Seventh Semester 2017
Examination: B.S. 4 Years Programme

PAPER: Palaeontology **TIME ALLOWED: 30 mins.**
Course Code: ZOOL-403 **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

Q.1. Choose the Correct One: **{1 x 10 = 10}**

(i) Deinotherium has been classified into

a. Artiodactyla b. Perissodactyla c. Proboscidea d. Primate

(ii) The Camels and Llamas originated in

a. South America b. North America c. Africa d. Asia

(iii) Branch of geology which help to understand the unique evolutionary history called

a. Stratigraphy b. Biostratigraphy c. Palaeontology d. Morphology

(iv) Petrification includes

a. Mineralization b. Permineralization c. Carbonization d. All

(v) The Geological Time Scale is divided into large and small

a. 24 units b. 26 units c. 28 units d. 30 units

(vi) Instead of vertical replacement, teeth are replaced horizontally in

a. Elephant b. Horse c. Rhinoceros d. Camel

(vii) The woody tissues are replaced by _____as a rule

a. Limestone b. Silica c. Iron d. Clay

(viii) The IGNEOUS rocks produced by LAVA called

a. Plutonic b. Volcanic c. Contact d. Regional

(ix) Palaeontologists basically recognize _____ types of fossils

a. 2 b. 3 c. 4 d. 5

(x) *Hipparion* was progressive horse in the development of the skull and teeth but conservative in the retention of _____.

a. Toes b. Legs c. Size d. Neck

UNIVERSITY OF THE PUNJAB

Seventh Semester 2017
Examination: B.S. 4 Years Programme

Roll No. .....

PAPER: Palaeontology | **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: ZOOL-403 | **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

Q.2. Define the Following Terms: [10 x 2 = 20]

1. Core
2. Lithification
3. Cercopithecidae
4. Fossils
5. Magma
6. *Eohippus*
7. Cast
8. Half-life
9. CroMagnon
10. *Stegodon*

Q. 3. Write short notes on the followings: [30]

a. Sedimentary Rocks {10}

b. Evolution of Horses {10}

c. Types of Fossils {10}

UNIVERSITY OF THE PUNJAB

Roll No. .....

Seventh Semester 2017
Examination: B.S. 4 Years Programme

PAPER: Economics Zoology | **TIME ALLOWED: 30 mins.**
Course Code: ZOOL-405 | **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

Q1. Encircle the correct answer **(10×1=10)**

1. Mulberry silkworm is:
   (a) *Bombyx morri* (b) *Anthreaea pernyi*
   (c) *Anthreaea mylitta* (d) *Attacus atlas*
2. The process of rearing honeybee artificially is called as:
   (a) Horticulture (b) Apiculture
   (c) Sericulture (d) Pisciculture
3. Queen cell shape is:
   (a) Hexagonal (b) Pentagonal
   (c) Octagonal (d) None
4. Which of the followings is the smallest honey bee?
   (a) *Apis mellifera* (b) *Apis dorsata*
   (c) *Apis cerana* (d) *Apis florea*
5. The cattle, horses, goats and deer are attacked by one of the following:
   (a) *Boophilus microplus* (b) *Argas persicus*
   (c) *Eutrombicula alfreddugesi* (d) None of these
6. The sting apparatus is absent in:
   (a) Worker (b) Queen
   (c) Drone (d) All of these
7. The intermediate host of the filarial worm Wuchereria bancrofti is one of these mosquitoes:
   (a) *Aedes* (b) *Anopheles*
   (c) *Culex* (d) None of these
8. The Mangemite Sarcoptes scabiei is a pest of:
   (a) Horses and sheep (b) Human beings
   (c) Human being, horses and sheep (d) None of these
9. The process of killing the pupa present inside the cocoon is called:
   (a) Stifling (b) Spinning
   (c) Realing (d) *Leishmaniasis*
10. *Lepisma saecharina* is scientific name of one of the following fishes:
   (a) Carp Fish (b) Cat Fish
   (c) Silver Fish (d) Star Fish

UNIVERSITY OF THE PUNJAB

Seventh Semester 2017
Examination: B.S. 4 Years Programme

Roll No. .....

PAPER: Economics Zoology | **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: ZOOL-405 | **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

Q2. Write short answers of the following questions. **(10×2=20)**

i. Briefly describe any two diseases of poultry.
ii. Write a brief note on pearl formation.
iii. Write down the properties of lac.
iv. Differentiate between stifling and realing.
v. Enumerate methods of preservation of fishes.
vi. What is Rigg's disease?
vii. Write down the control of ticks on the host.
viii. Pests of Tea.
ix. Explain the morphology and functions of queen bee.
x. Give brief account of indoor and outdoor duties of worker bees.

Q3. Write extensive answers of the following questions. **(3×10=30)**

i. Write a detailed note on sericulture. Also write about its diseases and problems.

ii. Explain four parasitic nematodes and their control.

iii. Describe major edible freshwater fishes? Also write methods for their preservations.

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Roll No. .....

Seventh Semester 2017
Examination: B.S. 4 Years Programme

PAPER: General Microbiology | **TIME ALLOWED: 30 mins.**
Course Code: ZOOL-415 | **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

Q. 1 Encircle the correct answer **1x10=10**

i. _____ a Dutch scientist whose hobby was making microscope
   A) Antony van Leewenhoek
   B) Francesco Radi
   C) Paul Ehrlich
   D) Robert Koch
   E) None of these

ii. The ability of the microorganism to cause disease
   A) Infection
   B) Septicemia
   C) Pathogenicity
   D) None of these

iii. The phenomenon of absorbing light of a particular wavelength and emitting of a long wavelength is
   A) Fluorescence
   B) Staining
   C) Both A and B
   D) None of these

iv. Some bacterial cells are surrounded by a viscous substance forming a covering layer that is referred as
   A) Bacterial endospore
   B) Bacterial capsule
   C) Both A and B
   D) None of these

v. The growth of cultures with all the cells in the same stage of growth cycle is called
   A) Continuous growth
   B) Synchronous growth
   C) Both A and B
   D) None of these

vi. The descendants of a single isolation in pure culture are called as
   A) Species
   B) Type species
   C) Strain
   D) None of these

vii. Gram negative bacteria appears after Gram staining
   A) Purple
   B) Pink
   C) Blue
   D) None of these

viii. Mycology and phycology is the study of ____ and ___, respectively
   A) Fungi and protozoa
   B) Algae and bacteria
   C) Fungi and algae
   D) None of these

ix. Haeckel suggested third kingdom
   A) Protista
   B) Monera
   C) Both A and B
   D) None of these

x. The hollow, non helical, filamentous appendages that are thinner, shorter and more numerous are termed as
   A) Pili
   B) Fimbriae
   C) Both A and B
   D) None of these

UNIVERSITY OF THE PUNJAB

Seventh Semester 2017
Examination: B.S. 4 Years Programme

Roll No. .....

PAPER: General Microbiology | **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: ZOOL-415 | **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

Q.2 Give short answer of the following **2x10=20**

i. Genetic relatedness and taxonomy
ii. Sulfur dependent archaeobacteria
iii. Dark field microscope
iv. Importance of protozoa
v. Type strain
vi. Methogens
vii. Acidophilic
viii. Exponential growth
ix. Relationship between microbiology and biotechnology
x. Broth

Q. 3 Write brief note on the following **4 x 5 = 20**

a. Distinctive characteristics of fungi and protozoa
b. Place of microorganism in world
c. Bacterial grouping on the basis of their temperature
d. Bacterial flagella
e. Nutritional requirement of bacteria

Q.4 Give a comprehensive account on preservation of pure culture. **10**

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Seventh Semester 2017

Examination: B.S. 4 Years Programme

PAPER: Applied Microbiology **TIME ALLOWED: 30 mins.**

Course Code: ZOOL-417 **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

Q. 1 Choose/Fill the best possible option **1x10=10**

i. The surface forces exist between two immiscible liquids and at the interface between a solid and a liquid are referred to
a) Surface tension b) Interfacial tension c) Both a and b d) None of these

ii. The term antibiosis was first defined by _____ in 1889
a) Vuillemin b) Paul Ehrlich c) Tyndall d) None of these

iii. Domestic and industrial waste waters are carried by
a) Storm sewers b) Sanitary sewers c) Combined sewers d) None of these

iv. The mixtures of iodine with surface-active agents act as carriers and solubilizers for iodine
a) Tincture of iodine b) Iodo-carrier c) Iodophors d) None of these

v. The process in which dewatered sludge undergoes decomposition, usually within the thermophilic temperature range is termed as
a) Composting b) Sludge digestion c) Acid digestion d) None of these

vi. In some infections, bacteria may actively multiply in the bloodstream and produce toxic products, a condition known as
a) Parasitism b) Septicemia c) Anemia d) None of these

vii. The major commercial product(s) of microorganisms can be classified as follows
a)The microbial cells b) Microbial enzymes c) primary and secondary metabolic products d) All of these

viii. The time in minutes to reduce the population by 90% is termed as
a) Decimal reduction time b) Thermal death time c) Percent death time d) None of these

ix. Penicillins are a class of _____ antibiotics
a) Gamma lactam b) Beta lactam c) Alpha lactam d) None of these

x. The toxins that affect nerve tissue are termed as
a) Cytotoxin b) Leukocidins c) Neurotoxins d) None of these

UNIVERSITY OF THE PUNJAB

Seventh Semester 2017
Examination: B.S. 4 Years Programme

Roll No. .....

PAPER: Applied Microbiology | **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: ZOOL-417 | **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

Q.2 Give short answer of the following (ANY TEN) **2x10=20**

i. Disinfectant and Antiseptic
ii. Fractional sterilization
iii. Incineration
iv. Activated Sludge
v. Single cell protein
vi. Laboratory testing for detection of coliform group in water
vii. Mode of action of ethylene oxide
viii. Biological oxygen demand (BOD)
ix. Selection of chemical agent for practical application
x. Bactericidal and bacteriostatic
xi. Microbial adherence
xii. Rate of death of bacteria

Q. 3 Write brief note on the following **4 x 5 = 20**

a. Diphtheria toxin
b. Septic tank
c. Petroleum microbiology
d. Role of microorganism in nitrogen fixation

Q.4 Give a comprehensive account on the role of alcohol and halogens to control the microorganisms. **10**

UNIVERSITY OF THE PUNJAB

Roll No. .....

Seventh Semester 2017

Examination: B.S. 4 Years Programme

PAPER: Applied Microbiology **TIME ALLOWED: 30 mins.**

Course Code: ZOOL-417 **MAX. MARKS: 10**

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UNIVERSITY OF THE PUNJAB

Seventh Semester 2017
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UNIVERSITY OF THE PUNJAB

Roll No. .....

Eighth Semester - 2017
Examination: B.S. 4 Years Programme

PAPER: Biological Techniques **TIME ALLOWED: 30 mins.**
Course Code: ZOOL-407 **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

Q. 1 Encircle the correct answer 1x10=10

i. Addition of 2% _____ help to slow down the fast moving organisms
   A) Carboxymethylcellulose
   B) Carboxymethylcellulase
   C) Carbolfuchin
   D) Both A and B
   E) None of these

ii. For sterilization, ... will be used
   A) Incubator
   B) Pressure cooker
   C) Centrifuge
   D) None of these

iii. The chromatography in which stationary phase is non polar and Mobile phase is polar referred as
   A) Normal phase
   B) Reverse phase
   C) Both A and B
   D) None of these

iv. When an object continuously emit light in the absence of light is termed as
   A) Absorption
   B) Phosphorescence
   C) Luminescence
   D) None of these

v. The corresponding to shorter wavelength, _____ will be greater
   A) Absorption
   B) Resolution
   C) Transmission
   D) Magnification
   E) None of these

vi. Total magnification of microscope is --------
   A) 10x, 200x, 100x
   B) 100x, 400x, 1000x
   C) 1000x, 40x, 4000x
   D) 1x, 40x, 10x

vii. DNA polymerase moves
   A) from 3' →5'
   B) from 5' → 3'
   C) Both A and B
   D) None of these

viii. Cryomicrotome use for the cutting of _____
   A) Thick tissues
   B) Thin tissues
   C) Freezing tissues
   D) All of above
   E) None of these

ix. The solution contains the unknown concentration of the substance together with the reagents used is
   A) Standard solution
   B) Test solution
   C) Control solution
   D) Blank solution
   E) Both C and D

x. Paraffin has been used as _____ in histoprocessing.
   A) Strain
   B) Embedding medium
   C) Sectioning medium
   D) All of above

UNIVERSITY OF THE PUNJAB

Eighth Semester - 2017
Examination: B.S. 4 Years Programme

Roll No. .....

PAPER: Biological Techniques **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: ZOOL-407 **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

Q.2 Give short answer of the following **2x10=20**

i. What is use of ultracentrifugation? Briefly discuss
ii. Differentiate between batch and continuous distillation.
iii. What is the general principle of electrophoresis?
iv. Define iso-electric point.
v. Give principle of chromatography?
vi. What is mounting?
vii. Differentiate between smear and stain.
viii. What is meant by primary and secondary Data.
ix. What is use of distillery and oven
x. What is meant by ocular and stage micrometer?

Q.3a Write a detail note on THIN LAYER CHROMATOGRAPHY with suitable sketches. 7

Q.3b Write down the applications of gas chromatography. 3

Q.4 a What is meant by electron microscope? Differentiate between TEM and SEM with suitable ray diagrams. 6

Q.4b Give a comprehensive account on the use of centrifuge. 4

Q.5a What is the main purpose and structure of research paper? 7

Q.5b Write down precautionary measures for animal preservation. 3

UNIVERSITY OF THE PUNJAB

Roll No. .....

Eighth Semester - 2017
Examination: B.S. 4 Years Programme

PAPER: Zoogeography | **TIME ALLOWED: 30 mins.**
Course Code: ZOOL-409 | **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

Q.1. Encircle the Correct Answer: **{1 x 10 = 10}**

1. Frog is an example of a zoogeography branch
   a. Experimental b. Applied c. Historical d. Biocoenotic
2. Blackbuck is endemic to Region
   a. Nearctic b. Ethiopian c. Australian d. Oriental
3. Rat is an example of distribution type
   a. Cosmopolitan b. Endemic c. Discontinuous d. Isolated
4. Wegener proposed that Pangaea began to break apart about----- million years ago
   a. 250 b. 200 c. 150 d. 65
5. The study of the distribution of full range of any group of animals is called --------- zoogeography
   a. Causal b. Chorology c. Applied d. Historical
6. Alpine mountain range is between
   a. Europe and Africa b. North and South America c. Pakistan and Afghanistan d. Australia and New Zealand
7. Neotropical region separated from Africa during---------- Period
   a. Triassic b. Jurassic c. Cretaceous d. Tertiary
8. Galapagos group of islands found in
   a. North America b. South America c. Africa d. Australia
9. Sclater (1858) divided the surface of earth into ------- ZOOGEOGRAPHICAL REGIONS
   a. 4 b. 5 c. 6 d. 7
10. Wallace (1876) divided the surface of earth into six ZOOGEOGRAPHICAL REGIONS based on the distribution of
    a. Birds b. Mammals c. Amphibians d. Reptiles

UNIVERSITY OF THE PUNJAB

Eighth Semester - 2017
Examination: B.S. 4 Years Programme

Roll No. .....

PAPER: Zoogeography | **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: ZOOL-409 | **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

Q.2. Answer the following short questions briefly: **{2 x 10 = 20}**

I. Differentiate between EXPERIMENTAL and APPLIED ZOOGEOGRAPHY.
II. Define TOPOGRAPHIC barriers.
III. Differentiate between COSMOPOLITAN and ENDEMIC distribution.
IV. Differentiate between STENOHALINE and EURYHALINE animals.
V. Write the names of LAND BRIDGES.
VI. Define FAUNISTICS zoogeography with examples.
VII. Define ARCTOGAEA.
VIII. Write the boundary of AUSTRALIAN region?
IX. Write the Zoogeographical features of EUROPEAN Sub region.
X. Differentiate between TAIGA and TUNDRA.

Q.3. Define DISTRIBUTION and write occurrence and significance of DISCONTINUOUS DISTRIBUTION. {10}

Q.4. Explain CONTINENTAL and OCEANIC islands. {10}

Q.5. Write a note on ORIENTAL REGION. {10}

UNIVERSITY OF THE PUNJAB

Roll No. .....

Eighth Semester - 2017
Examination: B.S. 4 Years Programme

PAPER: Bacteriology **TIME ALLOWED: 30 mins.**
Course Code: ZOOL-429 **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

Q. 1 Encircle the correct answer **1x10=10**

i. _____ technique is used for the isolation of anaerobic microbes.
   A) Pour plate
   B) Streak plate
   C) Both A and B
   D) None of these

ii. The functions of plasmid are _____
   A) DNA Replication
   B) Cell wall Synthesis
   C) Both A and B
   D) None of these

iii. When the bacterial strain is derived from a single parent cell it is termed as _____
   A) Clone
   B) Poluculture
   C) Sub-species
   D) None of these

iv. Percentage of alcohol used in Gram's staining is_____
   A) 75%
   B) 90%
   C) 25%
   D) None of these

v. Cytochromes are _____
   A) Oxygen acceptor
   B) Electron acceptor
   C) ATP acceptor
   D) Both A and B
   E) None of these

vi. The process of destroying all forms of microbial life_____
   A) Disinfection
   B) Sterilization
   C) Boiling
   D) All of these

vii. The relationship between NA and resolution can be expressed as __
   A) $\lambda/3NA$
   B) $3\lambda/2NA$
   C) $2\lambda/NA$
   D) $\lambda/2NA$
   E) None of these

viii. Generation time for *E. coli* is
   A) 10-20 minutes
   B) 25-35 minutes
   C) Several minutes
   D) None of these

ix. The distance between front surface of lens and surface of cover glass
   A) Resolving power
   B) Numerical aperture
   C) Working distance
   D) Field of vision

x. The most usual cell division(s) in bacterial populations
   A) Transverse binary fission
   B) budding
   C) Fragmentation
   D) All of these
   E) None of these

UNIVERSITY OF THE PUNJAB

Eighth Semester - 2017
Examination: B.S. 4 Years Programme

Roll No. .....

PAPER: Bacteriology | **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: ZOOL-429 | **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

Q.2 Give short answer of the following **2x10=20**

i. What is mean by drug resistance?
ii. How active transport occurs in cell?
iii. Write briefly about continuous culture?
iv. Write the application of lyophilization?
v. What is meant by chemical sterilization? Briefly discuss
vi. Write down limitation of turbidimetric method.
vii. What is meant by in vitro and in vivo straining?
viii. What is meant by aseptic technique? Give brief note.
ix. Give a note on biomass determination.
x. What is meant by immunofluorescence?

Q.3 What is meant by pure culture? Give an comprehensive note on the preservation of pure culture. 10

Q.4a Discuss phenol, aldehyde and heavy metals as chemical agents to control the microbial growth. 6

Q.4b Write characteristics of an ideal antibiotic. 4

Q. 5a How microbes are controlled by using high temperature and surface tension? 5

Q.5b Discuss the protein metabolism in detail. 5

UNIVERSITY OF THE PUNJAB

Roll No. .....

Eighth Semester - 2017

Examination: B.S. 4 Years Programme

PAPER: Environmental Microbiology | **TIME ALLOWED: 30 mins.**

Course Code: ZOOL-431 | **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

Q. 1 **Encircle the correct answer** **1x10=10**

i. In aerobic soil, _____ is the most important cellulolytic bacteria
   A) *Aspergilluls*
   B) *Pseudomonas*
   C) *Fusarium*
   D) *Cytophage*
   E) None of these

ii. _____is the process whereby dewatered sludge undergoes decomposition, usually within the thermophilic range.
   A) Oxidation pools
   B) Stabilizing
   C) Anaerobic sludge digestion
   D) Composting

iii. Autochthonous microflora is characterized by
   A) High metabolic activity
   B) Low metabolic activity
   C) Show periodic changes
   D) All of these
   E) None of these

iv. The floating aquatic fern *Azolla* forms an economically important symbiotic association with _____
   A) *Rhizobium*
   B) *Anabaena*
   C) *E. Coli*
   D) *Pseudomonas*
   E) All of these
   F) None of these

v. In water containing abundant Ca^{2+} ions in alkaline medium, _____ provides nucleation sites for carbonate mineral formation
   A) Algae
   B) Cyanobacteria
   C) Bacterial blooms
   D) Protozoans
   E) None of these

vi. Pseudomonas falls in which biochemical type of microorganisms in milk
   A) Acid producers
   B) Ropy fermentation
   C) Gas producers
   D) Proteolytic
   E) None of these

vii. _____ may be formed by Euglena which contains photoreceptive pigments.
   A) Neuston
   B) Blooms
   C) Sea Autotrophs
   D) Phytoplanktons
   E) None of these

viii. Dimethylsulphopropionate is an osmolyte synthesized by ____
   A) *Chlorobium*
   B) *Vibrio*
   C) Dinoflagellates
   D) None of these

ix. In response to osmotic shock, marine *Vibrio* species produces
   A) Biofilm
   B) Slime
   C) Compatible solutes
   D) Cocci form
   E) None of these

x. The usual structure of bio film is a collection of micro colonies separated by___
   A) Ligaments
   B) Adhesive structure
   C) Protein channels
   D) Water channels
   E) None of these

UNIVERSITY OF THE PUNJAB

Eighth Semester - 2017
Examination: B.S. 4 Years Programme Roll No. .....

PAPER: Environmental Microbiology **TIME ALLOWED: 2 hrs. & 30 mins.**
Course Code: ZOOL-431 **MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

Q.2 **Give short answer of the following** **2x10=20**

i. Give a brief note on light as stress for microbes
ii. Write about microbial life at low nutrient concentration.
iii. How radiation play role in food preservation.
iv. Write briefly about microbiology of canned food spoilage.
v. What is meant by wastewater? Write its types.
vi. Write about types of natural waters.
vii. What is meant by microbial ecology? Briefly discuss
viii. How compatible solutes exert their protective effect in low water availability
ix. Compare microbial food web in estuaries and marine environment.
x. Write possible effects of lake stratification.

Q. 3 Give an account on various steps of municipal treatment processes. 10

Q.4 Write a detail note on biochemical types of microorganisms in milk. 10

Q.5a Describe the distribution of microorganisms in the aquatic environment. 5

Q.5b What is meant by competitive strategies of microorganisms? Discuss in detail 5