VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST - 625234
DEPARTMENT OF ZOOLOGY

Course Code:	31CT21	**Programme:**	M.Sc.	**CIA:**	I
Date:	16.02.2021	**Major:**	Zoology	**Semester:**	II
Duration:	2 Hours	**Year:**	I	**Max.Marks:**	50
Course Title:		**IMMUNOLOGY**			

SECTION – A (Remembering)

Answer **ALL** the Questions: **(5 X 1 = 5 Marks)**

Q.No.		CO
1	Antigen binding sites of an Ig are located in a) light chain alone b) Heavy chain alone c) FC region of the antibody d) Fab region of the antibody	CO1
2	Anti –Rh antibody belongs to ----- type. a) IgE b) IgA c) IgG d) IgM	CO1
3	In complement pathway cytolysis is initiated by a) Membrane degradation complex b) Membrane attacking complex c) Membrane dissociation d) Lysis	CO2
4	The maximum rate of precipitation occurs in a) Zone of antigen excess b) Zone of equivalence c) Zone of antibody excess d) all the above	(CO5)
5	Immune surveillance is concerned with a) Cytotoxic T cells b) T regular cells c) Natural killer cells d) Memory cells	(CO5)

SECTION – B (Understanding)

Answer any **FIVE** Questions: Very Short Answers **(5 X 2 = 10 Marks)**

6	Define antigen.	CO1
7	What are haptens?	CO1
8	Specify the basis of difference in the isotypes of Ig.	CO1
9	What are complementary proteins?	CO2
10	Define VDRL test and its applications.	CO5
11	List out the types of immunotechniques.	CO5
12	What are all the major targets of immune system?	CO5

SECTION – C (Applying)

Answer any **THREE** Questions: **(3 X5= 15 Marks)**

13	Describe the molecular organization in different types of immunoglobulins.	CO1
14	Enumerate the properties of antigens.	CO1
15	Describe the double Immunodiffusion.	CO5
16	Expand and describe the ELISA test.	CO5
17	Give an account on Radial Immunodiffusion.	CO5

SECTION – D (Analyzing)

Answer any **TWO** Question: **(2X 10= 20 Marks)**

18	Explain the genetic rearrangements in antibody diversity.	CO1
19	Discuss the activation pathways of complement activation.	CO2
20	Give a detailed account on the principle and applications of immunoelectrophoresis.	CO5

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Course Code:	31CT22	**Programme:**	M.Sc.,	**CIA:**	I
Date:	17.02.2021	**Major:**	Zoology	**Semester:**	II
Duration:	2 Hours	**Year:**	I	**Max.Marks:**	50
Course Title:		**BIOSTATISTICS**			

SECTION – A (Remembering)

Answer **ALL** the Questions: **(5 X 1 = 5 Marks)**

1 Studying the relationship of three or more variables simultaneously is called **CO3**
a. partial correlation b. multiple correlation c. rank correlation d. linear correlation

2 In simple regression equation, the numbers of variables involved are: **CO3**
a. 0 b. 1 c. 2 d. 3

3 Analysis of Variance technique was developed by
a. Fisher b. Gosset c. Pearson d. Miovre **CO4**

4 In chronological classification of data are classified on the basis of **CO1**
a. Geographical area b. Quality c. Time of occurrence d. Class interval

5 The bar diagram divided into various parts in proportion to values given in data are called **CO1**
a. Multiple bar b. Deviation bar c. Horizontal bar diagram d. Sub – divided bar

SECTION – B (Understanding)

Answer any **FIVE** Questions: **(5 X 2 = 10 Marks)**

6 What is Correlation? **CO3**

7 State the application of correlation **CO3**

8 Comment on Regression coefficient **CO3**

9 What is degree of freedom? **CO4**

10 Comment on pictogram and cartogram **CO1**

11 Define pie diagram **CO1**

12 What is X^2 test of goodness of fit? **CO1**

SECTION – C (Applying)

Answer any **THREE** Questions: **(3 X5= 15 Marks)**

13 Describe the types of correlation with examples **CO3**

14 Obtain the regression equation Y on X for the following data. **CO3**

Salinity (%)	**5**	**7**	**9**	**3**	**16**	**14**
O_2 content (mg/l)	**7**	**5**	**5**	**9**	**3**	**2**

15 Explain the various methods of collecting primary data **CO1**

16 What is a histogram? How do you construct it? **CO1**

17 Explain addition and Multiplication theorem of probability measure **CO1**

SECTION – D (Analyzing)

Answer any **TWO** Question: **(2X 10= 20 Marks)**

18 Compare the regression analysis and correlation **CO3**

19 Calculate the Karl Pearson's Coefficient of correlation between X and Y from the following data. **CO3**

X	5	9	13	17	21	26	28	30
Y	12	20	25	33	35	32	36	25

20 Calculate the arithmetic mean and standard deviation from the following data **CO1**

Weight of fishes (g)	5-15	15-25	25-35	35-45	45-55
No. of fishes	8	12	15	9	6

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DEPARTMENT OF ZOOLOGY

Course Code:	31CT23	**Programme:**	M.Sc.,	**CIA:**	I
Date:	18.02.2021	**Major:**	Zoology	**Semester:**	II
Duration:	2 Hours	**Year:**	I	**Max.Marks:**	50

Course Title: **DEVELOPMENTAL BIOLOGY**

SECTION – A (Remembering)

Answer **ALL** the Questions: **(5 X 1 = 5 Marks)**

1 Mitochondria of the sperm occurs in **CO1**
a) Middle piece (b) Head c) Acrosome (d) Tail

2 The germ cells in vertebrate gonads formed by **CO1**
a) Mitosis b) Meiosis c) Both a and b d) Maturation without cell division

3 Neural induction was first discovered by____ **CO3**
a) Hall b) Maclean c) Mangold d) Spemann

4 Endogenous induction is reported in _____ **CO3**
a) Parenchyma cells b) Mesenchyma cells c) Pancreas cells d) Beta cells

5 _____ defined differentitation as the production of unique enzymatic patterns. **CO4**
a) Runnstrom b) Spiegelmann c) Spemann d)Boveri

SECTION – B (Understanding)

Answer any **FIVE** Questions: **(5 X 2 = 10 Marks)**

6 Write the any two functions of sertoli cells **CO1**

7 What is capacitation? **CO1**

8 Define the Parthenogenesis **CO1**

9 Distinguish between Fertilizin and Antifertilizin **CO1**

10 Define the term differentiation according to spiegelman. **CO4**

11 Distinguish between homotypic and heterotypic inductions. **CO3**

12 What do you mean by competence? **CO3**

SECTION – C (Applying)

Answer any **THREE** Questions: **(3 X5= 15 Marks)**

13 Narrate the Arrhenotoky. **CO1**

14 Explain the formations of acrosomes. **CO1**

15 Briefly discuss the molecular biology of competence. **CO3**

16 Explain the concepts of gradient theory. **CO3**

17 Describe the Briggs and king's experiments. **CO3**

SECTION – D (Analyzing)

Answer any **TWO** Question: **(2X 10= 20 Marks)**

18 Discuss in brief the process of Oogenesis. Give necessary diagrams. **CO1**

19 What is stem cell? Elucidate the process of erythropoiesis in mammals. **CO4**

20 Discuss the characteristics, type and chemical basis of differentiation. **CO4**

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DEPARTMENT OF ZOOLOGY

Course Code:	31EP21	**Programme:**	M.Sc	**CIA:**	I
Date:	19.02.2021	**Major:**	Zoology	**Semester:**	II
Duration:	2 Hours	**Year:**	I	**Max.Marks:**	50
Course Title:		**EVOLUTION**			

SECTION – A (Remembering)

Answer **ALL** the Questions: **(5 X 1 = 5 Marks)**

1 Darwin's finches provided an evidence of evolution, which is CO 1
a. Paleontological b. Embryological c. Biogeographical d. Biochemical

2 ---- was a predecessor of Darwin and he developed the theory of acquired characters CO 1
a. Weismann b. Mendel c. Malthus d. Lamarck

3 Genetic Drift is also known as CO 1
a. Founder effect b. Sewall Wright effect c. Bottleneck effect d. Gene migration

4 Ploypoid organisms have more than ---------- sets of chromosomes CO 4
a. 2 b.4 c.6 d.8

5 5. Theory of Kin selection was postulated by CO 4
a. Hamilton et al. b. Wynne-Edwards c. Wilson d. Wright

SECTION – B (Understanding)

Answer any **FIVE** Questions: **(5 X 2 = 10 Marks)**

6 Give a short comment on Bottleneck phenomenon CO 1
7 Define:- Gause's law. CO 3
8 What you meant by biological wastage CO 3
9 Define:- Neotony CO 4
10 Write a short note on Bak-Snepper model of Co-Evolution CO 4
11 Comment on origin of polyploidy. CO 4
12 What is Rapid evolution? CO 4

SECTION – C (Applying)

Answer any **THREE** Questions: **(3 X5= 15 Marks)**

13 Where does Darwin's stand in morden concepts of evolution? CO 1
14 Write short notes on: CO 1
i. Normalizing selection
II. Directional selection
15 Differentiate between allopatric and sympatric speciation CO 3
16 Differentiate Gradualism and Punctuated equilibrium. CO 4
17 Enumerate the importance of Horotely, Bradley and Fachytely CO 4

SECTION – D (Analyzing)

Answer any **TWO** Question: **(2X 10= 20 Marks)**

18 Write an essay on Darwin's natural selection and origin of species CO 1
19 What is isolation? Describe the various isolating agents and the importance of isolation. CO 3
20 Write a detailed account on Simpson's adaptive grid on micro, macro and mega evolution and its mechanisms CO 4

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DEPARTMENT OF ZOOLOGY

Course Code:	31CT41	**Programme:**	M.Sc	**CIA:**	I
Date:	16.02.2021	**Course:**	Zoology	**Semester:**	IV
Duration:	2 Hours	**Year:**	II	**Maximum:**	50
Course Title:	**APPLIED BIOTECHNOLOGY**				

SECTION – A (Remembering)

Answer **ALL** the Questions: **(5 X 1 = 5 Marks)**

1 Immunoglobulin's are protein molecules produced by a specialized group of cells called____
a. B- Lymphocytes b. RBC cells c. WBC cells d. Myeloma calls

2 _____ may be regarded as the backbone of reconstructive surgery CO1
a. Single cell protein b. Sugar crops c. Tissue engineering d. Cell culture

3 _____ chromosomes is responsible for familial Alzheimer's disease CO1
a. 28 b. 23 c. 21 d. 25

4 The best biofertilizers for rice is CO3
a. *Bacillus polymaxa* b. *Azolapinnata*
c. *Bacillus megatherium* d. *Rhizobium meliloti*

5 The use of living organism to degrade environmental pollutants is called CO5
a. Microremediation b. Nanoremediation c. Bioremediation d. All

SECTION – B (Understanding)

Answer any **FIVE** Questions: **(5 X 2 = 10 Marks)**

6 Comment on SCID. CO1
7 What is Fragile X syndrome? CO1
8 Comment on drug target. CO1
9 What is Xenobiotics? CO5
10 Define the term Biodegradation. CO5
11 Give a short note on mechanisms behind the Phytoremediation CO5
12 Comment on Superbug CO5

SECTION – C (Applying)

Answer any **THREE** Questions: **(3 X5= 15 Marks)**

13 Comment on Sickle cell anemia and Huntington's disease. CO1
14 Write an account on the various types of Biomaterials and their applications. CO1
15 Narrate the Cystic fibrosis as a human disease. CO1
16 Write a short account on *Bacillus thuringiensis* and discuss its application CO3
17 How genetically modified organisms are created? With suitable example discuss its usage in removal of environmental pollutants. CO5

SECTION – D (Analyzing)

Answer any **TWO** Question: **(2X 10= 20 Marks)**

18 Explain the production and applications of monoclonal antibodies. CO1
19 Write a detailed account on the process of various sewage treatments. CO5
20 Discuss in detail the production of biogas and advantages and disadvantages. CO5

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Course Code:	31CT42	**Programme:**	M.Sc.,	**CIA:**	I
Date:	17.02.2021	**Major:**	Zoology	**Semester:**	IV
Duration:	2 Hours	**Year:**	II	**Max.Marks:**	50
Course Title:	**ENVIRONMENTAL BIOLOGY**				

SECTION – A (Remembering)

Answer **ALL** the Questions: **(5 X 1 = 5 Marks)**

1 The sequence of the eaters being eaten is called CO1
a) Food web b) Producers c) Food chain d) Consumers

2 Plants convert light energy into chemical energy in the form of sugar by CO1
a) Energy b) Photosynthesis c) Gross Primary Production d) Secondary Production

3 _____ is the unit used to express the intensity of radioactivity. CO3
a) Curie b) PPM c) PPt d) ttc

4 Which of the following is the chronic toxicity test? CO3
a) MATC b) AF c) Functional tests d) All

5 Toxicity is influenced by CO3
a) Environmental factors b) Chemical c) Exposure d)All

SECTION – B (Understanding)

Answer any **FIVE** Questions: **(5 X 2 = 10 Marks)**

6 Comment on Leibigs law. CO1
7 What is food web? CO1
8 Mention the concept of ecological niche. CO1
9 Define Shelfords law. CO1
10 What is ecotoxicology? CO3
11 What are pollutants? CO3
12 Define Xenobiotics. CO3

SECTION – C (Applying)

Answer any **THREE** Questions: **(3 X5= 15 Marks)**

13 Write a brief notes on energy flow in the ecosystem. CO1
14 Bring out the General process of ecological succession. CO1
15 Explain the sources of toxicants of air, water and soil. CO3
16 Provide the list of importance environmental agencies. CO3
17 Examine critically the radioactive fallout problems. CO3

SECTION – D (Analyzing)

Answer any **TWO** Question: **(2X 10= 20 Marks)**

18 Elaborate the Biogeochemical cycles of Carbon and Nitrogen. CO1
19 Narrate the *in situ* and *ex situ* conservation of biodiversity. CO1
20 Write an essay on MAB. CO5

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DEPARTMENT OF ZOOLOGY

Course Code:	31EP41	**Programme:**	M.Sc	**CIA:**	I
Date:	19.02.2021	**Major:**	Zoology	**Semester:**	IV
Duration:	2 Hours	**Year:**	II	**Max.Marks:**	50
Course Title:	**BIO-FARMING TECHNOLOGY**				

SECTION – A (Remembering)

Answer **ALL** the Questions: **(5 X 1 = 5 Marks)**

1 The temperature required for making quality casting is **CO1**
a. 15-20^{o}C b. 25-30^{o}C c. 5-10^{o}C d. 0-5^{o}C

2 The important food fish is **CO4**
a) Rohu b. Catla c. Wallago d. Clarius

3 Honey bees belong to the order **CO2**
a) hemiptera b) homoptera c) lepidoptera d) hymenoptera

4 The common name of *Apis mellifera* **CO2**
a) rock bee b) Indian bee c) little bee d) European bee

5 Life span of workers bee is_____. **CO2**
a) four weeks b) six weeks c) eight weeks d) ten weeks

SECTION – B (Understanding)

Answer any **FIVE** Questions: **(5 X 2 = 10 Marks)**

6 Write the importance of earthworm **CO1**
7 Comment on Dactylogyrosis **CO4**
8 What is Monoculture? **CO4**
9 Define the following terms: Supersedure and Nuptial flight. **CO2**
10 Comment on typical movable hive. **CO2**
11 Write a short note about the swarming in honey bee. **CO2**
12 Name any two wax moths of honey comb. **CO2**

SECTION – C (Applying)

Answer any **THREE** Questions: **(3 X5= 15 Marks)**

13 Discuss the Windrow method of vermicompost technology **CO1**
14 Describe the salient features of *Rohu* **CO4**
15 Give a short account of the species of honey bees. **CO2**
16 Discuss in brief the indigenous and modern methods of bee keeping. **CO2**
17 Bring out the economic importance of Honey and Beeswax. **CO2**

SECTION – D (Analyzing)

Answer any **TWO** Question: **(2X 10= 20 Marks)**

18 Explain the process of vermicomposting technology **CO1**
19 Describe the methods of Induced spawning technique **CO4**
20 Write an essay on the biology and caste system in honey bees. **CO2**