VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST
(Autonomous & Residential)
[Affiliated to Madurai Kamaraj University]
M.Sc. Zoology Degree (Semester) Examinations, April 2019
Part – III : Core Subject : Second Semester : Paper – I
IMMUNOLOGY
Under CBCS – Credit 4

Time: **3** Hours   Max. Marks: **75**

SECTION – A

Answer ALL Questions :   **(5 × 1 = 5)**

1. The antibody found in tears, saliva and colostrum is

   a) IgE   b) IgA   c) IgG   d) IgM

2. Which of the following is associated with the production of humoral antibodies?

   a) T lymphocytes b) B lymphocytes c) Bone marrow   d) Liver

3. HIV initially infects cells expressing _____

   a) CDI   b) CCRS   c) CD8   d) CD36

4. The active fraction of Mycobacterium tuberculosis that stimulates the immunity is

   a) Cell wall polysaccharide   b) Capsular polysaccharide

   c) Pili   d) Muramyl dipeptide

5. The most suitable method of the rapid chemical diagnosis of bacterial, mycoplasmal and viral disease is

   a) Double immunodiffusion   b) Immunoelectrophoresis

   c) Two dimensional electrophoresis d) Counter immunoelectrophoresis

SECTION – B

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

6. Mention the characteristics of specific immune response?

7. Differentiate T cells and B cells.

8. What are Peyer's patches and mention its role in immunity?

9. Comment on the process of phagocytosis.

10. What is an epitope?

11. Mention the significance of HLA typing?

12. What are recombinant vaccines?

SECTION – C

Answer ALL Questions :   **(5 × 6 = 30)**

13. a) List and comment on immune functions of antibodies.

(OR)

b) Write an account on how antibody diversity is achieved by different mechanisms.

14. a) Describe how T- helper & T-cytotoxic cell activation occurs.

(OR)

b) Explain Type III hypersensitivity reactions with an example.

15. a) What is the impact of HIV infection on the immune system?

(OR)

b) Highlight the role of immunosuppressive drugs in transplantation.

16. a) Enumerate the molecular immune mechanisms against protozoan infections.

(OR)

b) Discuss with examples, how pathogens try to escape immune system by adopting various strategies.

17. a) Explain the techniques of Radio immuno assay.

(OR)

b) Highlight the principle and application of VDRL test.

SECTION – D

Answer any THREE Questions :   **(3 × 10 = 30)**

18. Describe the various immune mechanisms which form the first and second line of defense against bacteria and virus.

19. Briefly describe how complement factors play an important role in killing pathogens by classical pathway.

20. Write an account on the structure and function of various immune cells.

21. Explain the immune-pathologic mechanisms leading to autoimmunity with few examples.

22. Describe how ELISA could be used to screen HIV. Add a note on the types of ELISA.

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M.Sc. Zoology Degree (Semester) Examinations, April 2019
Part – III : Core Subject : Second Semester : Paper – II
BIOSTATISTICS
Under CBCS – Credit 4

Time: **3** Hours   Max. Marks: **75**

SECTION – A

Answer ALL Questions :   (5 × 1 = 5)

1. The curve that helps to locate median graphically is called
   a) harmonic mean   b) arithmetic mean   c) ogive   d) mode

2. Hypothesis that differ from the null hypothesis is called
   a) confidence limit   b) null hypothesis
   c) alternate hypothesis   d) all the above

3. If the scatter diagram is drawn the scatter points lie on a straight line
   then it indicates
   a) skewness   b) no correlation
   c) perfect correlation   d) all the above

4. Analysis of Variance technique tests the significance of the difference
   among sample
   a) between   b) within   c) both a and b   d) column

5. _____ refers to the number of live births per thousand of population?
   a) Crude death rate   b) Crude birth rate
   c) Fertility rate   d) All the above

SECTION – B

Answer any FIVE Questions :   (5 × 2 = 10)

6. Differentiate between geometric mean and harmonic mean.

7. What is Nominal data? Give an example.

8. What is a sample?

9. Define: Null hypothesis.

10. What is a correlation coefficient?

11. List any two applications of f-test.

12. What are age standardized rates?

SECTION – C

Answer ALL Questions : (5 × 6 = 30)

13. a) In an experiment the pod per plant were counted for a variety of garden pea. Calculate the standard deviation.

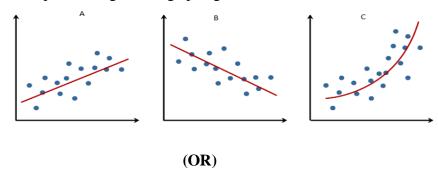| x	15-18	18-21	21-24	24-27	27-30	30-33	33-36	36-39	39-42
f	5	6	8	12	22	18	15	9	5

(OR)

b) Explain the characteristics of a binomial curve using a biological example.

14. a) A group of teachers developed a designed to increase scores on the quantitative section of the Graduate Record Exam (GRE). They tested the program on a group of 8 students. Prior to entering the program, each student took a practice quantitative GRE; after completing the program, each student took another practice exam. Given the following data, apply your knowledge of statistics and state the steps needed to prove the efficiency of the program.

Student	Before Program	After Program
1	520	555
2	490	510
3	600	585
4	620	645
5	580	630
6	560	550
7	610	645
8	480	520

(OR)

b) Enumerate the factors involved in formulation of a hypothesis and construct one of your own.

15. a) Make use of your knowledge of regression analysis and try to interpret the regression graphs given below.

(OR)

b) Dr Chris Moyes has measured the body mass and COX enzyme activity in a sample of individuals from 12 species of small mammals. He calculated the mean body mass and enzyme activity for each species, and log-transformed both variables to make the distributions closer to normal. He then ran a correlation and a regression analysis and got the following results: $r = -0.72$ $(P = 0.009)$; $a = -0.01$ $(P = 0.85)$ and $b = -0.16$ $(P = 0.009)$, where r is the correlation coefficient and can vary between -1 and $+1$, a is the intercept of the regression line, and b is the slope of that line. How can you interpret this data?

16. a) If you were to choose do an analysis of variance (ANOVA) test, what are the assumptions you will make?

(OR)

b) Look at the image given below and identify the type of ANOVA used. Add a note on its application and significance.

Multiple Comparisons

Dependent Variable: wloss Observed weigth loss in kilos over last 2 months

Tukey HSD

(I) Exercise level assigned to participant	(J) Exercise level assigned to participant	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1 None	2 30 minutes per day	-.289	.5358	.852	-1.556	.978
	3 60 minutes per day	-6.281*	.5358	.000	-7.548	-5.014
2 30 minutes per day	1 None	.289 ①	.5358	.852 ①	-.978	1.556
	3 60 minutes per day	-5.992*	.5358	.000	-7.259	-4.725
3 60 minutes per day	1 None	6.281* ②	.5358	.000 ②	5.014	7.548
	2 30 minutes per day	5.992* ③	.5358	.000 ③	4.725	7.259

17. a) What are vital statistics? Where would you apply them?

(OR)

b) Take a look at the table below and list out your inference.

DECREASING THE GAP (percentages of mortality rate)

Reduction in the gender gap started by TN govt a decade ago

TAMIL NADU

Year	Total	Male	Female
2011	25%	23%	27%
2012	24%	23%	26%
2013	23%	22%	24%
2014	21%	22%	21%
2015	20%	20%	21%
2016	19%	19%	19%

INDIA

Year	Total	Male	Female
2011	55%	51 %	59%
2012	52%	49 %	56%
2013	49 %	47 %	53%
2014	45%	42 %	49%
2015	43%	40 %	45%
2016	39%	37 %	41 %

SECTION – D

Answer any THREE Questions :   **(3 × 10 = 30)**

18. On the basis of the information given below on the treatment of 200 patients suffering from a disease. State whether the new treatment is superior to the conventional treatment. (Tabulated χ^2 @ 5% = 3.84)

	Favorable	Not Favorable
New treatment	60	30
Old treatment	40	70

19. Albino rats (n = 10) were administered with an Ayurvedic mercurial drug@ 10 mg/ kg/ day for 7 days. Initial and final body weights of the rats were recorded as shown in the table. Determine whether administration of the drug has any significant effect on the gain or loss in the body weight. (Tabulated t = 1.833 @ $p \le 0.05$).

Rat numbers	1	2	3	4	5	6	7	8	9	10
Initial body weight before treatment (gms)	110	115	102	98	112	110	97	120	102	110
Final body weight after treatment for 7 days (gms)	109	116	100	95	108	112	98	115	98	111

20. In an experiment, rats were exposed to sublethal concentration of Dimecron. The Body weight of the rats and the SDH activity was analyzed and the following results were obtained. Calculate the correlation coefficient and test its significance. (tabulated 't' = 2.31)

Body weight of rats (kg) (x)	1	1.2	2.8	3.5	4.5	5.4
SDH activity (mol/ sec) (y)	6	6.1	5.8	5.0	3.5	4.5

21. Compare the different types of ANOVA and point out the major differences in their formulae, steps and applications.

22. 'A male child born in India can expect to live an average of 67 years where as a male child born in the USA can expect to live an average of 80 years.' Examine the reasons for the difference.

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M.Sc. Zoology Degree (Semester) Examinations, April 2019
Part – III : Core Subject : Second Semester : Paper – III

DEVELOPMENTAL BIOLOGY
Under CBCS – Credit 4

Time: **3** Hours   Max. Marks: **75**

SECTION – A
__Answer ALL Questions__ :   (5 × 1 = 5)

1. An egg is said to be a macrolecithal one if it has
   a) no yolk   b) little yolk
   c) homogenous yolk   d) plenty of yolk
2. Epiboly occurs during
   a) cleavage   b) oogenesis
   c) gastrulation   d) organogenesis
3. Chemical substance that is secreted by an inductor is called _____
   a) morphogen   b) inductgen   c) methanogen   d) mutagen
4. Heterokaryon is a hybrid cell formed by the fusion of _____
   a) 2   b) 3   c) 4   d) 5
5. _____ refers to the reversion of differentiated cells to totipotent cells
   a) Differentiation   b) Dedifferentiation
   c) Comet stage   d) Autotomy

SECTION – B
__Answer any FIVE Questions__ :   (5 × 2 = 10)

6. Capacitation.
7. Spermiogenesis.
8. Placenta.
9. FSH.
10. Cord blood banking.
11. Inductor.
12. Prometamorphosis.

SECTION – C
__Answer ALL Questions__ :   (5 × 6 = 30)

13. a) "Development of egg without fertilisation" – Discuss any two natural types.

    (OR)

    b) Discuss fertilizin- antifertilizin reaction.

14. a) "Teratogenesis is an environment assault on development"–Discuss.

    (OR)

    b) Describe the events in the secretory phase of Menstrual cycle.

15. a) Write a brief account on the experimental proof of the organizer concept by Spemann.

    (OR)

    b) Explain the mechanism of action of Spemann organizer.

16. a) What is differentiation? Explain their types.

    (OR)

    b) Bring out the role of egg cytoplasm during differentiation.

17. a) Describe the constructive and regressive changes during metamorphosis of amphibians.

    (OR)

    b) Highlight the role of hormones in amphibian metamorphosis with experimental evidences.

SECTION – D
__Answer any THREE Questions__ :   (3 × 10 = 30)

18. Explain the growth and maturation phases of oogenesis.
19. Describe the features of gastrulation and the morphogenetic movements involved in it.
20. With a suitable experiment, explain the conversion of egg into complex body animal.
21. Write an elaborate account on stem cells and their applications.
22. What is regeneration? Explain the process involved in Salamander.

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M.Sc. Zoology Degree (Semester) Examinations, April 2019
Part – III : Elective Subject : Second Semester : Paper – I
EVOLUTION
Under CBCS – Credit 5

Time: **3** Hours   Max. Marks: **75**

SECTION – A

Answer ALL Questions :   **(5 × 1 = 5)**

1. The term Bottleneck phenomenon was coined by

   a) Stebbins   b) Moody   c) Lamarck   d) Huxley

2. Balanced genetic polymorphism occurs when there is selction against

   a) All homozygotes   b) All genotypes

   c) Heterozygotes   d) Only homozygous recessive

3. Which one the following is a casual factor of speciation?

   a) Genetic drift and Mutation

   b) Geographical isolation and Migration

   c) Habitat geometry

   d) All of these

4. Rates of extinction of species is higher in

   a) Genera   b) Family   c) Order   d) Both a and b

5. _____ is the science of management of environmental

   manipulation of the manifestations of genetic endowments

   a) Eugenics   b) Euthenics

   c) Euphenics   d) Genetic counselling

SECTION – B

Answer any FIVE Questions : (5 × 2 = 10)

6. Theory of Pangenesis.

7. Molecular clocks.

8. Species.

9. Neotony.

10. *Homo erectus.*

11. Kin selection.

12. Parapatric speciations.

SECTION – C

Answer ALL Questions : (5 × 6 = 30)

13. a) Write about Directional selection (or) Progressive selection.

(OR)

b) Explain stabilizing selection.

14. a) Write short notes on molecular clocks.

(OR)

b) Write about test tube evolution.

15. a) What is species concept? Write a note on different criteria to define

species.

(OR)

b) Write about Quantum speciation.

16. a) What is Aneuploidy? Write about Mongolian Syndrome and its

significance.

(OR)

b) Write about causes and extinction of species with example.

17. a) Write a short notes on cultural evolution of man.

(OR)

b) Explain dating of fossils.

SECTION – D

Answer any THREE Questions : (3 × 10 = 30)

18. Give an account on Darwin principles with example.

19. Write about amino acids sequence of proteins and its significances.

20. Give an account on types of isolating mechanism.

21. Describe the rates of evolution.

22. Give an account on characteristic features of Australopithecus.

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M.Sc. Zoology Degree (Semester) Examinations, April 2019
Part – III : Core Subject : Fourth Semester : Paper – I

APPLIED BIOTECHNOLOGY
Under CBCS – Credit 5

Time: **3** Hours   Max. Marks: **75**

SECTION – A

Answer ALL Questions :   **(5 × 1 = 5)**

1. The diagnostic imaging of diseases is referred to as _____
   a) Immunology   b) Immunoscintigraphy
   c) Immunogenesity   d) Micrography

2. _____ is closely associated with ovulation and release of egg.
   a) Thyro hormones   b) Gonadotrophic hormones
   c) MOET   d) FACS

3. _____ infect plant tissues and induces the formation of a plant tumor called crown gall
   a) *P. fluorescens*   b) *A. tumefaciens*
   c) *B. thuringiensis*   d) *A. hydromones*

4. Who coined the word Nanotechnology?
   a) Stebbins   b) Richard Feynmann
   c) Eric Drexler   d) Richard Smalley

5. The process of extracting metals from ore bearing rocks is called
   a) bioemediation   b) biodegradation
   c) Biofiltration   d) Bioleaching

SECTION – B

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

6. Write short notes on ex vivo gene therapy.

7. What is meant by embryo cloning?

8. Write short notes on embryonic stem cells.

9. Comment on biopesticides.

10. What is known as nanomedicine?

11. Define xenobiotics.

12. Write short notes on landfilling.

SECTION – C

Answer ALL Questions :   **(5 × 6 = 30)**

13. a) Explain the applications of nucleic acid probes in clinical diagnosis.

    (OR)

    b) Write an account on the various types of biomaterials.

14. a) Comment on vitro fertilization.

    (OR)

    b) Enlist the salient features of YAC.

15. a) Enumerate the applications of plant tissue culture.

    (OR)

    b) Give an account of germplasm storage.

16. a) List out the characteristics of nanoparticles.

    (OR)

    b) Enlist the applications of nanobiotechnology in medicine.

17. a) Write short notes on secondary treatment of sewage.

    (OR)

    b) Give an account of biogas production.

SECTION – D

Answer any THREE Questions :   **(3 × 10 = 30)**

18. Explain the production and applications of monoclonal antibodies.

19. Give an elaborate account on the various methods of gene transfer.

20. Write an essay on biofertilizers.

21. Discuss the methods of biological synthesis of nanoparticles.

22. Explain the role of biotechnology in biodegradation of environmental pollutants.

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M.Sc. Zoology Degree (Semester) Examinations, April 2019
Part – III : Core Subject : Fourth Semester : Paper – II
ENVIRONMENTAL BIOLOGY
Under CBCS – Credit 5
Time: **3** Hours   Max. Marks: **75**

SECTION – A

Answer ALL Questions :   (5 × 1 = 5)

1. The concept of "Hot spots of biodiversity" was proposed by

   a) Normen Myers in 1998   b) Ramdeo Mishra in 1978

   c) P. Maheshwari in 1979   d) E. P. Odum in 1968

2. Natural parks are coming under _____ conservations

   a) In Situ   b) Ex Situ   c) conservation d) Detoriation

3. The process whereby chemicals enters the body of the organism from the surrounding and accumulates in certain tissue is

   a) Accumulation   b) Bio concentration

   c) Bioaccumulation   d) Bio-magnification

4. _____ deals with the various biological sciences concerned with the study of travel in the space craft and the space environment

   a) Population ecology   b) Urban ecology

   c) Space ecology   d) Community ecology

5. The instrument used to record the earthquake is called

   a) Hygrometer   b) Thermometer   c) Lactometer   d) Seismograph

SECTION – B

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

6. What is the purpose of biogeochemical cycle?

7. Explain Bioindicators and give two examples.

8. Which type of animal and plants endangered in India?

9. Why do we conserve biodiversity?

10. Examples of non-conventional energy resources and give some importance?

11. What are the benefits of radio activity?

12. Write short notes on urban ecology?

SECTION – C

Answer ALL Questions :   **(5 × 6 = 30)**

13. a) Write a brief notes on energy flow in the ecosystem?

(OR)

b) Explain insitu and exsitu conservation with suitable examples?

14. a) Soil erosion and soil conservation and suitable diagram?

(OR)

b) Rain water harvesting with suitable diagram?

15. a) Explain the radioactive problem in the environment and enlist the elements.

(OR)

b) What are the characteristics and problems involved in the urbran environment.

16. a) Write short note Population control and ecological implication.

(OR)

b) Write notes on space ecology support human welfare.

17. a) A brief account an environment education in india.

(OR)

b) Give a notes on Importance of environmental agencies.

SECTION – D

Answer any THREE Questions :   **(3 × 10 = 30)**

18. Elaborate the Biogeochemical cycles of Carbon and Nitrogen.

19. Write elaborate notes on origin of monsoon and its impacts.

20. Explain toxicological testing methods with illustrations.

21. Write history and development of urbanization and its impacts and problems.

22. Elaborate the environmental education monitoring and awareness.

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M.Sc. Zoology Degree (Semester) Examinations, April 2019
Part – III : Elective Subject : Fourth Semester : Paper – I

BIO-FARMING TECHNOLOGY
Under CBCS – Credit 5

Time: **3** Hours   Max. Marks: **75**

SECTION – A

Answer ALL Questions :   **(5 × 1 = 5)**

1. The institute which has developed cost effective package to promote vermi activity is

   a) BERI   b) CECRI   c) NEERI   d) AQUATER

2. Which of the following statement is wrong?

   a) The stored honey becomes granular in

   b) Dextrose is maximum honey

   c) Honey is mildly laxative

   d) after crystallization, honey is subjected to fermentation

3. How many moultings occur in larvae to attain the final instar stage in *Bombyx mori?*

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

4. CMFRI is

   a) Central Marine Fish Research Institution

   b) Central Marine Fisheries Research Institute

   c) Central Mariculture Fish Research Institute

   d) Central Marine Fish Recreation Institute

5. Which of the following is English class breed of fowl?

   a) Minorca   b) Red cap   c) Leghorn   d) Ancona

SECTION – B

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

6. Comment on preparation of vermiwash.

7. Queen Bee.

8. Tasar silk.

9. Indian Major carp.

10. Exotic breed.

11. Native breed.

12. Vermicast.

SECTION – C

Answer ALL Questions :   **(5 × 6 = 30)**

13. a) Write the biology of earthworm.   **(OR)**
    b) Enlist Characters and application of vermiwash.

14. a) Describe about various races of honey bee.   **(OR)**
    b) Comment on diseases and enemies of honey bees.

15. a) Give an account on sericulture pest and diseases.   **(OR)**
    b) Write about the biology of *Bombyx mori*.

16. a) Depict the biology of Indian Major Carps.   **(OR)**
    b) Comment on Ornamental fish culture.

17. a) Explain the Housing system in Dairy.   **(OR)**
    b) Write short notes on artificial insemination.

SECTION – D

Answer any THREE Questions :   **(3 × 10 = 30)**

18. Write an essay on the role of vermitechnology in organic farming.

19. Describe the nutritive and medicinal values of honey.

20. Write an elaborate account on grainage and silk technology.

21. Discuss about the Induced spawning technique in Pisciculture.

22. Comment on feeding and breeding of Dairy animals.

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