

**SECTION – A****Answer ALL Questions****(5 × 1 = 5)**

1. The substance inducing a specific immune response is _____
a) Antigen b) Antibody c) Immunogen d) Epitope
2. The role of complement system is
a) Cytolysis b) Opsonisation
c) Anaphylotoxin d) All the above
3. Auto immunity is caused by
a) Bacteria b) Virus
c) T dependent antigens d) Self antigens
4. The phagocytic cell that generates acute inflammation is
a) Neutrophils b) Basophils
c) Eosinophils d) Monocytes
5. The amount of antigen present in the serum is estimated using
a) Direct ELISA b) Indirect ELISA
c) Dot ELISA d) Both a and b

SECTION – B

Answer any FIVE Questions

(5 × 2 = 10)

6. What are antigens?
7. Specify the role of complement proteins.
8. Define autoimmunity. Cite examples.
9. Enlist the types of viral infectious diseases in human.
10. Distinguish between epitope and paratope.
11. What are adjuvants?
12. Differentiate humoral immunity and cell mediate immunity.

SECTION – C

Answer ALL Questions

(5 × 6 = 30)

13. a) Enumerate the properties of antigens.
[OR]
b) Relate the isotypes and idiotope.
14. a) Give a brief account on IgE mediated hypersensitivity.
[OR]
b) Write a short note on DTH hypersensitivity.
15. a) What is autoimmunity? Explain.
[OR]
b) Discuss the impact of tumour on AIDS.

16. a) Narrate the viral strategies of immune evasion.

[OR]

- b) Describe the immune response against protozoan parasites.

17. a) Write down the protocol and significance of ELISA.

[OR]

- b) Explain the principles and applications of immunological prorenin.

SECTION – D

Answer any THREE Questions

(3 × 10 = 30)

18. Elaborate germline re - arrangement on the genes of Ig genes to produce diverse antibodies.
19. Discuss the activation methods of complement system.
20. Explain the role of HLA genes on tissue transplantation.
21. Write a detailed account on immunity against bacterial diseases.
22. Highlight the applications of immunodiffusion.




SECTION – A
Answer ALL Questions
(5 × 1 = 5)

- In chronological classification, data are classified on the basis of
 - Geographical area
 - Quality
 - Time of occurrence
 - Class interval
- In which method of sampling, each item has equal chance to be included in the sample?
 - Purposive sampling
 - Random sampling
 - Selective sampling
 - Systematic sampling
- In simple regression equation, the numbers of variables involved are:
 - 0
 - 1
 - 2
 - 3
- Analysis of Variance technique was developed by
 - Fisher
 - Gosset
 - Pearson
 - Miovre
- Which of the following is the number of live births per thousand of population?
 - Crude death rate
 - Crude birth rate
 - Total fertility rate
 - Specific fertility rate

SECTION – B
Answer any FIVE Questions
(5 × 2 = 10)

- What is χ^2 test of goodness of fit?
- Define: Skewness
- Define: Null hypothesis

9. Comment on regression coefficient

10. What is Analysis of variance?

11. What is F test?

12. What do you mean by age standardized rates?

SECTION – C

Answer ALL Questions

(5 × 6 = 30)

13. a) Define explain addition and multiplication.

[OR]

b) Write a short note on a) Pie diagram b) Histogram.

14. a) Distinguish between hegumen random and non-random sampling.

[OR]

b) Explain the method and purpose of calculating standard error.

15. a) Define and Discuss the scatter diagram with illustration.

[OR]

b) Obtain the regression equation Y on X for the following data.

| | | | | | | |
|-------------------------------------|----------|----------|----------|----------|-----------|-----------|
| Salinity (%) | 5 | 7 | 9 | 3 | 16 | 14 |
| O₂ content (mg/l) | 7 | 5 | 5 | 9 | 3 | 2 |

16. a) Explain two way ANOVA using suitable examples.

[OR]

b) Write down the applications of F-distribution.

17. a) Explain the importance of vital statistics.

[OR]

b) Describe the method to depict life expectancy.

SECTION – D

Answer any THREE Questions

(3 × 10 = 30)

18. Calculate the arithmetic mean and standard deviation from the following data:

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

19. Explain the steps involved in t-test to compare mean.

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

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

21. A certain manure was used on four plots of land, A,B,C and D. Four beds were prepared in each plot and the manure used. The output of the crop in the beds of plots A,B,C and D is give below.

| | | | |
|----|---|----|----|
| A | B | C | D |
| 8 | 9 | 15 | 6 |
| 12 | 3 | 10 | 8 |
| 1 | 7 | 4 | 10 |
| 3 | 1 | 7 | 8 |

Find out whether the difference in the means of the production of crops of the plots is significant or not. (The table value of F for $V_1=3$ and $V_2=12$ at 5% level of significance=3.49)

22. Give a detailed account on demographic characteristics of India.




SECTION – A
Answer ALL Questions
(5 × 1 = 5)

1. Mitochondria of the sperm occurs in
 - a) Middle piece
 - b) Head
 - c) Acrosome
 - d) Tail
2. Which hormone is produced by placenta?
 - a) ACTH
 - b) Progesterone
 - c) GH
 - d) Gastrin
3. Protein denaturation theory was proposed by_____
 - a) Barth
 - b) Spemann
 - c) Ranzi
 - d) Mangold
4. The process by which cells gradually specialize to undergo change in shape and function is called
 - a) Morphological differentiation
 - b) Physiological differentiation
 - c) Chemodifferentiation
 - d) Cytodifferentiaion
5. The adult frog is
 - a) Ammonotelic
 - b) Ureotelic
 - c) Uricotelic
 - d) Aminotelic

SECTION – B

Answer any FIVE Questions

(5 × 2 = 10)

6. What are sertoli cells?
7. What is manchette?
8. Define: Blastula
9. What do you mean by teratology?
10. Comment on gradient theory.
11. Differentiate between totipotency and pluripotency
12. What is blastema?

SECTION – C

Answer ALL Questions

(5 × 6 = 30)

13. a) Classify eggs and cite examples.
[OR]
b) What is parthenogenesis? Explain its types.
14. a) What is menstrual cycle? Discuss its different phases with diagram.
[OR]
b) With suitable examples, describe the various types of placenta.
15. a) Discuss briefly the competence and its molecular biology.
[OR]
b) Narrate Brigg's and King's experiment.

16. a) Categorize the types and characteristics of differentiation.

[OR]

- b) Expound the molecular biology of differentiation.
17. a) Through suitable diagram, explain the mechanism of regeneration.

[OR]

- b) What is metamorphosis? Briefly explain the hormonal control of amphibian metamorphosis.

SECTION – D

Answer any THREE Questions

(3 × 10 = 30)

18. Describe the process of oogenesis in vertebrates.
19. Elucidate the mechanism of gastrulation in frog.
20. Write an essay on embryonic inductions.
21. Discuss elaborately the gene action and hormonal control in development.
22. What are the morphological, physiological and biochemical changes that occurs during amphibian metamorphosis?




SECTION – A
Answer ALL Questions
(5 × 1 = 5)

1. Darwin's finches provided an evidence of evolution, which is

| | |
|--------------------|------------------|
| a) Paleontological | b) Embryological |
| c) Biogeographical | d) Biochemical |
2. _____ is evolutionary conservative molecules and it acts as a respiratory enzyme

| | |
|----------------------|-----------------|
| a) Cytochrome c | b) Myoglobin |
| c) Transport protein | d) All of these |
3. The formation of new species from pre-existing one is

| | |
|--------------|---------------|
| a) Mutation | b) Speciation |
| c) Isolation | d) Polyploidy |
4. Theory of kin selection was postulated by

| | |
|---------------------|------------------|
| a) Hamilton et al., | b) Wynne-Edwards |
| c) Wilson | d) Wright |
5. The skull of Neanderthal man had been unearthed in Germany in

| | | | |
|---------|---------|---------|---------|
| a) 1855 | b) 1856 | c) 1857 | d) 1858 |
|---------|---------|---------|---------|

SECTION – B

Answer any FIVE Questions

(5 × 2 = 10)

6. Give a short note on Bottle-neck phenomenon
7. Comment on pangenesis.
8. What do you mean by biological wastage?
9. Define: Gause's law.
10. What is quantum evolution?
11. Differentiate between cladogenesis and anagenesis
12. What is kin selection?

SECTION – C

Answer ALL Questions

(5 × 6 = 30)

13. a) Where does Darwin's stand in modern concepts of evolution?
[OR]
b) Explain the following:
i) Normalizing selection ii) Directional selection
14. a) Write a brief account on the electrophoretic analysis of genetic variation.
[OR]
b) Write a short note on DNA phylogeny.
15. a) Distinguish between allopatric and sympatric speciation.
[OR]
b) Discuss briefly the various governing factors of speciation.

16. a) Describe the phenomenon of Neotony and its importance with evolution.

[OR]

- b) Explain the concept of tachytely, homotely and bradytely with suitable examples.
17. a) Describe the physical and anatomical difference between man and ape.
[OR]
b) Write a brief account on the cultural evolution of man.

SECTION – D

Answer any THREE Questions

(3 × 10 = 30)

18. Write an essay on Darwin's natural selection and origin of species.
19. Discuss the molecular evolution of following: -
i) Hemoglobin ii) Cytochrome C
20. What is isolation? Describe the various isolating agents and the importance of isolation.
21. Write an essay on the mini, micro, macro and mega evolution modes of arising higher taxa.
22. Give a detailed account on the biological evolution of man.




SECTION – A
Answer ALL Questions
(5 × 1 = 5)

- Immunoglobulin's are protein molecules produced by a specialized group of cells called _____
 - B- Lymphocytes
 - RBC
 - WBC
 - Myeloma
- HAT medium containing _____
 - Hypothymine, Aminoacid, Thymidine
 - Hypoxanthine, Aminoprotein, Thymidine
 - Hypoxanthine, Aminopterin, Thymidine
 - Hypoxanthine, Aminoprotein, Thymulin
- Best biofertilizers for rice is
 - Bacillus polymaxa*
 - Azola pinnata*
 - Bacillus megatherium*
 - Rhizobium meliloti*
- Nanometre= _____ cm.
 - $10^{(-9)}$
 - $10^{(-8)}$
 - $10^{(-7)}$
 - $10^{(-6)}$
- The use of living organism to degrade environmental pollutants is called
 - Microremediation
 - Nanoremediation
 - Bioremediation
 - All

SECTION – B

Answer any FIVE Questions

(5 × 2 = 10)

6. Comment on Alzheimer's disease.
7. Define: Germ cell gene therapy
8. What is transgenesis?
9. Mention the significance of germplasm storage.
10. What is bioremediation?
11. Define the term biodegradation.
12. What is biodiesel?

SECTION – C

Answer ALL Questions

(5 × 6 = 30)

13. a) Give a short note on sickle cell anemia and Huntington's disease.
[OR]
b) Summarizes the types of various biomaterials and their applications.
14. a) Write down the steps involved in the artificial insemination.
[OR]
b) Explain the various transgenic gene transfer methods.
15. a) Discuss the tissue culture technique and its applications,
[OR]
b) Write a brief account on *Bacillus thuringiensis* and discuss its biological significance.

16. a) Enumerate the properties of nano particles.

[OR]

- b) Explain the strategies that are followed in the synthesis of a nanoparticle.
17. a) Describe trickling filter methods and its significance.
[OR]
b) How genetically modified organisms are created? Discuss its usage in the removal of environmental pollutants with suitable example.

SECTION – D

Answer any THREE Questions

(3 × 10 = 30)

18. Describe the production and applications of monoclonal antibodies.
19. Explain the following: -
 - i) Somatic cell nuclear transfer (SCNT)
 - ii) Yeast Artificial Chromosome (YAC)
20. Categorize the various forms of biofertilizers. Explain their role on agricultural crop productions.
21. Highlight the applications of nano particles in medicine.
22. Write a detailed account on the production of biogas.




SECTION – A
Answer ALL Questions
(5 × 1 = 5)

1. Transfer of food energy through a series of organism is referred to as
 - a) Pyramid of energy
 - b) Food web
 - c) Nutrient cycle
 - d) Food chain
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. _____ is used for obtaining data to prepare inventory of complex natural ecosystems and their regular monitoring.
 - a) Geographic information system
 - b) Satellite
 - c) Scanner
 - d) Remote sensing
5. All Govts. in the states, UTs, universities, schools, colleges, academic institutions and voluntary organisations organise suitable activities on World Environmental Day which falls on
 - a) 5th January
 - b) 5th April
 - c) 5th June
 - d) 5th October

SECTION – B

Answer any FIVE Questions

(5 × 2 = 10)

6. What is food chain?
7. Enlist any two endangered species.
8. What is soil erosion?
9. What is social forestry?
10. What is meant by half life?
11. What do you mean by CBD?
12. Comment on cyclones.

SECTION – C

Answer ALL Questions

(5 × 6 = 30)

13. a) With suitable diagram, elucidate the models of energy flow.
[OR]
b) What are bioindicators? Mention their role in environmental monitoring.
14. a) Through suitable diagram, describe the rain water harvesting technology.
[OR]
b) Discuss the impact of civilization on sustainable development.
15. a) Define toxicants. Discuss the various sources of toxicants in air, water and soil.

[OR]

- b) Derive the equation $E=mc^2$.

16. a) Write a brief account on population explosion.

[OR]

- b) What is a slum? Explain its nature.

17. a) Discuss the role of MAB in environmental management in India.

[OR]

- b) Explain the following: i) Environmental laws ii) Tsunami

SECTION – D

Answer any THREE Questions

(3 × 10 = 30)

18. What are biogeochemical cycles? Explain the nitrogen cycle in detail.
19. Trace the origin and kinds of monsoon and also explain the impact of monsoon on the Indian peninsula.
20. Examine critically the biological effects of nuclear radiations.
21. Write an essay on space ecology.
22. Discuss the goals, objectives and guiding principles of environmental education with reference to India.




SECTION – A
Answer ALL Questions
(5 × 1 = 5)

1. The percentage of nitrogen in earthworm casting is
 a) 3% b) 2% c) 1% d) 4%
2. The common name of *Apis florea* is
 a) Little bee b) Indian bee c) Bombara d) Giant bee
3. Central Silk Board (CSB) is located at
 a) Bangalore b) Mysore c) New Delhi d) Kolkatta
4. The important food fish is
 a) *Rohu* b) *Catla* c) *Wallago* d) *Clarius*
5. The deep freezing of semen is stored at _____
 a) -50⁰C b) -70⁰C c) -80⁰C d) -196⁰C

SECTION – B
Answer any FIVE Questions
(5 × 2 = 10)

6. Write the importance of earthworm
7. What is harvesting?

8. Comment on Waggle dance
9. Define moriculture
10. What is monoculture?
11. Define: Feeders
12. Comment on Rinderpest

SECTION – C

Answer ALL Questions (5 × 6 = 30)

13. a) Describe the methods of preparation of vermiwash and add a note its applications.

[OR]

- b) Discuss the process of vermicomposting.

14. a) Trace the life cycle of honey bee.

[OR]

- b) Highlight the nutritive and medicinal values of honey.

15. a) Describe the biology of mulberry silkworm.

[OR]

- b) Write a short note on vegetative propagation method of mulberry cultivation.

16. a) Explain the methods of Induced spawning technique.

[OR]

- b) Write down the characteristics of culturable fishes.

17. a) Mention the role of artificial insemination in dairy farming.

[OR]

- b) Discuss the native breeds of dairy animals.

SECTION – D

Answer any THREE Questions (3 × 10 = 30)

18. Describe the role of vermicompost in organic farming

19. Explain in detail the selection of species for running a good apiary.

20. Give a detailed account on rearing appliances used for silkworm rearing

21. Enumerate the characteristics of Indian major carps

22. Discuss elatorate rtle poultry diseases and their control measures.

