JHARGRAM RAJ COLLEGE

M.Sc. Semester-I Examination, 2020

ZOOLOGY

Paper-ZOO 101

Time- 2 hours **Use Separate Scripts for Each Group** Full Marks- 40

Each question carries EQUAL *mark*

Candidates are required to give their answers in their own words as far as practicable

---

ZOO 101.1
(Non chordate)

Answer **any two** questions

1. Discuss various theories regarding origin of metazoa. 10

2. Give an account of mastax in rotifer with necessary diagram. 6+4

3. What do you mean by free living nematodes? Mention different feeding types of nematodes after Weiser (1953). State the role of free living nematode in ecosystem. 1+4+5

4. Why bryozoans are called impingement feeders? State the role of cilia in their feeding process. Why bryozoans are called ectoprocts and how do they differ from entoprocts? 2+3+2+3

5. Compare and contrast any two arthropod larvae. 5+5

ZOO 101.2
(Chordate)

Answer **any two** questions

6. State the role of Sahelanthropus and Australopithecus in human evolution. 10

7. How do pathways in the auditory system give rise to neurons that are sensitive to pulse-echo delays? Your answer must accompany by proper neural network's diagram showing the mechanism. 10

8. Write down the probable phylogeny of vertebrate air breathing showing the origin and evolution of lung and ABOs. 10

9. What is the importance of Root Effect and counter current mechanism in functioning of the gas bladder in fish? Also explain the role of counter current mechanism in fish respiration with proper diagrams. 6+4

10. 'The protochordate endostyle is a forerunner of vertebrate thyroid gland cells'---justify the statement with supportive evidences. 10

JHARGRAM RAJ COLLEGE

M.Sc. Semester-I Examination, 2020

ZOOLOGY

Paper-ZOO 102

Time- 2 hours **Use Separate Scripts for Each Group** Full Marks- 40

Each question carries EQUAL *mark*

Candidates are required to give their answers in their own words as far as practicable

---

ZOO 102.1

(Histochemistry)

Answer **any two** questions

1. 'Enzymes are labile and their preservation is important'-Justify the statement and write down the measures you can take to prepare tissues for EHC to get best possible results. 10

2. Compare 'Simultaneous Capture' and 'Post Incubation Coupling' reaction types in respect to enzyme histochemical detection. 10

3. Describe how EHC could be clinically applied as confirmatory diagnostics test for Hirschsprung's disease. 10

4. Why are the stains not taken up into every part of the tissue? 10

5. What is signal amplification in IHC? Write a note on HRP polymer secondary antibody and why it is suitable over traditional HRP-tagged secondary antibody? 3+7

ZOO 102.2

(Animal Physiology)

Answer **any two** questions

6. State Bernoulli's Principle with equation. Compare aneurism & stenosis. What is Reynold's number? State its application. Write a note on the regulation of blood volume. 2+2+ (2+1) +3

7. What is utilization coefficient? Comment on the factors that shift Oxygen- Haemoglobin dissociation curve. Compare the Extrinsic & Intrinsic pathways of the formation of Prothrombin activator. 2+3+5

8. What is Frank- Starling mechanism? Write a note on the Ventricular Function Curves. Discuss briefly the means by which a person gets acclimatized to the hypoxic condition. 2+4+4

9. State the role of thermogenin. Discuss the mechanism by which ectotherms can survive in temporary extreme heat. Narrate the role of hypothalamus in temperature regulation. 2+4+4

10. Give a brief account of stress proteins. State the importance of glucocorticoids in stress resistance. Write a note on ROS toxicity. 3+4+3

JHARGRAM RAJ COLLEGE

M.Sc. Semester-I Examination, 2020

ZOOLOGY

Paper-ZOO 103

Time- 2 hours **Use Separate Scripts for Each Group** Full Marks- 40

Each question carries EQUAL *mark*

Candidates are required to give their answers in their own words as far as practicable

---

ZOO 103.1

(Immunology)

Answer **any two** questions

1. Briefly describe the exogenous antigen processing pathway. Write a short note on Hapten and Adjuvants. 6+4

2. Write down the Principle and procedure of Radioimmunoassay. 10

3. What do you mean by sandwich ELISA? How it is principally different from indirect ELISA? Describe the process with suitable example. Mention its utilities. Write the source and functions of granzyme and perforin. 2+1+4+1+2

4. What is MHC? Elaborate the structure and function of Class – I MHC. 2+8

5. Describe the steps of B cell development. Write a short note on cytotoxic T lymphocyte. 7+3

6. ZOO 103.2

7. (Methods in Biology)

i. Answer **any two** questions

8. Define isoschizomers, neoschizomers, isocaudomers, Klenow fragment. Write the role of RNase H in cDNA synthesis. 2+2+2+2+2

9. A circular fragment of DNA is cleaved with the individual restriction enzymes Psti and Ecori and then with a combination of the two enzymes. the fragments obtained are:
   a. PstI 7.0, 4.0, EcoRI 6.0, 5.0, PstI + EcoRI, 4.3, 3.3, 2.7, 0.7
   b. Draw the restriction map. Define Subtractive hybridization. 8+2

10. Why blastofiltration do is considered as preferable approach in waste water treatment. Comment on different types of ex situ bioremediation. 3+7

11. Write the principle of mechanism of FTIR spectroscopy. Write two functional differences
    a. between 1d gel electrophoresis and 2d gel electrophoresis. What do you mean by ‘activity
    b. staining’? 6+2+2

12. With suitable sketch diagram(s) describe the RFLP method of DNA fingerprinting. 10

JHARGRAM RAJ COLLEGE

M.Sc. Semester-I Examination, 2020

ZOOLOGY

Paper-ZOO 104

Time- 2 hours **Use Separate Scripts for Each Group** Full Marks- 40

Each question carries EQUAL *mark*

Candidates are required to give their answers in their own words as far as practicable

---

ZOO 104.1
(Cell Biology)

Answer **any two** questions

11. Name the major component proteins of extra cellular matrix. Write a short note on proteoglycans. What is focal adhesion? 2+6+2

12. Mention different types of membrane proteins present on plasma membrane. Describe briefly the fluid mosaic model of plasma membrane. What is lipid raft? 3+5+2

13. State the mechanism of signal transduction through cAMP as second messenger with suitable flow chart. 10

14. Distinguish between microtubule and microfilament. Enumerate the structure of microtubule with diagram. 4+6

15. What is MTOC? State the structural cap model of dynamic instability. 2+8

ZOO 104.2
(Cytogenetics)

Answer **any two** questions

16. (a) Briefly describe the steps of transformation in *B. subtilis.* (b) In a transduction experiment, the donor was *c*+ *d*+ *e*+ and the recipient was *c d e*. Selection was for *c*+. The four classes of transductants from this experiment are shown in the following table:

Class	Genetic composition	Number of individuals
1	*c*+ *d*+ *e*+	57
2	*c*+ *d*+ *e*	76
3	*c*+ *d* *e*	375
4	*c*+ *d e*+	2

(i) Determine the cotransduction frequency for *c*+ and *d*+ .
(ii) Determine the cotransduction frequency for *c*+ and *e*+ .
(iii) Which of the cotransduction frequencies calculated in **(a)** and **(b)** represents the greater actual distance between genes? Why? 5+ (1+1+1+2)

17. Discuss the genetics of P53 Tumor Suppressor gene. How derivatives of protooncogene product RAS protein stimulate cell growth? 5+5

18. (a) Graphically represent the relationship between allele frequencies and genotype frequencies for a locus with two alleles. State the different aspects of this relationship.
    (b) A sample of 1000 students of Jhargram Raj College showed the following distribution of blood groups A 430; B 140; AB 50; O 380. Calculate the frequencies of I^A, I^B and i.

(2+3) +(2+2+1)

19. (a) How does Hfr x F- cross differ from F+ x F- cross?
    (b) Five Hfr strain A through E are derived from a single F+ strain of *E. coli*. The following table shows the entry times of the first five markers into an F- strain when each is used in an interrupted-conjugation experiment:

A	B	C	D	E
mal+ (1)	ade+ (13)	pro+ (3)	pro+ (10)	his+ (7)
str^s (11)	his+ (28)	met+ (29)	gal+ (16)	gal+ (17)
ser+ (16)	gal+ (38)	xyl+ (32)	his+ (26)	pro+ (23)
ade+(36)	pro+ (44)	mal+ (37)	ade+ (41)	met+ (49)
his+ (51)	met+ (70)	str^s (47)	ser+ (61)	xyl+ (52)

(i) Draw a map of the F+ strain, indicating the positions of all genes and their distances apart in minutes.
(ii) Show the insertion point and orientation of the F plasmid in each Hfr strain. 4 + (4+2)

20. What is episome? Mention the role of F factor in bacterial conjugation. What are Hfr cells? Describe schematically the process of bacterial conjugation with labelled diagram (only diagram, no description required). 2+2+2+4

JHARGRAM RAJ COLLEGE

M.Sc. Sem II Examination, 2020

ZOOLOGY

Paper- ZOO C-ZOO 204

Time- 1 hour Full Marks- 20

The figures in the right hand margin indicate marks. Marks of all questions are equal. Candidates are required to give their answers in their own words as far as practicable

Group- A (Wildlife & Environmental Management)

Answer *any five* questions

1. Name the biodiversity hotspots in India.
2. Define wildlife.
3. What do you mean by endangered species?
4. Mention any four objectives of wildlife conservation.
5. Name any two National Parks in India with State, where tigers are conserved.
6. State two salient features of Asiatic Elephant conservation initiatives.
7. What are nodes and corridors?
8. State any four causes for depletion of tiger population..

Group- B (Aquainformatics)

Answer *any five* questions

9. Define aquaculture.
10. Why sea fish is known as food for brain?
11. Mention any two benefits of ocean based aquaculture.
12. State two utilities of Water Trax.
13. Give two examples of reef fish.
14. Name the method of finding fish in deep sea. What is FTP?
15. Name two methods of marine fish culture.
16. Name any two software related to aquaculture and state one utility of eacj.

JHARGRAM RAJ COLLEGE

M.Sc. Sem II Examination, 2020

ZOOLOGY

Paper- ZOO 201

Time- 1 hour Full Marks- 20

Use Separate Scripts for Each Group

The figures in the right hand margin indicate marks
Candidates are required to give their answers in their own words as far as practicable

Group- A

Subject- Biosystematics

Answer *any one* question

1. Write a detail note on the principles of biological nomenclature. (10)

2. Elaborately describe evolutionary species concept. (10)

Group- B

Subject- Ecological principles

Answer *any one* question

3. a) Mention any three usefulness of life table, specially for wildlife ecology. (3)
b) State the differences of WPC and BPC of niche width and comment on the effect of the nature of resource on utilization. (3+1)
c) What are nodes and link in food web and how they are represented? How trophic levels and species are related with nodes? (2+1)

4. a) Explain chain length, linkage density & connectance with proper illustration.(3)
b) Key stone species reduces competitive exclusion in a community- justify with example. (3)
c) With example elucidate semelparous, iteroparous, r slected and k selected species. (4)

JHARGRAM RAJ COLLEGE

M.Sc. Sem II Examination, 2020

ZOOLOGY

Paper- ZOO 202

Time- 1 hour Full Marks- 20

Use Separate Scripts for Each Group

The figures in the right hand margin indicate marks
Candidates are required to give their answers in their own words as far as practicable

Group- A

Subject- Biophysics

Answer *any one* question

1. Write a note on Donan membrane equilibrium. (10)

OR

Define Gibbs-Donnan effect. Explain two of biological application of this effect. State the Van't hoff law. Comment on temperature and solutes as regulating factor of surface tension. (5+2.5+2.5)

2. Write down the difference between colloidal system and true solution. Write a short note on Tyndall effect (5+5)

Group- B

Subject- Parasitology

Answer *any one* question

3. Explain the significance of formation of phosphorylated intermediates during glycolysis. "Anaplerosis helps in well performance of TCA cycle"- explain. Write the role of transketolase and transaldolase in formation of hexose sugar from pentose. (5+2.5+2.5)

OR

Briefly explain the process of regulation of glycolysis.Write a short note on wernicke-korsaff syndrome.Write the role of biotin in pyruvate carboxylase reaction. (5+2.5+2.5)

OR

Discuss on the hydrogen bonding and the hydrophobic interaction. (10)

4. What is Lineweaver–Burk plot? Briefly describe the competitive and non-competitive mode of enzyme inhibition (3+7)

OR

Define coenzyme with suitable example. What is the significance of Michaelis-Menten constant (K_m)? Write a short note on suicide inhibition (2+4+4)

JHARGRAM RAJ COLLEGE

M.Sc. Sem II Examination, 2020

ZOOLOGY

Paper- ZOO 203

Time- 1 hour Full Marks- 20

Use Separate Scripts for Each Group

The figures in the right hand margin indicate marks
Candidates are required to give their answers in their own words as far as practicable

Group- A

Subject- Molecular Biology

Answer *any one* question

1. a) Differentiate between inducer & gratuitous inducer. (3)
b) Comment on the structure of monomeric repressor protein of lac operon. (3)
c) How does tetrameric form of repressor, advantageous over dimeric form of repressor to establish full repression? (4)

2. a) How does DNA polymerase discriminates between dNTPs from rNTPs? (3)
b) State the roles of thumb domain of DNA polymerase.(2)
c) "DNA polymerases are Processive Enzyme" - illustrate the statement with proper justification. (5)

Group- B

Subject- Parasitology

Answer *any one* question

3. Explains phoresis. How does a vector differ from a phoretic organism? Illustrate the examples of phoresis from different groups of organisms. (4+2+4)

4. Define epidemiology, zoonosis and commensalism with examples. Describe in brief the human cycle of malarial parasite. (6+4)

JHARGRAM RAJ COLLEGE

M.Sc. Semester-III Examination, 2020

ZOOLOGY

Paper-ZOO 301

Time- 2 hours **Use Separate Scripts for Each Group** Full Marks- 40

Each question carries EQUAL *mark*

Candidates are required to give their answers in their own words as far as practicable

---

Group A
(Basic and Applied Entomology)

Answer **any two** questions

1. 'Insects are being used as human food around the world'- State the reasons. Why insects are so successful on this planet? 2+8

2. What is tagmosis? Write a short note on insect cuticle with suitable diagram. 2+8

3. Name any two family of insect that show light production. Describe the mechanism of light production in insects. State the significance of it. 2+5+3

4. What is the difference between damage and injury? Describe briefly the life cycle and nature of damage of any stored grain pest. 2+6+2

5. What are the benefits of mutualism that the partners enjoy in *Acacia- Pseudomyrmex* ant interaction? Explain the phenomenon of evolutionary arms race in insect-plant interaction with suitable example. Explain why galls can be treated as examples of extended phenotype? 3+4+3

Group B
(Ecotoxicology)

Answer **any two** questions

6. Comment on the role of cytochrome p450 monooxygenase in biotransformation of xenobiotics. 10

7. Mention the significance of s9 mixture in ames test. Comment on comet assay in detection of DNA damage in genotoxicological studies. 4+6

8. Comment on role of different xenobiotics that are responsible for causing bulky DNA adduct. Define bioaccumulation factor. Define metabolic toxin. 5+3+2

9. What is MFO? Define compartmental model of xenometaboilsm. explain the basic mechanism of DNA damage mechanism. 2+ 2+6

10. Comment on graded and quantal dose response relationships. Define theraputic index. 8+2

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

JHARGRAM RAJ COLLEGE

M.Sc. Semester-III Examination, 2020

ZOOLOGY

Paper-ZOO 302

Time- 2 hours **Use Separate Scripts for Each Group** Full Marks- 40

Each question carries EQUAL *mark*

Candidates are required to give their answers in their own words as far as practicable

---

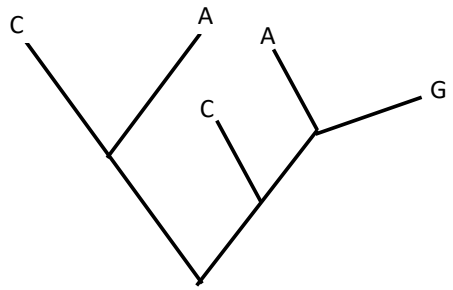
Group A
(Molecular evolution)

Answer **any two** questions

1. From the given table of genes and their short sequence form the phylogenetic tree based on the parsimony method. 10

Gene	Sequences
A	GGG
B	GTG
C	TGT
D	TTT

2. Using the Fitch algorithm determine the length of the given tree. Leaves are indicating different taxa and A, C, G are nucleotides of the corresponding position among the homologous sequence under comparison between these taxa. 10



3. Why patristic distance differs from observed distance? Do you think superimposed substitution plays any role in this difference? Justify your answer. 3+1+6

4. "Neo-Darwinism is more acceptable over Darwinism in explain Evolutionary mechanisms"-Justify the statement with rigorous arguments. 10

5. Construct a distance matrix and infer the phylogenetic relationship between these three apes from the given data. 10

Gorilla : ACGTCGTA
Human : ACGTTCCT
Chimpanzee : ACGTTTCG

Group B
(Microbiology)
Answer **<u>any two</u>** questions

6. Elaborate different phases of bacterial growth. What is generation time of bacterial growth? In a culture plate, the initial number of bacteria is 12000. If generation time is 15 min, calculate the final number of bacterial cells after 12 hrs. 6+2+2

7. Describe the structure of bacterial cell wall. Write a short note on carbon storage polymers 7+3

8. Define "Two component system" of signal transduction. Describe the mechanism of Quorum Sensing in bacteria 2+ 8

9. Write a short note on Selective and Differential media. What is Chocolate Agar ? 4+4+2

10. Explain the role of *Rhizobium* to increase soil fertility. Describe the process of ethanol production by yeast. State the role of enzyme(s) in this regard. 4+4+2

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

JHARGRAM RAJ COLLEGE

M.Sc. Semester-III Examination, 2020

ZOOLOGY

Paper-ZOO 303B

Ecology Special Paper

Time- 2 hours **Use Separate Scripts for Each Group** Full Marks- 40

Each question carries EQUAL *mark*

Candidates are required to give their answers in their own words as far as practicable

---

Group A
(Biodiversity & Conservation Ecology)

Answer **any two** questions

1. What do you mean by CBD? Mention two criteria each for mega diversity country & biodiversity hotspot. Comment on threatened species as mentioned in IUCN red list category version 3.1. 2+4+4

2. State the importance of Shanon index in estimating biodiversity. What are protected landscapes and community reserves? Discuss the criteria to identify areas for biodiversity conservation. Mention two benefits & two disadvantages of bioindicators. 2+2+4+2

3. Write short notes on joint forest management & wildlife crime. 5+5

4. What is the purpose of wildlife conservation? State the importance of CITES in this aspect. State the threats of Great Indian bustard and mention some initiative of conservation of Indian elephant. 2+3+3+2

5. Mention some wetland and forest habitats of West Bengal important for the conservation of Avifauna. What is Human Wildlife Conflict? How climate change affects the alpine zone fauna? 4+3+3

Group B
(Aquatic ecology)

Answer **any two** questions

6. What are the goals of water conservation effort? Write a note on conservation of river and socio ecohydrological balancing. 3+4+3

7. Mention some strategies for conservation of coastal dunes. What is a salt wedge? What are marine snow and hydrothermal vents? 4+2+2+2

8. What do you mean by hydrologic budget of earth? What are the factors affecting infiltration? Mention the salient features of sustainable water management. 3+3+4

9. Define bioremediation. Write a short note on coral bleaching. What are macroplankton, mesoplankton and ultra plankton? Give examples in each. 2+3.5+4.5

10. Describe how geophysical properties of soil and water influence the habitat distribution & ecosystem functionality of the flagship faunal components in the mangrove ecosystem of Indian Sunderbans. Add a note on the role of macrophytes in nutrient recycling in wetland ecosystem. 5+5

xxxxxxxxxx

JHARGRAM RAJ COLLEGE

M.Sc. Semester-III Examination, 2020

ZOOLOGY

Paper-C ZOO 304

(CBCS)

Time- 2 hours **Use Separate Scripts for Each Group** Full Marks- 40

Each question carries EQUAL *mark*

Candidates are required to give their answers in their own words as far as practicable

---

Group A
(Genetics)

Answer **any two** questions

1. Write a brief note on the organisation of DNA in eukaryotic chromosome. 10

2. The following numbers were obtained from test cross progeny in *Drosophila*

Phenotypes	Number
+ m +	218
w + f	236
+ + f	168
w m +	178
+ m f	95
w + +	101
+ + +	3
w m f	1
Total	1000

Construct a genetic map & Calculate C.O.C. 8+2

3. State the Genic Balance Theory. Briefly describe the role of sex-lethal gene (sxl) in *Drosophila* sex determination. 2+8

.

4. How does XX-XO sex determination system differ from XX-XY sex determination system? Comment on the inheritance pattern of the X linked genes. State the criteria to identify X linked recessive traits. 2+3+5

5. A series of two-point crosses were carried out among seven loci (a, b, c, d, e, f, and g), producing the following recombination frequencies. Using these recombination frequencies, map the seven loci, showing their
   (a) linkage groups
   (b) the order of the loci in each linkage group
   (c) the distances between the loci of each group. 3+5+2

Loci	Recombination frequency (%)	Loci	Recombination frequency (%)
a and b	10	c and d	50
a and c	50	c and e	8
a and d	14	c and f	50
a and e	50	c and g	12
a and f	50	d and e	50
a and g	50	d and f	50
b and c	50	d and g	50
b and d	4	e and f	50
b and e	50	e and g	18
b and f	50	f and g	50
b and g	50		

Group B
(Haematology)

Answer **any two** questions

6. Define erythropoiesis. Write down the process of erythropoiesis. Mention the regulating factors of erythropoiesis. 2+5+3

7. Classify the different types of anaemia.Write a short note on iron deficiency anaemia. 5+5

8. Describe different types of W.B.Cs. Mention their functions. What is leukemia? 4+4+2

9. What is coagulation? State briefly the role of platelets in coagulation. Mention the factors involved in coagulation. 2+5+3

10. What is PCV? What is Thalassemia? State the role of Megakaryocyte. What is Haemopoietic tissue? What is Perpura? 2+2+2+2+2

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

JHARGRAM RAJ COLLEGE

M.Sc. Semester-IV Examination, 2020

(under CBCS wef 2016-17)

ZOOLOGY

Paper-ZOO 401

Time- 2 hours **Use Separate Scripts for Each Group** Full Marks- 40

Each question carries EQUAL *mark*

Candidates are required to give their answers in their own words as far as practicable

---

Group - A

(Biodiversity, Pollution & Environmental management)

Answer any ONE question

1. Write a short note on any five different environmental movements of India.
2. Write a short note on pollution of water by agricultural wastes.
3. Comment on sustainable resource management in the perspective of conservation of biodiversity.
4. Write a short note on role of different types air pollutants with special reference to oxides of nitrogen and sulphur.
5. Comment on the role of thermal power plant and spillage of oils and pesticides in causing water pollution.
6. Comment on the role of agricultural waste and solid waste in soil pollution.

Group - B

(Neurobiology and Endocrinology)

Answer any ONE question

7. Write a Short note on hypothalamic neurohypophyseal system..
8. Describe the structure and function of neuroendocrine glands in fish.
9. Write a short note on Parkinson's disease.
10. Describe the mode of cellular signalling mechanism of Prolactin hormone.
11. Give an account of different cell types of olfactory epithelium.
12. Write a short note on Auditory processing disorder.

JHARGRAM RAJ COLLEGE

M.Sc. Semester-IV Examination, 2020

(under CBCS wef 2016-17)

ZOOLOGY

Paper-ZOO 402

Time: 2 hours **Use Separate Scripts for Each Group** Full Marks: 40

Each question carries EQUAL *mark*

Candidates are required to give their answers in their own words as far as practicable

---

Group - A

(Biostatistics)

Answer any ONE question

1. Define central tendencies. Find the mean for the following reflex knee jerk strengths in degrees of arc of a sample of athletes: 19,21,22,26,28,30,31,35,35,37
2. Compute the mean & SD of body heights in cm in the following distribution:

Class intervals:	156-160	161-165	166-170	171-175	176-180
Frequencies:	4	14	25	11	6

3. State and explain Addition theorem. Discuss the properties of normal distribution.
4. Write notes on (i) Null hypothesis (ii) Level of significance
5. Comment on assumption and properties of Pearson's product-moment correlation coefficient..
6. Apply one-way ANOVA to find whether or not there is a significant difference between the mean wing lengths (mm) of the following two groups of flies sampled from two different habitats.

Group 1: 3.8, 4.3, 4.6, 5.1, 4.6, 5.3, 4.5, 2.8, 4.0, 5.0

Group 2: 3.0, 4.6, 3.1, 3.7, 2.8, 4.5, 3.0, 2.2, 2.4, 4.7

Group - B

(Developmental Biology)

Answer any ONE question

7. How does the head of *Hydra* can act both as organizing region and inhibitor for inappropriate head formation?
8. Write a short note on the mechanisms involved in preventing polyspermy during fertilization.
9. Comment on the physiological and molecular changes occur in mammalian sperm at the time of capacitation.
10. Describe the role of nerves and retinoic acid in the regenerating limb of Salamander.
11. Describe the role of calcium ions in the fertilization in sea urchin.
12. How does the Nieuwkoop center arise? Write the functions of organizer.

****

JHARGRAM RAJ COLLEGE

M.Sc. Semester-IV Examination, 2020

(under CBCS wef 2016-17)

ZOOLOGY

Paper-ZOO 403

Ecology Special

Time: 2 hours **Use Separate Scripts for Each Group** Full Marks: 40

Each question carries EQUAL *mark*

Candidates are required to give their answers in their own words as far as practicable

---

Group - A

(Systems Ecology)

Answer any ONE question

1. Write briefly on metapopulation dynamics.
2. Define restoration ecology & state the principles involved in it. Discuss the aims, potential & options available in ecological restoration.
3. Define ecotourism. What do you mean by 'green washing' and 'green star rating'? How improving sustainability is achieved through ecotourism? Mention the merits & demerits of ecotourism.
4. Give an account of the role of genetically modified organisms on environment. Write down the role of DNA fingerprinting in wildlife conservation.
5. Distinguish between (i) deterministic & stochastic models (ii) analytical & simulation models. Discuss the index of similarity with reference to Jaccard coefficient and Sorensen coefficient.
6. Give an account of tropical forest ecosystem. Discuss the process of thermal stratification in lakes.

Group - B

(Human Ecology)

Answer any ONE question

7. What are the main features and causes of formation of wastelands? Define watershed. State its objective. Why watershed management is important?
8. Write a note on climate change and its impact with reference to acid rain & stratospheric ozone layer destruction.
9. Discuss the aims & objectives of EIA. Schematically represent the steps involved in EIA as suggested by UNEP. Add a note on its benefit & problems of EIA.
10. Describe the criteria of urbanization. What are the effects of urbanization on biodiversity? Add a note on indoor pollution.
11. Write a note on co evolution of plants and carbon di oxide.
12. What are pyrolysis and radioactive waste? Mention different types of biomedical wastes generated during health care activities. State the effects of biomedical wastes and suggest some control measures.

****