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प्रश्नपत्र पर क्रमांक (रोल नम्बर) के अतिरिक्त कुछ भी लिखना अनुचित साधनों का प्रयोग माना जायेगा तथा नियमानुसार कार्यवाही की जायेगी।

B.A./B.A.Ed./B.SC. / B.SC. B.Ed./B.Com Semester-II (SUMMER-2019)

BES231 ENVIRONMENTAL STUDIES

Time – Three Hours

Maximum Marks – 80

Note:

- All questions are compulsory in Part A. The answers of these questions are limited upto 30 words each. Each question carries 2 marks.
भाग- अ के सभी प्रश्न अनिवार्य हैं | इन प्रश्नों के उत्तर प्रत्येक 30 शब्दों तक सीमित हैं। प्रत्येक प्रश्न 2 अंक का है |
- Attempt FIVE questions in all from Part B, selecting ONE question either (i) or (ii) from each question. Answer of each question shall be limited upto 250 words. Each question carries 6 marks.
भाग - ब से प्रत्येक प्रश्न में से (i) अथवा (ii) का चयन करते हुए, कुल पाँच प्रश्नों के उत्तर दीजिये | प्रत्येक प्रश्न का उत्तर लगभग 250 शब्दों का हो | प्रत्येक प्रश्न 6 अंक का है |
- Attempt 3 questions in all from Part C. Answer of each question shall be limited upto 500 words. Each question carries 10 marks.
भाग - स से कुल तीन प्रश्नों के उत्तर दीजिये | प्रत्येक प्रश्न का उत्तर लगभग 500 शब्दों का हो | प्रत्येक प्रश्न 10 अंक का है |

PART – A / भाग - अ

- Define the following: निम्नलिखित को परिभाषित कीजिए:
 - Ozone layer depletion ओजोन परत रिक्तिकरण
 - Nuclear disaster परमाणु तबाही
 - Natural resources प्राकृतिक संसाधन
 - Ecological pyramid पारिस्थितिक पिरामिड
 - Food chain खाद्य श्रृंखला
 - In situ conservation इन सीटू संरक्षण
 - Give any two factors responsible for soil pollution. मिट्टी प्रदूषण के लिए जिम्मेदार कोई दो कारक बताइए।
 - Give any two suggestions to prevent noise pollution. ध्वनि प्रदूषण को रोकने के लिए कोई दो सुझाव बताइए।
 - Give the names of any two extinct species. किन्हीं दो विलुप्त प्रजातियों के नाम बताइए।
 - Give any two methods to conserve non renewable resources.
अनवीकरणीय संसाधनों के संरक्षण के कोई दो तरीके बताइए।

PART – B / भाग - ब

- Write in short on social issues of environment.
पर्यावरण के सामाजिक मुद्दों पर संक्षेप में लिखिए।
OR
 - What are the effects of global warming?
ग्लोबल वार्मिंग के क्या प्रभाव होते हैं?
- Mention the major environmental impacts of mining.
खनन के प्रमुख पर्यावरणीय प्रभावों का उल्लेख कीजिए।
OR
 - What is the role of an individual in conservation of natural resources?
प्राकृतिक संसाधनों के संरक्षण में एक व्यक्ति की भूमिका क्या है?

4. i Give an account of energy flow in an ecosystem.
परिस्थितिकी तंत्र में ऊर्जा के प्रवाह का लेखा-जोखा दीजिए।
OR
- ii What are the benefits of ecosystem?
एक पारिस्थितिकी तंत्र के क्या लाभ होते हैं?
5. i Write a short note on human wildlife conflicts.
मानव वन्य जीवन-संघर्ष पर एक संक्षिप्त टिप्पणी लिखिए।
OR
- ii Do you think biodiversity is important? If yes, why?
क्या आपको लगता है कि जैव विविधता महत्वपूर्ण है। यदि हाँ, क्यों?
6. i Write a short note on effect of firecrackers pollution on human health.
मानव स्वास्थ्य पर पटाखों के कारण होने वाले प्रदूषण के प्रभाव पर संक्षिप्त टिप्पणी लिखिए।
OR
- ii What do you understand by Solid Waste Management?
ठोस कचरा प्रबंधन से आप क्या समझते हैं?

PART – C / भाग - स

7. Write short notes on: टिप्पणी लिखिए:
(a) Scope of environmental studies पर्यावरण अध्ययन का दायरा
(b) Causes and effects of acid rain अम्ल वर्षा के कारण और प्रभाव
8. Write short notes on: टिप्पणी लिखिए:
(a) Conservation of water जल का संरक्षण
(b) Food resource खाद्य संसाधन
9. What is an aquatic ecosystem? Write in detail about the characteristic feature and types of aquatic ecosystem.
एक जलीय पारिस्थितिकी तंत्र क्या है? जलीय पारिस्थितिकी तंत्र की विशेषताओं और प्रकार के बारे में विस्तार से लिखिए।
10. What do you understand by endangered and endemic species of India? How does over exploitation of natural resources lead to extinction of species?
भारत के विलुप्त प्राय प्रजातियाँ और स्थानिक प्रजातियों से आप क्या समझते हैं? प्राकृतिक संसाधनों के अत्यधिक दोहन के कारण प्रजातियाँ विलुप्त कैसे हो रही हैं?
11. Write an essay on causes of water pollution and its effect.
जल प्रदूषण के कारण और उसके प्रभाव पर निबंध लिखिए।

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M.SC. (ZOOLOGY) SEMESTER-I (WINTER-2019)
MSZO111 BIOSYSTEMATICS & EVOLUTION

Time – Three Hours

Maximum Marks – 80

Note:

1. All questions are compulsory in Part A. The answers of these questions are limited upto 30 words each. Each question carries 2 marks.
2. Attempt FIVE questions in all from Part B, selecting ONE question either (i) or (ii) from each question. Answer of each question shall be limited upto 250 words. Each question carries 6 marks.
3. Attempt 3 questions in all from Part C. Answer of each question shall be limited upto 500 words. Each question carries 10 marks.

PART – A

1.
 - i Explain DNA sequencing.
 - ii Write any two types of chemotaxonomy.
 - iii Write a note on formalin preservation.
 - iv Give basic idea of preservation of invertebrates.
 - v Write the formula of association index.
 - vi Write difference between similarity and dissimilarity index.
 - vii Explain the theory of catastrophism.
 - viii Write a note on mechanical isolation.
 - ix Define Meristic variation.
 - x Write sources of variation.

PART – B

2.
 - i Write a note on importance of biosystematics.

OR

 - ii Give a brief account of banding pattern in cyto taxonomy.
3.
 - i Write the scope and purpose of scientific collection.

OR

 - ii Write a note on Box type key.

4. i Explain the Shannon weiner index.
OR
ii Explain the Dominance index.
5. i Describe in detail the theory of Darwin and Neo Darwinism.
OR
ii Explain modern synthetic theory of evolution.
6. i Explain the types of natural selection.
OR
ii Differentiate between Determinate and Indeterminate kinds of variation.

PART – C

7. What is Chemotaxonomy? Explain different types of chemotaxonomy.
8. Write a short note on :
(i) Preparation of material for study.
(ii) Housing.
(iii) Cataloging.
(iv) Arrangement of collection.
9. Give a detailed account on ICZN.
10. Write an essay on evolution of man.
11. Explain different kinds of mimicry. Write the significance of mimicry.

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M.SC. (ZOOLOGY)-SEMESTER-I (WINTER-2019)
MSZO112 STRUCTURE & FUNCTION OF INVERTEBRATES

Time – Three Hours

Maximum Marks – 80

Note:

1. All questions are compulsory in Part A. The answers of these questions are limited upto 30 words each. Each question carries 2 marks.
2. Attempt FIVE questions in all from Part B, selecting ONE question either (i) or (ii) from each question. Answer of each question shall be limited upto 250 words. Each question carries 6 marks.
3. Attempt 3 questions in all from Part C. Answer of each question shall be limited upto 500 words. Each question carries 10 marks.

PART – A

1.
 - i What is coelom?
 - ii Write any two characteristic features of true metamerism.
 - iii Explain the nutrition in Euglena.
 - iv What are book lungs?
 - v Describe the branchial formula of palomon.
 - vi Draw a neat labeled diagram of nervous system of class oligochaeta.
 - vii What are 'Bojanus' organs?
 - viii Draw a neat labeled diagram of coxal-gland.
 - ix What are malpighian tubules?
 - x What is the special characteristic feature of echinoderm's nervous system?

PART – B

2.
 - i Differentiate between Protostomia and Deuterostomia.

OR

 - ii Explain acoelomate, pseudo coelomate and true coelomate.
3.
 - i Explain the feeding structure and physiology of digestion in class-turbellaria.

OR

 - ii Explain the process of digestion in class polychaeta.

4. i Describe the respiratory pigments in invertebrates.
OR
ii Explain the structure function of gill's with suitable example.
5. i Explain the excretory organ of pheretima-posthuma.
OR
ii Differentiate between protonephridia, mesonephridia and metanephridia.
6. i Explain the nervous system of class oligochaeta.
OR
ii Explain the nervous system of class cephalopoda.

PART – C

7. What is metamerism? Explain its types, origin and evolution.
8. Describe nutrition, feeding structure and physiology of digestion in class cephalodopa.
9. Write an essay on respiratory organs in invertebrates.
10. Explain the accessory excretory organs in invertebrates.
11. Explain the nervous system of Periplaneta-americana.

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M.SC. (ZOOLOGY) Semester-I (WINTER-2019)
MSZO113 VERTEBRATE PHYSIOLOGY-I

Time – Three Hours

Maximum Marks – 80

Note:

1. All questions are compulsory in Part A. The answers of these questions are limited upto 30 words each. Each question carries 2 marks.
2. Attempt FIVE questions in all from Part B, selecting ONE question either (i) or (ii) from each question. Answer of each question shall be limited upto 250 words. Each question carries 6 marks.
3. Attempt 3 questions in all from Part C. Answer of each question shall be limited upto 500 words. Each question carries 10 marks.

PART – A

1. i How vitamins, minerals and water are digested by your body?
- ii What is the main function of liver in human body?
- iii Why hiccups are caused?
- iv What will happen if CO (carbon monoxide) combines with hemoglobin?
- v Write down some main symptoms of anemia disease.
- vi Give some reasons behind heart attack.
- vii What is dialysis?
- viii What is vasopressin?
- ix What is isometric and isotonic contraction?
- x What is tetanus?

PART – B

2. i Explain the digestion of carbohydrate.
OR
 ii Write a short note on pancreas.
3. i Draw a well labeled diagram of human lungs.
OR
 ii Explain the neural control of respiration.
4. i Describe the steps of cardiac cycle.
OR
 ii Explain the analysis and applications of ECG.
5. i Explain briefly the urea cycle.
OR
 ii Draw a labeled diagram of kidney.
6. i Explain different types of muscle protein.
OR
 ii Discuss different types of muscles.

PART – C

7. Write an essay on 'Vitamins'.
8. Describe different types of respiratory pigments.
9. Explain the blood clotting mechanism in detail.
10. Describe the mechanism of urine formation.
11. Describe the muscle contraction mechanism.

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M.SC. (ZOOLOGY) SEMESTER-I (WINTER-2019)
MSZO114 ECOLOGY AND ANIMAL BEHAVIOR

Time – Three Hours

Maximum Marks – 80

Note:

1. All questions are compulsory in Part A. The answers of these questions are limited upto 30 words each. Each question carries 2 marks.
2. Attempt FIVE questions in all from Part B, selecting ONE question either (i) or (ii) from each question. Answer of each question shall be limited upto 250 words. Each question carries 6 marks.
3. Attempt 3 questions in all from Part C. Answer of each question shall be limited upto 500 words. Each question carries 10 marks.

PART – A

1.
 - i What do you mean by succession?
 - ii What is Lindeman's law of energy flow?
 - iii Write a difference between primary and secondary productivity.
 - iv What do you mean by foraging time?
 - v Define demography.
 - vi What is crude population density?
 - vii Define rhythmic behavior.
 - viii What is imprinting?
 - ix Write a difference between hormone and pheromone.
 - x What are alarm pheromones?

PART – B

2.
 - i Explain patterns of succession.

OR

 - ii Write short note on limiting similarity.
3.
 - i Explain characteristics of secondary production in ecosystem.

OR

 - ii Write note on predation of black buck in Rajasthan.
4.
 - i Explain statistical analysis of life tables.

OR

 - ii Discuss logistic model of population.
5.
 - i Explain motivation and its different phases.

OR

 - ii Write a short note on taxis and kinesis.
6.
 - i Explain briefly the caste system in honey bee.

OR

 - ii Discuss social organization in Hanuman Langur (*Presbytis entellus*).

PART – C

7. Describe the models of energy flow.
8. Explain the methods of estimating secondary production.
9. Describe the structure and patterns of population.
10. Discuss habituation and insight learning.
11. Describe communication in animals.

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M.SC.(ZOOLOGY) Semester-II (SUMMER-2019)
MSZO211 DEVELOPMENTAL BIOLOGY

Time – Three Hours

Maximum Marks – 80

Note:

1. All questions are compulsory in Part A. The answers of these questions are limited upto 30 words each. Each question carries 2 marks.
2. Attempt FIVE questions in all from Part B, selecting ONE question either (i) or (ii) from each question. Answer of each question shall be limited upto 250 words. Each question carries 6 marks.
3. Attempt 3 questions in all from Part C. Answer of each question shall be limited upto 500 words. Each question carries 10 marks.

PART – A

1.
 - i What is spermiation?
 - ii Draw a well-labeled diagram of mammalian ova.
 - iii Which types of enzymes are present in sperm's head?
 - iv What is polyspermy?
 - v What are the products of cleavage?
 - vi What do you understand by fate-map?
 - vii What is ureteric bud?
 - viii Which germinal layer forms the lining of alimentary canal?
 - ix Write any two complications of IVF procedure.
 - x What is ICSI procedure?

PART – B

2.
 - i Describe briefly the process of spermiogenesis.
 - OR**
 - ii Give an account of types of egg on the basis of distribution of yolk.
3.
 - i Explain briefly the biochemical aspects of fertilization.
 - OR**
 - ii Write a note on the process of Amphimixis.
4.
 - i Describe the characteristics of cleavage and its significance.
 - OR**
 - ii Write a note on the types of blastula.
5.
 - i Explain organogenesis of brain in mammals.
 - OR**
 - ii Briefly explain the formation of mid-gut in mammals.
6.
 - i Give an account of IVF procedure.
 - OR**
 - ii Describe in brief cloning technique in mammals.

PART – C

7. Give an account of oogenesis.
8. Describe the complete process of fertilization.
9. Describe the process of gastrulation in birds.
10. Explain organogenesis of kidney in mammals.
11. Describe the method and success rate of GIFT assisted reproductive technology.

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M.SC.(ZOOLOGY) Semester-II (SUMMER-2019)
MSZO212 MICROBIOLOGY

Time – Three Hours

Maximum Marks – 80

Note:

1. All questions are compulsory in Part A. The answers of these questions are limited upto 30 words each. Each question carries 2 marks.
2. Attempt FIVE questions in all from Part B, selecting ONE question either (i) or (ii) from each question. Answer of each question shall be limited upto 250 words. Each question carries 6 marks.
3. Attempt 3 questions in all from Part C. Answer of each question shall be limited upto 500 words. Each question carries 10 marks.

PART – A

1.
 - i What is contribution of Jenner in microbiology?
 - ii Differentiate between prokaryotes and eukaryotes.
 - iii Differentiate between gram positive and gram negative bacteria.
 - iv Give examples of some natural and synthetic media.
 - v Draw a well labeled diagram of HIV.
 - vi Write the scientific names of the causative agents of disease, malaria and typhoid?
 - vii Give two examples of chemical food preservatives.
 - viii What is pasteurization?
 - ix What is bioleaching?
 - x Explain temperature effect in food preservation.

PART – B

2.
 - i Write about works of Louis Pasteur.
OR
 - ii Explain tyndallization.
3.
 - i Give an account on bacterial culture.
OR
 - ii Describe the structure of a typical bacterium.
4.
 - i Write an account on gram negative bacteria of medicinal importance.
OR
 - ii How are antibiotics useful in controlling microbial growth?
5.
 - i Write comments on alcoholic beverages.
OR
 - ii Write note on food poisoning.

6. i Explain pest control by microbes.
OR
ii How microbes help in protecting the environment.

PART – C

7. Classify different types of bacteria given by Bergey.
8. Explain enrichment culture technique.
9. Write an essay on AIDS.
10. Define food preservation and give the detail of food preservation methods.
11. Write an essay on biofertilizers.

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M.SC.(ZOOLOGY) Semester-II (SUMMER-2019)
MSZO213 VERTEBRATE PHYSIOLOGY-II

Time – Three Hours

Maximum Marks – 80

Note:

1. All questions are compulsory in Part A. The answers of these questions are limited upto 30 words each. Each question carries 2 marks.
2. Attempt FIVE questions in all from Part B, selecting ONE question either (i) or (ii) from each question. Answer of each question shall be limited upto 250 words. Each question carries 6 marks.
3. Attempt 3 questions in all from Part C. Answer of each question shall be limited upto 500 words. Each question carries 10 marks.

PART – A

1. i Name the hormones responsible for the following abnormalities-
 - a) Grave's Disease
 - b) Acromegaly
 - c) Hypoglycemia
 - d) Goitre
- ii Name the endocrine gland which disappears after puberty in our body
- iii What is Conn's Disease?
- iv What is Cushing's Syndrome?
- v Draw a diagram of neuron.
- vi What is cataract disease?
- vii Which hormones are used in contraceptive pills?
- viii What do you mean by Cowper's Glands?
- ix Define hibernation & aestivation.
- x Give examples of bioluminescent animals **(ANY FOUR)**

PART – B

2. i Explain the role of Pancreas in endocrine system.
OR
 ii Write a short note on Thyroid gland.
3. i Explain the different functions of adrenal gland.
OR
 ii Describe in brief the endocrine role of an Ovary.
4. i Write a short note on neurotransmitters.
OR
 ii Draw a well labeled diagram of structure of human eye.

5. i Explain the generalized structure of male reproductive system.
OR
ii Explain the structure and functions of female nervous system.
6. i What are Chromatophores? Explain the mechanism of colour change?
OR
ii Write a short note on Bioluminescence in different animals.

PART – C

7. Describe in detail why Pituitary gland is known as “Master of endocrine glands”?
8. Explain the mechanism of action of peptide and steroid hormones.
9. Describe the photochemistry of vision in human eye.
10. What is menstrual cycle? Explain the hormonal control in detail.
11. Describe the Osmoregulation of different animal groups in detail.

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M.SC.(ZOOLOGY) Semester-II (SUMMER-2019)
MSZO214 QUANTITATIVE BIOLOGY

Time – Three Hours

Maximum Marks – 80

Note:

1. All questions are compulsory in Part A. The answers of these questions are limited upto 30 words each. Each question carries 2 marks.
2. Attempt FIVE questions in all from Part B, selecting ONE question either (i) or (ii) from each question. Answer of each question shall be limited upto 250 words. Each question carries 6 marks.
3. Attempt 3 questions in all from Part C. Answer of each question shall be limited upto 500 words. Each question carries 10 marks.

PART – A

1.
 - i Define biostatistics. Write its importance in biology.
 - ii What is mode?
 - iii Write a note on equal, scalar, positive and negative vector.
 - iv If $A = \begin{bmatrix} 2 & 4 \\ 3 & 2 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 3 \\ -2 & 5 \end{bmatrix}$, find $2A - 3B$.
 - v Define 'ANOVA'.
 - vi Define skewness.
 - vii Write the formula of chi-square ' χ^2 '.
 - viii What do you mean by probability?
 - ix Define correlation.
 - x What is SPSS?

PART – B

2.
 - i Write short notes on the following:
 - (i) Histogram
 - (ii) Multiple bar diagram
 - ii Find the median for the following frequency distribution:

Class	Frequency
0-7	19
7-14	25
14-21	36
21-28	72
28-35	51
35-42	43
42-49	28

3.
 - i If $A = \begin{bmatrix} 2 & 3 & 6 \\ 4 & 5 & 4 \\ -1 & 2 & 3 \end{bmatrix}$, $B = \begin{bmatrix} 2 & 6 & -5 \\ 4 & 1 & 3 \\ 0 & 1 & 2 \end{bmatrix}$, find $A \times B$.

OR

- ii Write a short note on classification of data.

4.
 - i Describe the concept of Kurtosis.
 - ii Define mean deviation and what are its merits and demerits?

OR

5.
 - i Explain the hypothesis testing (null and alternative).
 - ii A dice is tossed 120 times with the following result:

No. of turned up	Frequency
1	30
2	25
3	18
4	10
5	22
6	15
Total	120

Using chi-square test explain whether the dice is unbiased?

6. i Briefly discuss statistical analysis software.

OR

- ii The body length (x-axis) and length of snout to dorsal fin (y-axis) of 7 group of fishes of a species is given below:

Body length (x)	Length of snout to dorsal fin (y)
13.4	8.9
15.1	10.0
15.3	10.1
16.8	11.1
17.5	11.6
19.2	12.6
21.2	14.0

Find the regression equation for the above data.

PART – C

7. What is graphic representation of data and what is its usefulness? Represent the data given in the following table in multiple bar diagram.

Zoo	Species of Mammals			
	Lion	Tiger	Deer	Monkey
Jaipur	8	2	37	25
Mumbai	7	8	32	20
Udaipur	6	9	40	15
Hyderabad	3	7	20	50

8. Describe the type of sampling methods of data collection.

9. Find the standard deviation for the following frequency distribution:

Height of Plants	No. of Plants
20-30	5
30-40	3
40-50	2
50-60	9
60-70	6

10. The weights of testis of an untreated group of rats are 900, 950, 2010, 1012, 1100, 930, 980 and 910 mg. The testicular weight of another group of rats from the same population after treatment with a drug was obtained as 100, 880, 640, 870, 520, 590, 610, 680 and 610 mg. Apply 't-test' to find the significance of difference between means of two groups.

11. Number of ponds (X) in a town and number of fishes (Y) were as follows:

X	Y
17	230
17	210
18	290
19	230
19	330
20	320
21	360
22	340
23	320

Find the rank correlation ρ (Rho).

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M.SC. (ZOOLOGY) SEMESTER-III (WINTER-2019)
MSZO311 CHORDATE BIOLOGY-I

Time – Three Hours

Maximum Marks – 80

Note:

1. All questions are compulsory in Part A. The answers of these questions are limited upto 30 words each. Each question carries 2 marks.
2. Attempt FIVE questions in all from Part B, selecting ONE question either (i) or (ii) from each question. Answer of each question shall be limited upto 250 words. Each question carries 6 marks.
3. Attempt 3 questions in all from Part C. Answer of each question shall be limited upto 500 words. Each question carries 10 marks.

PART – A

1.
 - i Write two names of world's first vertebrates.
 - ii Which organism is a link between chordate and non chordate?
 - iii Draw a well labeled diagram of scoliodon's eye.
 - iv What are neuromast organs?
 - v Which amphibian shows viviparity?
 - vi Write two characteristic features of anapsid skull.
 - vii What is the main difference between sub-order lacertilian and ophidia?
 - viii Which reptiles are called stem reptiles?
 - ix Draw a labeled diagram of any one pterosaur.
 - x Which types of teeth are present in cobra and krait? Write two main characters of their teeth.

PART – B

2.
 - i Explain the life history of doliolum.

OR

 - ii Describe the affinities of cyclostomata.
3.
 - i Explain any three accessory respiratory organs in fishes.

OR

 - ii Describe the offensive and defensive adaptation in fishes.
4.
 - i Write a short note on extinct amphibia.

OR

 - ii Explain the factors affecting neoteny and paedogenesis.
5.
 - i Write a short note on dinosaurs.

OR

 - ii Give an account of temporal-regions of chelonia, crocodilia and ophidia.
6.
 - i Differentiate between poisonous and non-poisonous snakes.

OR

 - ii Explain the symptoms of snake bite and first aid measures.

PART – C

7. Describe the evolution and affinities of protochordata.
8. Explain the sensory organs and lateral line system in fishes.
9. Describe the parental care in amphibia.
10. Write short notes on:
 - i Locomotion in snakes
 - ii Adaptive radiations in reptiles
11. Describe the poison apparatus and biting mechanism of snakes.

Writing anything except Roll Number on question paper will be deemed as an act of indulging in unfair means and action shall be taken as per rules.

M.SC. (ZOOLOGY) Semester-III (WINTER-2019)

MSZO312 VERTEBRATE IMMUNOLOGY AND ANIMAL CELL CULTURE

Time – Three Hours

Maximum Marks – 80

Note:

1. All questions are compulsory in Part A. The answers of these questions are limited upto 30 words each. Each question carries 2 marks.
2. Attempt FIVE questions in all from Part B, selecting ONE question either (i) or (ii) from each question. Answer of each question shall be limited upto 250 words. Each question carries 6 marks.
3. Attempt 3 questions in all from Part C. Answer of each question shall be limited upto 500 words. Each question carries 10 marks.

PART – A

1. i What is lymphoid organ?
ii What do you mean by polio drops (do boond zindagi ki)?
iii Name different agents used for cryopreservation?
iv Which immunoglobulin can pass through mother's placenta to fetus?
v Define antibody.
vi What do you mean by R.I.A.?
vii Define monoclonal antibody?
viii What is hypersensitivity?
ix Define animal cell culture media.
x Which immunoglobulin comes first for our body defense mechanism?

PART – B

2. i Write a short note on Haematopoiesis.
OR
ii Differentiate between innate and acquired immunity.
3. i Briefly explain haptens and epitopes.
OR
ii Explain antigenic determinates.
4. i Differentiate between MHC-I and MHC-II molecules.
OR
ii Explain different types of antigen-antibody reaction.
5. i Write a short note on AIDS?
OR
ii Explain the hybridoma technology.
6. i Explain disintegration of tissues.
OR
ii Describe cryopreservation in brief.

PART – C

7. Describe the cells of immune system and their differentiation in detail.
8. Write an essay on 'immunoglobins'.
9. Write a short note on:
i Western blotting
ii Lymphocyte trafficking
10. Describe different autoimmune disorders in detail.
11. Write an essay on 'Animal Cell Culture'.

Writing anything except Roll Number on question paper will be deemed as an act of indulging in unfair means and action shall be taken as per rules.

M.SC. (ZOOLOGY) Semester-III (WINTER-2019)
MSZO313 ENVIRONMENTAL BIOLOGY-I

Time – Three Hours

Maximum Marks – 80

Note:

1. All questions are compulsory in Part A. The answers of these questions are limited upto 30 words each. Each question carries 2 marks.
2. Attempt FIVE questions in all from Part B, selecting ONE question either (i) or (ii) from each question. Answer of each question shall be limited upto 250 words. Each question carries 6 marks.
3. Attempt 3 questions in all from Part C. Answer of each question shall be limited upto 500 words. Each question carries 10 marks.

PART – A

1.
 - i Write the definition of ecosystem?
 - ii What are the characteristics of niche?
 - iii Draw the diagram of 'Y' shaped energy flow model.
 - iv Explain detritus food chain.
 - v Write the name of deserts of world.
 - vi Define aquatic ecosystem.
 - vii Write the name threatened species of amphibia.
 - viii Write the names of birds of India.
 - ix Differentiate between national park and national sanctuary.
 - x Write a note on Keoladeo National park.

PART – B

2.
 - i What is Homeostasis?

OR

 - ii Write a note on composition of biosphere.
3.
 - i Write causes of desertification.

OR

 - ii Explain terrestrial ecosystem.

4. i Write a note on Biota of Thar desert.
OR
ii Explain geophysiological adaptation of thar desert.
5. i Explain with the help of example the difference between vulnerable, rare and intermediate animal species.
OR
ii Write the principle for conservation of wild life.
6. i Write a note on Tal chhapar sanctuary and Manas national park.
OR
ii Give a brief account on Corbett and desert national park.

PART – C

7. Give a detailed account on Biosphere composition and types.
8. Write a short note on following :-
(i) Biochemical cycle of Nitrogen.
(ii) Biota of forest.
9. Write an essay on ecological adaptations of animals in cold desert and marine environment.
10. Give a detailed account on Indian species of amphibian, reptiles and mammals.
11. Write a short note on the following:-
(i) Biosphere reserve of Nanda devi and Nilgiri.
(ii) Ranthambhore National Park.

Writing anything except Roll Number on question paper will be deemed as an act of indulging in unfair means and action shall be taken as per rules.

M.SC. (ZOOLOGY) Semester-III (WINTER-2019)
MSZO314 ENVIRONMENTAL BIOLOGY-II

Time – Three Hours

Maximum Marks – 80

Note:

1. All questions are compulsory in Part A. The answers of these questions are limited upto 30 words each. Each question carries 2 marks.
2. Attempt FIVE questions in all from Part B, selecting ONE question either (i) or (ii) from each question. Answer of each question shall be limited upto 250 words. Each question carries 6 marks.
3. Attempt 3 questions in all from Part C. Answer of each question shall be limited upto 500 words. Each question carries 10 marks.

PART – A

1.
 - i Define topography?
 - ii Write an example of amensalism.
 - iii What is sustainable development?
 - iv Write any two effects of unsustainability.
 - v What do you mean by hot spots of biodiversity?
 - vi Why public awareness and participation is required for biodiversity conservation.
 - vii What is energy crisis?
 - viii Define natural resources and give example.
 - ix What do you mean by urbanization?
 - x Write role of information technology in environment awareness.

PART – B

2.
 - i Explain predation in ecosystem in detail.

OR

 - ii How rainfall affects biodiversity.
3.
 - i Write short note on national commissions for sustainable development.

OR

 - ii What are the threats of sustainable development?
4.
 - i Write short note on ex situ conservation.

OR

 - ii Explain restoration of endangered species.
5.
 - i Explain watershed management.

OR

 - ii Explain conservation of natural resources.

6. i Explain role of voluntary organization in environmental awareness.

OR

- ii Explain the role of women in environmental awareness.

PART – C

7. Write an essay on topographic and edaphic factors.
8. Describe concept and strategies for sustainable development.
9. Describe in-situ conservation of biodiversity in India.
10. Describe biodiversity in wetlands and its management.
11. Describe the impact of industrialization on environment.

Writing anything except Roll Number on question paper will be deemed as an act of indulging in unfair means and action shall be taken as per rules.

M.SC.(ZOOLOGY) Semester-IV (SUMMER-2019)
MSZO411 CHORDATE BIOLOGY II

Time – Three Hours

Maximum Marks – 80

Note:

1. All questions are compulsory in Part A. The answers of these questions are limited upto 30 words each. Each question carries 2 marks.
2. Attempt FIVE questions in all from Part B, selecting ONE question either (i) or (ii) from each question. Answer of each question shall be limited upto 250 words. Each question carries 6 marks.
3. Attempt 3 questions in all from Part C. Answer of each question shall be limited upto 500 words. Each question carries 10 marks.

PART – A

1.
 - i Draw labeled diagram of flight feather.
 - ii What is lift component and drag component in flight mechanism of birds?
 - iii Write short note on Wild Life Organization (WWF).
 - iv Define seasonal migration.
 - v Draw labeled diagram of V.S. of human molar tooth.
 - vi Write distinctive characters of Prototheria.
 - vii Give two examples of old world monkeys.
 - viii Give names of evolutionary stages of horse.
 - ix What is scratching feet?
 - x Write two characteristics of Keoladeo (Ghana) Bird National Park.

PART – B

2.
 - i Write short note on origin of birds.
 - OR**
 - ii Explain affinities of birds.
3.
 - i Write economic importance of birds.
 - OR**
 - ii Write a note on Archaeopteryx.
4.
 - i Write classification of mammals up to suborders.
 - OR**
 - ii Differentiate between metatheria and eutheria.
5.
 - i Write an essay on flying mammals (Chiroptera) and their adaptation.
 - OR**
 - ii Differentiate between old world and new world monkeys.
6.
 - i Write an essay on wild life conservation.
 - OR**
 - ii Describe habit, habitat, general characters and importance of Demoiselle Crane.

PART – C

7. Give an account of flightless birds.
8. Explain different type of claws in birds.
9. Describe parental care in mammals with the help of suitable examples.
10. Explain the ancestry of horse in detail.
11. Write short note on:
 - (a) Gray Langur
 - (b) Great Indian Bustard
 - (c) Tiger
 - (d) Common Peafowl

Writing anything except Roll Number on question paper will be deemed as an act of indulging in unfair means and action shall be taken as per rules.

M.SC.(ZOOLOGY) Semester-IV (SUMMER-2019)
MSZO412 APPLIED ZOOLOGY - ITS TOOLS AND TECHNIQUES

Time – Three Hours

Maximum Marks – 80

Note:

1. All questions are compulsory in Part A. The answers of these questions are limited upto 30 words each. Each question carries 2 marks.
2. Attempt FIVE questions in all from Part B, selecting ONE question either (i) or (ii) from each question. Answer of each question shall be limited upto 250 words. Each question carries 6 marks.
3. Attempt 3 questions in all from Part C. Answer of each question shall be limited upto 500 words. Each question carries 10 marks.

PART – A

1.
 - i Which microscopy is used to study live structures?
 - ii Draw a well labeled diagram of a microscope which is used by you in zoology practical laboratory
 - iii Name the infectious stage of *Plasmodium* to the human host.
 - iv Give some symptoms of schistosomiasis.
 - v Write classification of Lac Insect.
 - vi Give composition of honey.
 - vii What is isinglass?
 - viii Give zoological name of animal giving pearl production.
 - ix Which of the following is pest?
 - i. Blue Bull (Nil Gai)
 - ii. Termite
 - iii. Mouse
 - iv. Pigeon
 - x What is the impact of Chemical pesticides on our health?

PART – B

2.
 - i Explain the fluorescence microscopy in brief.
OR
 - ii Give a short note on electron microscopy
3.
 - i Draw a well labeled diagram of *Plasmodium* lifecycle.
OR
 - ii Explain pathogenicity of *Wuchereria* and *Giardia* in brief.
4.
 - i Draw a well labeled diagram of artificial bee hive.
OR
 - ii Write a short note on Lac culture.

5. i Describe the composite fish culture in brief?
OR
ii Explain the pearl culture technique.
6. i Explain the chemical control methods of pests.
OR
ii Briefly explain the biological control methods of pests.

PART – C

7. Describe spectrophotometry in detail.
8. Describe the Host-Parasite relationship and pathogenecity of *Taenia solium*.
9. Write a short note on
1) Bee Enemies
2) Lac Insect Enemies.
10. Give a detailed account of fish farm layout and its management.
11. Explain in detail the population dynamics of insect pests.

Writing anything except Roll Number on question paper will be deemed as an act of indulging in unfair means and action shall be taken as per rules.

M.SC.(ZOOLOGY) Semester-IV (SUMMER-2019)
MSZO413 ENVIRONMENTAL BIOLOGY-III

Time – Three Hours

Maximum Marks – 80

Note:

1. All questions are compulsory in Part A. The answers of these questions are limited upto 30 words each. Each question carries 2 marks.
2. Attempt FIVE questions in all from Part B, selecting ONE question either (i) or (ii) from each question. Answer of each question shall be limited upto 250 words. Each question carries 6 marks.
3. Attempt 3 questions in all from Part C. Answer of each question shall be limited upto 500 words. Each question carries 10 marks.

PART – A

1.
 - i What is ecological natality?
 - ii Define migration and write its types.
 - iii What are natural pollutants?
 - iv What is threshold of hearing?
 - v Write name of any four radioisotopes which produce radioactive pollution.
 - vi What is nuclear fallout?
 - vii Write name of four green house gases.
 - viii What do you mean by solid waste management?
 - ix Define ecotoxicology.
 - x What are direct effects of toxins on ecosystem?

PART – B

2.
 - i Write a note on population dispersion and equilibrium.

OR

 - ii Explain briefly the factors affecting population growth.
3.
 - i Provide a brief explanation of gaseous pollutants.

OR

 - ii What is eutrophication?
4.
 - i Explain briefly sources and effects of thermal pollution.

OR

 - ii Write a short note on effects of radiation on ecosystem.
5.
 - i Explain briefly the disposal of solid waste.

OR

 - ii Write a note on ozone layer depletion.
6.
 - i Give an account of types of environmental toxicants.

OR

 - ii Explain briefly toxic effects of pesticides on community.

PART – C

7. Describe age pyramids and population dynamics with the help of growth curve.
8. Explain sources, effects and control of water pollution.
9. Describe sources, effects and control of soil pollution.
10. Write detailed note on:
 - (a) Green house effect and global warming
 - (b) Acid rain
11. Write an essay on ecotoxicants dose-response relationships and methods for prevention of ecotoxicants.

Writing anything except Roll Number on question paper will be deemed as an act of indulging in unfair means and action shall be taken as per rules.

M.SC.(ZOOLOGY) Semester-IV (SUMMER-2019)
MSZO414 Environmental Biology IV

Time – Three Hours

Maximum Marks – 80

Note:

1. All questions are compulsory in Part A. The answers of these questions are limited upto 30 words each. Each question carries 2 marks.
2. Attempt FIVE questions in all from Part B, selecting ONE question either (i) or (ii) from each question. Answer of each question shall be limited upto 250 words. Each question carries 6 marks.
3. Attempt 3 questions in all from Part C. Answer of each question shall be limited upto 500 words. Each question carries 10 marks.

PART – A

1.
 - i Define bioaccumulation.
 - ii Define the term biomagnification.
 - iii What are the effects of detergents on the health of human beings?
 - iv Draw a tabulated diagram of EIA.
 - v What are the components of environmental impact assessment?
 - vi Write any four specified remote sensing satellites.
 - vii Define remote sensing.
 - viii Write a note on water pollution act 1974.
 - ix What is environmental policy in India?
 - x What are effects of pesticides on human health?

PART – B

2.
 - i Differentiate between bioaccumulation and bioremediation.
OR
 - ii Write a note on biodegradation.
3.
 - i Comment upon pesticides causing human health problems.
OR
 - ii Write a note on dyes.
4.
 - i Discuss the objectives and concept of EIA.
OR
 - ii Describe the procedure of constitution of state level environmental impact authority(SEIAA)
5.
 - i Write a note on types of resolution considered in remote sensing.
OR
 - ii Write a note on application and advantages of remote sensing.
6.
 - i Write a note on air pollution.
OR
 - ii Describe the beginning of environmental legislation in India.

PART – C

7. Write notes on:
 - a) Bioremediation needs and merits
 - b) Bioaccumulation through food chain
8. Discuss the heavy metal monitoring and remedial measure to control.
9. Discuss the EIA methodology and benefits of environmental impact assessment.
10. Describe the basics of remote sensing and describe the Indian remote sensing satellites in brief.
11. Write notes on:
 - a) Environmental protection act
 - b) Wildlife protection act 1972