

2022

ZOOLOGY — HONOURS

Paper : CC-11

(Ecology)

Full Marks : 50

*The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.**Question no. 1 is compulsory and answer any four questions from the rest.*1. Answer *any five* questions :

2×5

- (a) What do you mean by life table?
- (b) Why India is a mega-diversity country?
- (c) What is 'Flagship species'? Give one example.
- (d) What is Allen's rule?
- (e) Name two hotspots of India.
- (f) What is ecological efficiency?
- (g) Why is beaver a keystone species?
- (h) Name one mammal and one bird belonging to schedule IV.

2. Distinguish between the following :

2×5

- (a) Density dependent and Density independent growth regulation
- (b) DFC and GFC (Detritus food chain and Grazing food chain)
- (c) Dispersal and Dispersion
- (d) Nitrification and Denitrification
- (e) Ecotone and Edge effect.

3. Write short notes on :

2½×4

- (a) Lotka-Volterra equation for competition
- (b) Importance of biodiversity
- (c) Competitive coexistence
- (d) Vertical stratification.

Please Turn Over

4. (a) A record of survey in 2018 reveals that a *Tylotriton* sp. population was composed of 800 individuals. 35 new were born and 10 were died during that year. Calculate the population growth rate for that year.
- (b) Why logistic growth model in a population more realistic?
- (c) Draw the population growth curve of prey population when there is no predator. 4+3+3
5. (a) In a laboratory condition two different species of *Paramecium* are grown in the same medium. It was found that one of species dies in the presence of other in the medium.
- (i) Identify the species of *Paramecium* grown in the medium.
- (ii) What could be the probable cause for such finding?
- (b) Describe the Y-shaped model of energy flow.
- (c) What do you mean by fecundity? 4+4+2
6. (a) A bacterial colony becomes double in 2 hours. Find the reproductive rate of the bacteria. [Given : $\log_{10} 2 = 0.3010$]
- (b) Which one is better *ex situ* or *in situ* conservation? Justify your answer.
- (c) List the threats to olive ridley turtle. 3+4+3
7. (a) What are the aims / objectives of Wildlife Protection Act?
- (b) What do you mean by modular population?
- (c) How does temperature act as limiting factor in animals? 5+2+3
8. (a) What are age pyramids? Draw the age pyramids and comment on the basis of the given data :

Age group	Populations		
	I	II	III
Pre-reproductive →	900	900	300
Reproductive →	600	800	800
Post-reproductive →	300	300	400

- (b) Which of the following community is more rich and diverse? Justify your answer.

	Sp A	Sp B	Sp C
Community I	50	50	50
Community II	99	1	0

(1+6)+3

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ZOOLOGY — HONOURS

Paper : CC-12

(Principle of Genetics)

Full Marks : 50

*The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.*Answer **Question no. 1** and **any four** questions from the rest.1. Answer **any five** of the following :

- | | |
|---|-----|
| (a) What do you mean by cis-trans test? | 2 |
| (b) What are the direct and indirect effects of ionizing radiation? | 2 |
| (c) What is tandem duplication? | 2 |
| (d) Why Benzer selected rII locus for complementation study? | 2 |
| (e) Differentiate between Complete and Incomplete linkage. | 2 |
| (f) What are LINEs and SINEs? | 1+1 |
| (g) What are pseudoalleles? Give example. | 1+1 |
| (h) Give one example each for nullisomy and trisomy in human. | 1+1 |

2. Write short notes on **any four** of the following :

2½×4

- (a) Penetrance and Expressivity
 (b) Interference and coincidence
 (c) Non-disjunction of chromosome 21 in human
 (d) Role of 'XIC' in dosage compensation in human females
 (e) Alu elements
 (f) Epistasis
 (g) Haemophilia.

3. A *Drosophila* female heterozygous for the sex-linked recessive traits a, b and c were crossed to a male which was phenotypically a b c. The cross yielded following progeny phenotypes :

+ b c - 450

a + + - 450

a b c - 32 ✓

+ + + - 38 ✓

a + c - 11 ✓

+ b + - 9 ✓

Please Turn Over

- (a) Find out the genotype of the female parent.
- (b) Determine correct gene order.
- (c) Construct a linkage map of a, b, c.
- (d) Which progeny phenotypes are missing? Explain their absence. 2+2+4+(1+1)
4. (a) As per the theory of genic balance given by Calvin Bridges, mention the expected sex of the individuals with chromosome constitution as given below :
- (i) $3X : 3A$, (ii) $2X : 3A$, (iii) $3X : 2A$, (iv) $1X : 2A$.
- Justify your answer.
- (b) Write down the salient features of kappa particles in *Paramecium* sp.
- (c) Explain the transmission of kappa particles during short duration and long duration conjugation in *Paramecium* sp. with suitable diagrams. 4+2+4
5. (a) Alternative splicing plays a critical role during sex-determination of *Drosophila* sp. — Explain.
- (b) What do you mean by Hybrid dysgenesis?
- (c) Briefly describe the process of biochemical mutation detection in *Neurospora* sp. 4+2+4
6. (a) A colour blind man marries a phenotypically normal woman with no family history of colour blindness. They gave birth to a boy with klinefelter syndrome and colour blindness. Karyotypes of both parents are normal. Explain the origin of klinefelter syndrome and colour blindness in the boy.
- (b) What are transposable genetic elements?
- (c) Explain 'complementation' in the light of Benzer's rII locus experiment. 4+2+4
7. (a) Differentiate between Pericentric and Paracentric inversion.
- (b) What do you mean by alternate and adjacent segregation in a reciprocal translocation heterozygote? Explain with diagram.
- (c) Explain 'tautomeric shift'. 3+4+3
8. (a) What do you mean by primary and secondary sex determination in human?
- (b) What are IS elements?
- (c) Explain the process of mutation detection in *Drosophila* sp. by 'attached X' method. 3+2+5
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2022

ZOOLOGY — HONOURS

Paper : DSE-A-1

(Parasitology)

Full Marks : 50

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

Answer **question no. 1** and **any four** questions from the rest.

1. Answer **any fifteen** questions :

2×15

- 1 (a) What is parasitoid? Give one example. 1
(b) What are mechanical vectors? Give one example. 1
2 (c) Name two plant parasitic nematodes with their host choice. 2
(d) Name the different polymorphic forms of *Trypanosoma gambiense*. 3
3 (e) Enumerate the major symptoms of Schistosomiasis. 3
(f) Highlight blood drinking habit of hood mocking bird. 4
4 (g) What is measles pork? 5
5 (h) Mention the parasitic behaviour of Cookie-cutter shark. 6
6 (i) Distinguish between ectoparasitism and endoparasitism with examples. 7
7 (j) What is Swimmer's itch? 7
8 (k) Mention two important features of trophozoite of *Giardia intestinalis*. 8
(l) What is parasitic castration? 8
10 (m) What is Loeffler's syndrome? 10
(n) Name the larval forms of *Ancylostoma duodenale*. 10
11 (o) Mention the habitat of amastigote and promastigote forms of *Leishmania donovani*. 11
12 (p) What is neurocysticercosis? 12
12 (q) Mention the drugs for treatment of Kala-azar and Sleeping sickness. 12
(r) What is the parasitic importance of Flea? 12
11 (s) Distinguish between male and female *Ascaris* sp. 11
(t) What is PKDL? 11

Please Turn Over

2. (a) Write briefly on epidemiology and modes of transmission of *Wuchereria bancrofti*.
 (b) Distinguish between hexacanth and oncosphere. (2+2)+1
3. (a) Describe the development of *Taenia solium* in the secondary host.
 (b) What is occult filariasis? 3+2
4. (a) Schematically represent the life cycle of *Ancylostoma duodenale*.
 (b) Mention the diagnosis and treatment of *Trypanosoma gambiense*. 3+2
5. Name one cyst nematode and one root-knot nematode. Mention the control of plant nematode. What is the function of stylet? 2+2+1
6. (a) Describe with suitable diagram the structure of microfilaria of *Wuchereria bancrofti*.
 (b) How is taeniasis diagnosed? 3+2
7. (a) Distinguish between Soft tick and Hard tick with example.
 (b) Draw with labelled diagram of mouth parts of a tick. How do ticks transmit disease? 2+(1+2)
8. (a) Write briefly on the parasitic behaviour of Vampire bats.
 (b) Distinguish between hyperparasitism and brood parasitism. 3+2
9. Write short notes on (*any two*) : 2½+2½
- (a) Scabies
 (b) Microfilarial Periodicity
 (c) *Xenopsylla*
 (d) Larva migrans.
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2022

ZOOLOGY — HONOURS

Paper : DSE-B-1

(Endocrinology)

Full Marks : 50

The figures in the margin indicate full marks.

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

Answer *question no. 1* and *any four* questions from the rest.

1. Answer *any five* questions :

2×5

- (a) What do you mean by paracrine secretion? Give one example.
- (b) What are neurohormones? Give two examples.
- (c) What is an orphan receptor?
- (d) State the full form of PVN and SON.
- (e) Name one hyperglycaemic hormone and mention its site of synthesis.
- (f) What is folliculogenesis?
- (g) Mention the source and function of aldosterone. ^{2, 5}
- (h) Distinguish between proestrous and estrous stage.

2. (a) Draw and describe the histological features of a typical thyroid follicle.
(b) What is hypothalamo-hypophyseal portal system?
(c) State two functions of Sertoli cells.

(2+3)+3+2

3. (a) Distinguish between NIDDM and IDDM.
(b) State the principle of ELISA. Mention two enzymes used in the process.
(c) State the location and function of chromaffin cells.

4+(2+2)+2

4. (a) State the cause and symptoms of Graves' disease.
(b) Elucidate the hypothalamo-hypophyseal gonadal axis in male.
(c) Define second messenger. Give examples.

(2+2)+4+2

5. (a) Discuss the role of thyrocalcitonin in calcium homeostasis.
(b) State two advantages of RIA over ELISA.
(c) Draw and describe the structure of a seminiferous tubule.

4+2+4

Please Turn Over

6. (a) Discuss the role of insulin on glycogenesis and neoglucogenesis.
(b) Elucidate briefly the process of Sandwich ELISA. 5+5
7. (a) Discuss the mechanism of hormone action using cAMP as the second messenger.
(b) What is positive feedback mechanism?
(c) State the functions of prolactin in birds. 5+3+2
8. (a) Mention the functions of Melanotropin in Reptiles.
(b) Distinguish between acidophils and basophils of adenohipophysis. Give one example of each type and state their function.
(c) Mention the sources and function of inhibin in male. 2+(2+2+2)+2
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