WEST BENGAL STATE UNIVERSITY

B.Sc. Honours PART-I Examinations, 2018

ZOOLOGY-HONOURS

PAPER-ZOOA-I

Time Allotted: 4 Hours   Full Marks: 100

The figures in the margin indicate full marks.
Candidates should answer in their own words
and adhere to the word limit as practicable.

প্রান্তিক সীমার মধ্যস্থ সংখ্যাটি পূর্ণমান নির্দেশ করে।
পরীক্ষার্থীরা নিজের ভাষায় যথা সম্ভব শব্দসীমার মধ্যে
উত্তর করিবে।

1. Answer any *two* questions from the following: 1×2 = 2
    (a) Who proposed five kingdom system of classification?
    (b) Name one parasitic and one free living flagellate.
    (c) Name the phylum of the following animals-
        (i) Sea pen
        (ii) Sea mouse
    (d) Name two invertebrate phyla with most species richness.

2. Answer any *one* question from the following: 1×3 = 3
    (a) Give an account of distribution of different types of coral reefs in South East
        Asia.
    (b) State the salient features of the phylum Mollusca.

3. Answer any *one* question from the following: 1×5 = 5
    (a) Mention the significance of conjugation in *Paramoecium*. What are the
        factors affecting the process?
    (b) Discuss tracheal respiration in insects.

4. Answer any *eight* questions from the following: 1×8 = 8
    (a) What is haemolymph?
    (b) Define Atoll.
    (c) What is the functions of radula? Mention its location.
    (d) What is madreporite?
    (e) What is botryoidal tissue?
    (f) What is radial symmetry?
    (g) What are polian vesicles?
    (h) Distinguish between haemocoel and pseudocoel.
    (i) Name the class of Porifera where monoaxon spicules are found.

(j) Distinguish between flagella and cilia.

(k) What is tubulin? State its function.

(l) Why rotifiers are called "wheel animalcules"?

5.   Answer any *four* questions from the following: 3×4 = 12

(a) Draw and describe trochophore larva.

(b) State the adaptive significance of torsion.

(c) Discuss salient features of phylum Bryozoa with two examples.

(d) Describe the structure of flame cell.

(e) Distinguish between protostome and deuterostome.

(f) Describe the structure of a typical nephidia.

(g) Mention the role of zooxanthellae in the formation of coral reef.

(h) State the characteristics of Hemichordate.

6.   Answer any *three* questions from the following: 5×3 = 15

(a) To which phylum do the following structures belong? Mention one function of each –

(i)   Seta,

(ii) Choanocyte,

(iii) Compound eyes,

(iv) Mantle,

(v)   Parapodia.

(b) To which phylum do the following larval forms exist and mention one characteristic feature of each.

(i)   Zoea larva

(ii) Glochidium larva

(iii) Planula larva

(iv) Hexacanth larva

(v)   Ophiopluteus larva

(c) Compare water vascular system of different classes of Echinodermata.

(d) Describe the causes of cyclomorphosis in rotifers. Mention its significance.

(e) Draw and describe the ultrastructure of cilia.

(f) Compare salient features of phylum platyhelminthes and Aschelminths with examples.

7.   Answer any *eight* questions from the following: 1×8 = 8

(a) What is head kidney?

(b) What is wheel organ?

(c) What is ductus caroticus?

(d) What is an elephant tusk?

(e) Justify the name Tunicata.

(f) State two functions of integument.

   (g) State dental formula of *Homo erectus*.

   (h) What are "abdominal ribs"?

   (i) What is opisthonephros?

   (j) What is down feather?

   (k) What is aqueduct of sylvius?

   (l) Mention two reptilian features of Monotremes.

8.   Answer any *four* questions from the following: 3×4 = 12

   (a) Describe the structures of Ascidian larva with diagram.

   (b) Discuss the feeding mechanism of Urochordates with suitable diagram.

   (c) Give an outline classification of Amphibia with example.

   (d) Distinguish between atlas and axis.

   (e) State chemical composition of snake venom.

   (f) Comment on evolutionary development of cerebrum in vertebrates.

   (g) Mention evolutionary changes in aortic arches of amphibian and reptilia.

   (h) Draw and label a typical contour feather of a bird.

9.   Answer any *three* questions from the following: 5×3 = 15

   (a) Name the order to which the following animals belong:

      (i) Microchiroptera

      (ii) *Naja*

      (iii) *Pavo*

      (iv) *Rachophorus*

      (v) *Catla*

   (b) Write short notes on:

      (i) Chamber of ruminant stomach with symbiotic bacteria.

      (ii) Types of fangs in snake.

   (c) Distinguish between scales of fish and reptile. Draw a typical placoid scale.

   (d) Give an account of various types of dentition in mammals.

   (e) Give an example of digitigrade and unguiligrade mammal. Write salient features of metatherian mammals.

10.   Answer any *four* questions from the following: 1×4 = 4

   (a) Define eusociality.

   (b) What is trophallaxis?

   (c) Give an example of programmed learning.

   (d) Give examples of one usual releaser and one chemical releaser.

   (e) What is cultural transmission?

   (f) What is instinctive behaviour?

11.   Answer any *two* questions from the following: 3×2 = 6

   (a) State and explain Tinbergen's questions.

(b) Explain the idea of supernormal stimuli with an example.

(c) Outline the major features of social grouping in lions.

(d) What is filial imprinting? Example.

12. Answer any *two* questions from the following: 5×2 = 10

    (a) Discuss different levels of sociality with examples.

    (b) When does natural selection favour altruism among unrelated individuals?

    (c) Why do worker bees prefer to rear sisters our brothers?

    (d) Name an eusocial non hymenopteran insect. Discuss social organization of army ant.

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WEST BENGAL STATE UNIVERSITY

B.Sc. Honours PART-I Examinations, 2018

ZOOLOGY-HONOURS

PAPER-ZOOA-II

Time Allotted: 2 Hours   Full Marks: 50

The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.

1.   Answer any *eight* questions from the following: 1×8 = 8

   (a) What do you mean by 'incipient speciation'?

   (b) Name one species of *Homo* which is ancestrally closest to modern humans.

   (c) Mention two features of modern horse's legs which reflect cursorial adaptation.

   (d) Distinguish between Neoteny and Progenesis with example.

   (e) Name two major sources of heritable variation in a natural population.

   (f) What do you mean by genetic polymorphism?

   (g) Name two ancestral horse genera who used to have more than one digit.

   (h) How does macroevolution differ from microevolution?

   (i) 'Particulate nature of inheritance' or 'Blending theory' — Which one is supported by the results of Mendel's experiments on sweet pea?

   (j) If the genotypic frequencies of MN blood group in a population are 0.36 (MM), 0.48 (MN) and 0.16 (NN), find out the frequencies of all alleles in the population.

   (k) What do you mean by the state of 'genetic bottleneck' in a population?

   (l) What is 'stasis'?

2.   Answer any *four* questions from the following: 3×4 = 12

   (a) What is termed as 'Adaptationist programme'? Name one prominant critique of it.   2+1

   (b) Define allometry. Briefly explain the term with reference to equine evolution.   1+2

   (c) If the frequency of recessive homozygous in a population at H.W. equilibrium is 0.09, find out the frequency of individuals with dominant phenotype but carrying the recessive allele.   3

   (d) Explain the outline of allopatric speciation model briefly.   3

   (e) What is Hardy-Weinberg equilibrium? What are the factors that might disrupt such equilibrium in a population?   1+2

(f) Distinguish between punctuated equilibrium theory and gradualism theory of evolution.

3. Answer any **three** questions from the following: 5×3 = 15

(a) Mention different mechanisms of pre-zygotic and post-zygotic reproductive isolations leading to speciation. 2.5+2.5

(b) Explain the basic tenets of classical Darwinism. How did Mendel's experiment help to fill up a vital gap in it. 3+2

(c) Explain which of the following population is at H.W. equilibrium:

Number of Individuals

	AA	Aa	aa
Population 1	30	60	10
Population 2	36	48	16

(d) Draw a simple phyologenetic tree to depict the evolutionary relationship between modern humans and living apes. Mention one key difference in the structures of hands between apes and modern humans. 4+1

(e) Write short notes on: 2.5+2.5
  (i) *Hyracotherium*
  (ii) Parapatric speciation.

4. Answer any **four** questions from the following: 1×4 = 4

(a) What do you mean by 'level of significance'?

(b) Find the value of $\log_{10} 100$.

(c) What is a Null Hypothesis?

(d) Define Standard Error.

(e) How is Variance measured?

(f) If $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$, find A^{-1}.

(g) What is the probability of two heads appearing in two tosses of a coin?

5. Answer any **two** questions from the following: 3×2 = 6

(a) Define and distinguish continuous and discrete variables with examples.

(b) In a National Park, 16 amphibians, 18 reptilians, 34 avian and 32 mammalian species were recorded. Draw a pie-diagram to show the frequency distribution with four different shades.

(c) A bag contains 90 white marbles and 60 black marbles. What is the probability of drawing one black and one white marble together?

(d) In 200 tosses of a coin, 85 heads and 115 tails were observed. Test the hypothesis that the coin is fair at the $p < 0.05$.

[Given $\chi^2_{0.95}$ for 1 degree of freedom = 3.84]

6.   Answer any *one* question from the following: 5×1 = 5

  (a) Find out whether the productions after hormone treatment in mango orchards becomes significant.

  [Given that $t_{0.05} = 2.57$ and $t_{0.01} = 4.032$ for degrees of freedom = 5]

Orchard Type	Production without treatment (in quintals)	Production with treatment (in quintals)
A	60	85
B	85	98
C	135	162
D	160	180
E	182	200
F	205	230

  (b) Find out the mean with S.D and median of the following distributions:

Class	Frequency
30-32	39
27-29	37
24-26	32
33-35	24
21-23	23
18-20	19
36-38	14
15-17	12

  (c) Marks of 10 students in Mathematics and Statistics are given below:

Mathematics	32	38	48	43	40	22	41	69	35	64
Statistics	30	31	38	43	33	11	27	76	40	69

  Calculate the Pearson's correlation co-efficient between two subjects.

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