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Roll No. | | | | | | | |2|0|1|9|

S. No. of Question Paper : 7516   (9)

Unique Paper Code   : 32231501   J

Name of the Paper   : **Molecular Biology**

Name of the Course   : **B.Sc. (Hons.) Zoology**

Semester   : **V**

Duration : **3 Hours**   Maximum Marks : **75**

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt *five* questions in all.

Question No. **1** is compulsory.

Illustrate your answers with appropriate diagrams.

1.   (*a*)   Define (any *five*) :   5×1=5

   (*i*)   Okazaki Fragments

   (*ii*)   Polyribosome

   (*iii*)   Alternative splicing

   (*iv*)   Primer

   (*v*)   Consensus Sequence

   (*vi*)   Codon.

P.T.O.

(b) Differentiate between (any *five*) :　　　　5×2=10

    (i) B-DNA and Z-DNA

    (ii) Leading and lagging strands

    (iii) DNA Polymerase I and DNA Polymerase III

    (iv) Monocistronic and polycistronic mRNA

    (v) Prokaryotic and Eukaryotic ribosome

    (iv) Topoisomerase I and Topoisomerase II.

(c) Expand the following (any *four*) :　　　　4×1=4

    (i) ARS

    (ii) snRNA

    (iii) URE

    (iv) CTD

    (v) HU Enzyme

(d) Give the contribution of the following (any *four*) : 1×4=4

    (i) Erwin Chargaff

    (ii) Maurice Wilkins

    (iii) Arthur Kornberg

    (iv) Craig C Mello

    (v) Carol D Greider

(e) Draw neat and well labelled diagrams of the following :

                              2×2=4

    (i) m-RNA structure of Globin protein.

    (ii) Trombone model showing arrangement of different proteins during replication.

2. (a) Describe Watson and Crick model of DNA.　　6

   (b) Describe the salient features of Genetic code.　　6

3. (a) Discuss the mechanism of gene regulation in Tryptophan Operon.　　8

   (b) With the help of suitable diagram describe the mechanism of transcriptional termination in prokaryotes.　　4

4. (a) Discuss the process of activation of amino acids, formation of initiation complex and elongation of the polypeptide chain in prokaryotes.　　8

   (b) Describe different methods of RNA interference.　　4

5. (a) Explain the eukaryotic Transcription initiation Factors along with their functions.　　6

   (b) Describe the structure of Globin gene and its molecular mechanism of Splicing.　　6

P.T.O.

6. (a) Describe the sequence of events during DNA replication in eukaryotes and explain the role of various enzymes. 8

(b) Enumerate the various differences between prokaryotic and eukaryotic translation. 4

7. Write short notes on any *three* of the following : 3×4

(i) t-RNA

(ii) Replication of telomeres

(iii) Genetic Imprinting

(iv) DNA mismatch repair.

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S. No. of Question Paper : 7517   ⑩

Unique Paper Code   :   32231502   J

Name of the Paper   :   **Principles of Genetics**

Name of the Course   :   **B.Sc. (Hons.) Zoology**

Semester   :   V

Duration : **3 Hours**   Maximum Marks : **75**

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt *five* questions in all, including Q. No. **1** which is compulsory.

1.   (A)   Define : $1 \times 5 = 5$

       (*i*)   Phenocopy

       (*ii*)   Transgressive variation

       (*iii*)   Three factor cross

       (*iv*)   Frame shift mutation

       (*v*)   Episome.

   (B)   Distinguish between : $2 \times 3 = 6$

       (*i*)   Intersex and Gynandromorph

(ii) Sex limited and Sex influenced traits

(iii) Intragenic and intergenic recombination.

(C) Expand the following : 1×4=4

(i) PAR

(ii) SINEs

(iii) XIC

(iv) ClB.

(D) Explain the following : 2×2=4

(i) In a family blood group of mother is AB and that of daughter is O.

(ii) In *Drosophila*, mother contributes Y chromosome and father contributes X chromosome to the male offspring.

(E) Name the scientists who gave the following concepts : 4

(i) Recombination frequency used as linkage map distance

(ii) Gene complementation

(iii) Polygenic inheritance

(iv) Mutagenicity of X rays.

(F) *(i)* Determine the phenotypes (shell coiling pattern) of the parents and the genotypes and phenotypes of the F1 in the following crosses in *Limnaea* : 3

(a) Dd (female) × dd (male)

(b) Dd (male) × dd (female).

(ii) How many different types of gametes will be formed by a parent having genotype AABbccDdEe ? 1

2. *(a)* Describe molecular basis of spontaneous mutations. 6

(b) In complementation studies of the *r*II locus of phage T4, three different mutations were tested in each group. On the basis of the given data, predict the results of the III experiment for each group. 3

Experiment	Group A	Group B	Group C
I	$d \times e$ — lysis	$g \times b$ — no lysis	$j \times k$ — lysis
II	$d \times f$ — no lysis	$g \times l$ — no lysis	$j \times l$ — lysis
III	$e \times f$ — ?	$b \times l$ — ?	$k \times l$ — ?

(c) Describe the characteristic features of IS elements. 3

3. (a) For mapping three X linked genes in *Drosophila*, a female heterozygous for these genes was crossed with the male having dominant phenotype of these genes. Which sex of the F1 progeny would be used for construction of linkage map ? Why ? 4

(b) Define interference. Write the significance of − (negative), 0 (zero) and + (positive) value of interference. 4

(c) In a heterozygous female two linked genes A and B are arranged in Transconfiguration. The distance between two genes is 27 cM. If such a female is test crossed, write the genotype of the progeny and percentage of each type of progeny. 4

4. (a) Describe the genetic basis of continuous variation, with a suitable example. 6

(b) Explain somatic cell hybridization and its application in gene mapping. 6

5. (a) How does non-allelic interaction modify the Mendelian dihybrid ratio ? 6

(b) Describe Bridges theory of sex determination in *Drosophila*. 6

6. (a) Describe the phage λ mediated specialized transduction. 6

(b) Describe the experiment of Curt Stern for cytological basis of crossing over. 6

7. Write short notes on any *three* of the following : 3×4=12

(a) Retrotransposons

(b) Chromosomal inversion

(c) Sexduction

(d) Inheritance of antibiotic resistance in *Chlamydomonas*.
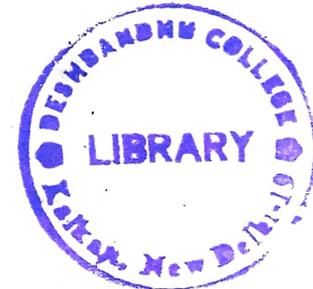
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(11)　　　Your Roll No. 2019

Sr. No. of Question Paper : 7974　　　　　　J

Unique Paper Code　　: 32237901

Name of the Paper　　: Animal Behaviour and Chronobiology

Name of the Course　　: **B.Sc. (H) Zoology : DSE-1**

Semester　　　　　　: V (CBCS)

Duration : 3 Hours　　　　　Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.

2. Attempt **Five** questions in all including Question No. **1** which is compulsory.

1. (a) Define the following :

    (i) Reciprocal altruism

    (ii) Reinforcement

    (iii) Menotaxis

    (iv) Infanticide

P.T.O.

(v) Latent learning

(vi) Nidifugous birds   (1×6=6)

(b) Differentiate between the following :

    (i) Innate and learned behaviour

    (ii) Altricial and precocial

    (iii) Primary and secondary orientation

    (iv) Circadian and circannual rhythms

    (v) Eusocial and semisocial animals

    (vi) Hormone and pheromone   (2×6=12)

(c) Give Contributions of the following :

    (i) Karl von Frisch

    (ii) Oskar Heinroth

    (iii) Franz Halberg

    (iv) C. O. Whitman   (1×4=4)

(d) State true or false :

    (i) Honeybees perform waggle dance to communicate about food source at short distances.

(ii) Cheater gene influences infidelity in humans.

(iii) Animals may be brightly colored to advertise to mates or warn potential predators of its toxicity.

(iv) In scan sampling, the behaviour of all individuals of a group of animals are recorded at fixed time intervals.

(v) Movement directed toward a light source is called positive chemotaxis.   (1×5=5)

2. (a) Describe the Pavlov's experiment on classical conditioning.   (6)

  (b) Draw a neat labelled diagram of different types of dances performed by forager honeybees to communicate about food source. Discuss the advantages of waggle dance for honeybee society.   (3,3)

3. (a) Write a note on Zeitgeber. Describe the factors responsible for its effectivity.   (3,3)

  (b) With the help of suitable examples, explain exogenous and endogenous rhythms.   (6)

4. (a) What is imprinting? Explain the contribution of Konrad Lorenz in describing the phenomenon of imprinting.

    (6)

    (b) Describe, with examples, the concept of sexual conflict in parental care. Add a note on the benefits and costs associated with parental care. (3,3)

5. (a) Define altruism and explain how natural selection will favor altruistic behavior.

    (6)

    (b) Classify and explain various form of orientation with suitable example.

    (6)

6. (a) Explain proximate and ultimate causes of behavior with help of suitable examples.

    (6)

    (b) Differentiate between classical and operant conditioning with suitable examples.

    (6)

7. Write short notes on any **three** of the following :

    (a) Kin selection

    (b) Biological oscillations

    (c) Society organization in honeybees

    (d) Parasitic brood care

    (e) Role of melatonin   (3×4=12)

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S. No. of Question Paper : 8122   (12)

Unique Paper Code   : 32237909   J

Name of the Paper   : Immunology

Name of the Course   : B.Sc. (Honors) Zoology : DSE-2

Semester   : V

Duration : **3 Hours**   Maximum Marks : **75**

(Write your Roll No. on the top immediately on receipt of this question paper.)

Question No. **1** is compulsory.

Attempt *five* questions in all.

Draw neat labelled diagrams wherever necessary.

1.   (*a*)   Define :   5

      (*i*)   Superantigens

      (*ii*)   Abzymes

      (*iii*)   Arthus reactions

      (*iv*)   Variolation

      (*v*)   Immunogenicity.

P.T.O.

(b)   Distinguish between :   5×2=10

  (i)   Neoantigenic and conformational epitopes

  (ii)   Autologous and allogenic antigens

  (iii) Calnexin and calreticulin

  (iv)   Subunit and recombinant vaccines

  (v)   Plasma and memory cells.

(c)   Expand the following :   3

  (i)   ISCOM

  (ii)   PRR

  (iii) CLIP

  (iv)   HSP

  (v)   ARAM

  (vi)   GPCR.

(d)   Write the contribution(s) of :   2

  (i)   S.A. Berson and R. Yalow

  (ii)   Wu and Kabat

(e)   Give the immunological significance :   4

  (i)   Bence Jones proteins

  (ii)   C3b

  (iii) Bioactive amines

  (iv)   Chemokines.

(f)   Give reasons :   3

  (i)   Burn victims are immunologically compromised.

  (ii)   Bivalent nature of an antibody is important.

  (iii) Multivalent vaccines are better than monovalent vaccines.

2. (a)   Describe the initiation and activation of the alternative complement pathway.   8

    (b)   Discuss the factors influencing immunogenicity.   4

3. (a)   Explain in detail the structure and functions of IgG. 6

    (b)   Illustrate and discuss the production of monoclonal antibody by hybridoma technology.   6

4. (a)   Explain the processing and presentation of endogenous antigens in a cytosolic pathway.   6

    (b)   Write the general properties of cytokines and chemokines. 6

5. (a)   Compare the structure and functions of class I and class II MHC molecules.   6

    (b)   Describe the role of various barriers involved in innate immune responses.   6

6. (a) What are the effector cells of anaphylaxis and their biological responses in immediate type hypersensitivity ?

6

(b) Describe the structure and function of primary lymphoid organs.

6

7. Write short notes on any *three* :

3×4=12

(i) Clonal selection theory

(ii) Inflammatory response

(iii) Properties of antigen

(iv) Elucidate the structure of antibody.

1,300