WEST BENGAL STATE UNIVERSITY

B.Sc. Honours 5th Semester Examination, 2020, held in 2021

ZOOACOR11T-ZOOLOGY (CC11)

MOLECULAR BIOLOGY

Time Allotted: 2 Hours | Full Marks: 40

The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.

1. Answer any ***eight*** questions from the following: 2×8 = 16

(a) What is a replisome?

(b) What are Okazaki fragments?

(c) What is the role of helicase in DNA replication?

(d) What is Shine Dalgarno sequence?

(e) What do you mean by *rho*-dependent termination of transcription?

(f) What do you mean by a nonsense codon?

(g) What do you mean by charging of tRNA during translation?

(h) What is the difference between replication and transcription?

(i) What are the forces that hold the DNA double helix together?

(j) Write the main differences between DNA and RNA.

(k) What is operon?

(l) Which enzyme is used for PCR technique and why?

(m) What is Wobble hypothesis?

(n) What is gratuitous inducer?

(o) What is cDNA library?

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

(a) Mention the main differences between eukaryotic and prokaryotic translation.

(b) Write the role of any three proteins in DNA replication.

(c) Name any inhibitor of translation and write its mode of action. 1+2

(d) What is the role of ribose sugar in DNA structure?

(e) What is TATA consensus sequence? Write its significance. 1+2

(f) Write the applications of PCR technique.

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

(a) Write the structure of a *lac* operon.

(b) Briefly write the process of Sanger method of DNA sequencing.

(c) Prove that DNA replication is semi conservation in nature.

(d) Distinguish between prokaryotic and eukaryotic promoters.

(e) Define telomere. Describe the role of telomere in replication. 1+4

(f) Distinguish between inducible system and repressible system.

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WEST BENGAL STATE UNIVERSITY

B.Sc. Honours 5th Semester Examination, 2020, held in 2021

ZOOACOR12T-ZOOLOGY (CC12)

GENETICS

Time Allotted: 2 Hours | Full Marks: 40

The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.

1. Answer any ***eight*** questions from the following: 2×8 = 16

(a) What are the different traits of the pea plant that Mendel used in plant breeding experiments?

(b) State what type of Mendelian inheritance leads to Sickle Cell Anaemia and Haemophilia.

(c) What are recombination hotspots?

(d) What type of mutation is seen in case of Down's syndrome and Klinefelter's syndrome? Mention the choromosomes that are affected.

(e) During recombination of genes *x*, *y* and *z*, double crossover did not occur at all. What will be the percent of interference and coefficient of coincidence?

(f) What will be the sexual type in *Drosophila* which has —
(i) three (3) X chromosomes and two (2) autosomes
(ii) three (3) X chromosomes and three (3) autosomes

(g) What is point mutation? Give an example.

(h) What is the function of the cis-trans test in genetics?

(i) Define epistasis.

(j) What are class I and class II transposable genetic elements? Give an example of each.

(k) Differentiate between the process of transformation and transduction in bacteria.

(l) What are the different types of linkage?

(m) What is the composition of an insertion sequence (IS)?

(n) State the law of independent assortment.

(o) What are gynandromorphs?

2. Answer any ***three*** questions from the following: $3\times3 = 9$

(a) The ABO blood group system is an example of incomplete dominance or co-dominance Explain briefly. 3

(b) Discuss about the pattern of sex-linked inheritance. 3

(c) Explain the three types of point mutations-silent, mis-sense and nonsense mutation with example. 1+1+1

(d) Define Incomplete dominance and Co-dominance with example. $1\frac{1}{2}+1\frac{1}{2}$

(e) What is the F-factor and how does it help in conjugation in bacteria? 3

(f) What is Alu element and its importance? 2+1

3. Answer any ***three*** questions from the following: $5\times3 = 15$

(a) What are the different types of chromosomal aberrations? Discuss with examples. 5

(b) Define cistron and recon. What is conditional lethal mutation? 3+2

(c) Discuss the role of *sxl*, *tra* and *dsx* genes in the male sex determination pathway in *Drosophila*. 2+1+2

(d) (i) What is the purpose of performing a test cross in breeding experiments? 1+4

(ii) Mr. and Mrs. Jones have six (6) children. Three (3) of them have attached earlobes (recessive trait) like their father and the other three (3) children have free earlobes like their mother. What are the genotypes of Mr. and Mrs. Jones and all their children?

(e) What is the function of transposase? Discuss the role of Ac-Ds system of transposable genetic elements with respect to seed colour in maize. 2+3

(f) In a three-point testcross following data are obtained: 2+3

ABC	abc	aBc	AbC	ABc	abC	aBC	Abc
230	240	96	104	138	142	12	8

Find out the correct linear order of genes and calculate recombination values.

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WEST BENGAL STATE UNIVERSITY

B.Sc. Honours 5th Semester Examination, 2020, held in 2021

ZOOADSE01T-ZOOLOGY (DSE1/2)

ANIMAL BEHAVIOUR AND CHRONOBIOLOGY

Time Allotted: 2 Hours | Full Marks: 40

The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.

1. Answer any ***eight*** questions from the following: 2×8 = 16

(a) Define altruism.

(b) What is *Ad Libitum* sampling and focal animal sampling?

(c) What do you understand by the term "cultural transmission"?

(d) Name two pioneer ethologists who won the Nobel Prize.

(e) Define FAP.

(f) What is innate behaviour?

(g) What is trophallaxis?

(h) What is male rivalry? State one example.

(i) What do you mean by primer and releaser pheromone?

(j) Name the different castes in a termite colony.

(k) What do you mean by "Events" and "States"?

(l) What is Chronobiology?

(m) Name the author of "*Handbook of the Birds of India and Pakistan*" and "*Survival Strategies-cooperation & conflict in animal societies*".

(n) What is the social oreganization of pride in lion?

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

(a) Define tidal and lunar rhythm with example.

(b) What is instinct? Explain it with a typical example.

(c) Define habituation. Give an example.

(d) What is inclusive fitness? Give example.

(e) Define waggle dance. Write its advantages.

(f) What do you mean by Fisherian runaway hypothesis?

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

(a) Outline the evolutionary problem of eusociality briefly. 5

(b) What is imprinting? Explain this behaviour with an example. 2+3

(c) Discuss adaptive significance of biological clocks. Explain Bateman's Principle. 3+2

(d) Discuss the role of supra-chiasmatic nucleus in maintenance of Circadian rhythm with diagram. Give example of Circadian rhythm one each from human and invertebrate animals. 3+2

(e) Explain the Hamilton's rule to explain altruism in social hymenopterans. 5

(f) Discuss about photoperiodic regulation of reproduction in vertebrates. 5

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WEST BENGAL STATE UNIVERSITY

B.Sc. Honours 5th Semester Examination, 2020, held in 2021

ZOOADSE03T-ZOOLOGY (DSE1/2)

ENDOCRINOLOGY

Time Allotted: 2 Hours | Full Marks: 40

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Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.

1. Answer any ***eight*** questions from the following: 2×8 = 16

(a) Give two examples of neurohormones.

(b) Distinguish between Estrous cycle and Menstrual cycle.

(c) Write names of specialized endocrine tissues.

(d) What is chalones?

(e) What is homeostasis?

(f) Write the full form of GnRH and MIH.

(g) Mention the position of Pituitary gland.

(h) What is Hypophyseal portal system?

(i) Which endocrine gland disorder is responsible for Cushing syndrome? Mention one symptom of it.

(j) Where are Chief cells found?

(k) What is the cause of Conn's syndrome?

(l) What is Endemic goiter?

(m) Write function of FSH and LH.

(n) What is atretic follicle?

(o) What is menarche?

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

(a) Explain positive and negative feedback control.

(b) Write in brief the effect of thyroid hormone on Cardio vascular system.

(c) Write in brief the mechanism of action of steroid hormones in nucleus.

(d) Write in brief the role of antibody in RIA.

(e) How PTH regulates blood level of calcium and phosphorus?

(f) Endocrine secretions are key factors to control homeostasis — Explain.

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

(a) Write in brief the action of vasopressin. Why it is also called ADH? 3+2

(b) Discuss the effects of hypothyroidism. 5

(c) Describe the structure of adenohypophysis with a suitable figure. 5

(d) Write in brief the uses of ELISA. 5

(e) State multifaceted role of oxytocin. 5

(f) Write in brief the role of hormones in maturation process of ovarian follicles during menstrual cycle. 5

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WEST BENGAL STATE UNIVERSITY

B.Sc. Honours 5th Semester Examination, 2021-22

ZOOACOR11T-ZOOLOGY (CC11)

Time Allotted: 2 Hours

Full Marks: 40

The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.

1. Answer any ***eight*** questions from the following: 2×8 = 16

(a) What are ligases?

(b) What is Chargaff's rule?

(c) What is hypsochromic shift?

(d) What is the role of cAMP in lac operon?

(e) Define sense and antisense strands of DNA in view of transcription.

(f) Distinguish between leading and lagging strands in respect of DNA replication.

(g) What is Shine-Dalgarno sequence?

(h) Distinguish between nucleoside and nucleotide.

(i) What is the function of anticodon loop of tRNA?

(j) What is hnRNA?

(k) What is the function of SSB protein?

(l) Why replication cannot occur without a primer?

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

(a) Write the steps in the initiation of translation in prokaryotes. 3

(b) Briefly describe the process of proofreading in prokaryotes DNA replication. 3

(c) Mention the steps by which mRNA is converted into cDNA. 3

(d) What is DNA sequencing? Write the advantages of Sanger DNA sequencing method. 1+2

(e) Write the names and function of DNA polymerases involved in prokaryotic replication system. 3

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

(a) What is Wobble hypothesis and code degeneracy?

(b) Discuss the process of attenuation in trp operon and state how it controls the tryptophan synthesis in *E. coli*.

(c) What is TATA-box? What do you mean by rho-dependent termination of transcription?

(d) What are the salient features of Watson and Crick model of DNA? Give suitable diagram.

(e) Explain the PCR technique.

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WEST BENGAL STATE UNIVERSITY

B.Sc. Honours 5th Semester Examination, 2021-22

ZOOACOR12T-ZOOLOGY (CC12)

Time Allotted: 2 Hours | Full Marks: 40

The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.

1. Answer any ***eight*** questions from the following: 2×8 = 16

(a) What is interference and coincidence?

(b) Differentiate between epistasis and dominance.

(c) Define complete and incomplete linkage.

(d) What are Heterozygous and Hemizygous allele?

(e) What is Haplotype?

(f) Differentiate mutagen from carcinogen.

(g) Distinguish between frameshift and non-sense mutation.

(h) What is dosage compensation? How is it achieved?

(i) What is Robertsonian translocation? Give example.

(j) What is 'P'elements in drosophila?

(k) What do you understand by loss-of-function mutation?

(l) Give a note on conjugation.

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

(a) What are the two different genetic cause of Trisomy 21? What are the known risk factor for having a child with Down syndrome?

(b) Discuss the role of Ac-Ds system as transposable genetic elements.

(c) What are spontaneous and induced mutation? What is clastogen?

(d) Describe the Holliday model of recombination.

(e) Discuss the fine structure of gene as revealed through the work on rII locus in T4 bacteriophage.

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

(a) How the sex of mammals is determined? Describe the mechanism. 1+4

(b) What are the different kinds of polyploids? How will you distinguish between autopolyploids and allopolyploids? 2+3

(c) Briefly discuss about transformation and transduction in bacteria. 5

(d) Singed bristles(Sn), Cross-veinless wing (Cv) and Vermilion eye colour (V) are due to recessive mutant alleles in D. melanogaster. When a female heterozygous for each of the three genes was test crossed, the following progeny were obtained. 5

Singed, Cross veinless, Vermilion	→	3
Vermilion	→	34
Cross veinless, Vermilion	→	392
Cross veinless	→	61
Singed, Cross veinless	→	32
Singed, Vermilion	→	65
Singed	→	410
Wild type	→	3

What is the correct order of these three genes? What are the genetic map distances between Sn and Cv, Sn and V and Cv and V? What is coefficient of coincidence?

(e) Write the difference between sex-linked, sex-influenced and sex-limited inheritance with example. 5

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WEST BENGAL STATE UNIVERSITY

B.Sc. Honours 5th Semester Examination, 2021-22

ZOOADSE01T-ZOOLOGY (DSE1/2)

ANIMAL BEHAVIOUR

Time Allotted: 2 Hours

Full Marks: 40

The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
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1. Answer any ***eight*** questions from the following: 2×8 = 16

(a) What do you know about SCN? Where is it located?

(b) What is female choice? Give an example.

(c) What are altruism and reciprocal altruism?

(d) What do you mean by inclusive fitness?

(e) What is sexual dimorphism? Give an insect example.

(f) What are Kin and Kin selection?

(g) Distinguish between instinct and learning behaviour.

(h) Raghabendra Gadagkar is famous for his studies on an insect. Give the common name and scientific name of this insect.

(i) What is Darwinian fitness?

(j) What is innate behaviour?

(k) Distinguish between Solitary and Social organisms with suitable examples in each.

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

(a) What is fixed action pattern? Illustrate this phenomenon with suitable example. 1+2

(b) What is the difference between direct and indirect fitnesses?

(c) Why do animals exhibit circadian rhythm?

(d) State the role of melatonin in maintaining photoperiodism in animal life.

(e) What is bee language? What will happen if all honey bees become vanished from the earth? 1+2

(f) What are ultradian, lunar and circadian rhythms?

3. Answer any ***three*** questions from the following: $5\times3 = 15$

(a) What is eusociality? Mention the factors that benefit the evolution of eusociality. What is 'point of no return' in eusociality evolution? 1+3+1

(b) Describe the degree of relatedness among different members of an insect colony using Hamilton's Rule (r).

(c) Which animals exhibit lunar rhythm and why? Discuss about the role of any physiological mechanism by which a species may exhibit lunar rhythm. $1\frac{1}{2}+3\frac{1}{2}$

(d) How many types of castes are found in a beehive? Name them. What are 'round dance' and 'waggle dance' in bee communication? 1+(2+2)

(e) What is habituation? What do you mean by filial and Sexual imprinting? Explain with examples. 1+2+2

(f) What is biological clock? Give a brief idea about the location of biological clock in animals. 2+3

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WEST BENGAL STATE UNIVERSITY

B.Sc. Honours 5th Semester Examination, 2021-22

ZOOADSE03T-ZOOLOGY (DSE1/2)

Time Allotted: 2 Hours | Full Marks: 40

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1. Answer any ***eight*** questions from the following: 2×8 = 16

(a) What is C19 steroid?

(b) What is acromegaly?

(c) Write two functions of somatostatin.

(d) Give examples of one hormone each from the following groups –

Peptide hormones, Steroid hormones, Eicosanoids.

(e) Mention the source and function of ICSH.

(f) What is the cause of Addison's disease?

(g) What is LH surge?

(h) Differentiate between polyestrous and monoestrous animals with examples.

(i) What are parafollicular C cells? State their function.

(j) Distinguish between diabetes insipidus and diabetes mellitus.

(k) What is antral follicle?

(l) Where from the glucocorticoids and mineralocorticoids are secreted?

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

(a) Write the role of pineal gland in mammalian reproduction. 3

(b) Describe the effect of glucocorticoids on carbohydrate metabolism. 3

(c) Explain negative feedback mechanism of endocrine regulation with proper example. 2+1

(d) Discuss the role of thyroxine in increase of BMR. What is Grave's disease? 2+1

(e) State the name and functions of the hormones secreted by Sertoli Cells and Leydig Cells. 1+2

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

(a) Describe the histological features of thyroid gland with suitable diagram. 3+2

(b) Describe the bioassays of hormones using ELISA technique. 5

(c) Compare the follicular and luteal phases of human menstrual cycle. 5

(d) State the mechanism of action of steroid hormones with proper diagram. 3+2

(e) What is infundibulum? Differentiate between acidophilic and basophilic cells found in adenohypophysis. Name the hormones secreted by these cells. 1+2+2

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WEST BENGAL STATE UNIVERSITY

B.Sc. Honours 5th Semester Examination, 2022-23

ZOOACOR11T-ZOOLOGY (CC11)

Time Allotted: 2 Hours | Full Marks: 40

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Candidates should answer in their own words and adhere to the word limit as practicable.

1. Answer any ***eight*** questions from the following: 2×8 = 16

(a) What are purines and pyrimidines?
(b) Write down the differences between DNA and RNA.
(c) What is TATA Box?
(d) What is cDNA?
(e) Explain the following statement — "the genetic code is degenerate".
(f) What are Okazaki fragments?
(g) Define sense and antisense strands of DNA in view of transcription.
(h) What is the function of topoisomerase enzyme?
(i) What is nonsense codon?
(j) Distinguish between Southern blot and Western blot techniques.
(k) Which enzyme is used in PCR technique and why?
(l) Write the names of two inhibitors of protein synthesis.

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

(a) Distinguish between Z, B and A DNA.
(b) What is the function of t-RNA and r-RNA?
(c) Distinguish between inducible and repressible system.
(d) Write the differences between prokaryotic and eukaryotic translation.
(e) What do you mean by splicing?
(f) Describe the process of amino acid activation during translation.

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

(a) Prove that DNA replication is a semiconservative.
(b) What do you mean by a codon? Discuss some important properties of a genetic code. 2+3
(c) Describe the structure and function of E coli RNA polymerase.
(d) Discuss in brief about the miRNA mediated gene silencing.
(e) Describe regulation of transcription in respect to lac operon.
(f) Describe the Western Blot technique.

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WEST BENGAL STATE UNIVERSITY

B.Sc. Honours 5th Semester Examination, 2022-23

ZOOACOR12T-ZOOLOGY (CC12)

GENETICS

Time Allotted: 2 Hours | Full Marks: 40

The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.

1. Answer any ***eight*** questions from the following: 2×8 = 16

   (a) What is Karyotype?

   (b) What happens to the DNA and RNA during mutation?

   (c) Define multiple allele. Give example.

   (d) What is competence?

   (e) Give one example each for homogametic male and heterogametic female and hemigametic male and homogametic female.

   (f) Explain the effect of duplication on phenotype by citing an example.

   (g) What is kappa particles?

   (h) What are LINE and SINE?

   (i) What is synaptonemal complex?

   (j) What is Lyon's hypothesis?

   (k) What is the difference between test cross and backcross?

   (l) Distinguish between X-linked and Y-linked genes.

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

   (a) Suppose that a snail had a dextral coiling. Upon self fertilization, it produces progeny all of which showed sinistral coiling. How do you explain results? 3

   (b) Who proposed the Genic balance theory? Why is this theory called genic balance? What are the chromosomal complements of supermale and superfemale flies in *D. melanogaster*? 1+1+1

   (c) What are cistron and recon? Mention the difference between complementation and epistasis. 1+1+1

   (d) State the role of UV rays in causing mutation in DNA. 3

   (e) What is Alu element? Mention its importance. 2+1

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

(a) A test cross was made between a tripple heterozygote plant (ABC/abc) and triply homozygous recessive plant (abc/abc). The following progenies were observed: 3+2

ABC/abc- 977; abc/abc- 960; aBC/abc- 402; Abc/abc- 427; AbC/abc- 85; aBc/abc- 95; ABc/abc- 27; abC/abc- 27.

Calculate the map distance and draw the genetic map. Calculate the coefficient of coincidence and inheritance.

(b) What is the difference between paracentric and pericentric inversion? Explain with a suitable diagram the crossing over pattern of a heterozygous individual having paracentric inversion. 1+3+1

(c) Differentiate between transformation and transduction. Briefly describe the steps of bacterial transduction with a suitable diagram. 1+3+1

(d) Distinguish between somatic and meiotic crossing over. Discuss the cytological evidence of crossing over in *Drosophila*. 2+3

(e) Describe the inheritence of haemophilia. 5

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WEST BENGAL STATE UNIVERSITY

B.Sc. Honours 5th Semester Examination, 2022-23

ZOOADSE01T-ZOOLOGY (DSE1/2)

Time Allotted: 2 Hours | Full Marks: 40

The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.

1. Answer any ***eight*** questions from the following: 2×8 = 16

(a) Define Kin selection.

(b) What is entrainment?

(c) Define reciprocal altruism with an example. 1+1

(d) What is sign stimulus?

(e) What do you mean by sexual dimorphism? Give an example in birds. 1+1

(f) Distinguish between orthokinesis and klinokinesis.

(g) What are crepuscular animals? Give example. 1+1

(h) Name the author of 'On aims and methods in ethology' and 'Evolution and modification of behaviour and on aggression'. 1+1

(i) State 'Aschoff's rule'.

(j) What is 'nauptial gift'?

(k) Define habituation.

(l) What is 'Darwinian fitness'?

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

(a) Differentiate between innate behaviour and acquired behaviour.

(b) Explain the evolution of altruistic trait with the help of Hamilton's rule.

(c) Write a short note on scan sampling with suitable example.

(d) Explain circannual rhythms with example. What is Zeitgeber? 2+1

(e) Describe age polyethism in honey bee society.

(f) What do you mean by asymmetry of sex? Give example. 2+1

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

(a) Define intrasexual selection. Explain it with reference to before and after mating. 1+4

(b) Describe Tinbergen's four questions in animal behaviour with suitable example. 5

(c) Illustrate with suitable diagram the round dance and waggle dance of honey bee. Write the advantages of waggle dance. 4+1

(d) Differentiate between associative and non-associative learning. Discuss Pavlov's classical conditioning theory. 2+3

(e) Define imprinting. Mention its characteristics. Describe different types of imprinting with example. 1+1+3

(f) What is female choice? State the role of melatonin in maintaining photoperiodism in animal life. 2+3

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WEST BENGAL STATE UNIVERSITY

B.Sc. Honours 5th Semester Examination, 2022-23

ZOOADSE03T-ZOOLOGY (DSE1/2)

Time Allotted: 2 Hours | Full Marks: 40

The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.

1. Answer any ***eight*** questions from the following: 2×8 = 16

(a) What are catecholamines?
(b) What do you mean by autocrine and paracrine secretion?
(c) What do you mean by neurohormones?
(d) Distinguish between diabetes insipidus and diabetes mellitus.
(e) Mention the source and function of HCG.
(f) What are eicosanoids?
(g) Name the enzymes used in ELISA.
(h) Distinguish between chromophobes and chromophils with examples.
(i) What are 'C' cells? State their functions.
(j) What is corpus luteum? Name the hormone secreted from it.
(k) Name the different phases of menstrual cycle in human.
(l) What do you mean by second messenger? Give example.
(m) Why insulin is known as hypoglycemic hormone? What is glucosuria?

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

(a) State the functions of different female hormones involved in parturition.
(b) State the physiological role of vasopressin. Why is it named 'ADH'?
(c) Name the secretory product of parathyroid gland and its physiological role.
(d) Write down the sources and names of adrenal cortical hormones.
(e) Write down the principle of Radio Immuno Assay.

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

(a) Discuss the biosignalling mechanism of peptide hormones in a target cell. 5
(b) Classify hormones on the basis of its chemical nature. 5
(c) Briefly describe the estrous cycle in rat. 5
(d) Write down the histological features of Graafian follicle. State the function of FSH and LH in male. 3+2
(e) Write short notes on: $2\frac{1}{2}+2\frac{1}{2}$
(i) Addison's disease
(ii) Acromegaly.

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WEST BENGAL STATE UNIVERSITY

B.Sc. Honours 5th Semester Examination, 2023-24

ZOOACOR11T-ZOOLOGY (CC11)

Time Allotted: 2 Hours | Full Marks: 40

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: 2×8 = 16

(a) What is B DNA?
(b) What do you mean by "Gene Silencing"?
(c) What is polysome?
(d) What is Pribnow box?
(e) Write the role of allolactose in Lac Operon.
(f) Explain the statement — "The Genetic Code is Degenerate".
(g) Define sense and antisense strands of DNA in view of Transcription.
(h) Define Chargaff's rule.
(i) What is RNA editing?
(j) What do you mean by the term 'Replicon'?
(k) What is Kozak's rule?
(l) Distinguish between leading and lagging strand in respect of DNA replication.

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

(a) What is Wobble base? What is split gene? $1\frac{1}{2}+1\frac{1}{2}$
(b) Write a short note on Genomic Imprinting.
(c) State the significance of photoreactivation in DNA repair.
(d) Write the structure and function of *E. coli* RNA polymerase.
(e) What do you mean by Lac Operon? Briefly describe its structure. 1+2

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

(a) What are the different steps in cDNA synthesis?
(b) Describe Sanger's Dideoxy method to determine the nucleotide sequence of a DNA molecule.
(c) Describe the Rho-Dependent and Rho-Independent termination of transcription.
(d) What is SOS repair? Discuss the main events that occur during the initiation phase of prokaryotic translation. 2+3
(e) What is Attenuation? Why does attenuation process works in *E. coli* but not in humans? Mention the name and function of the enzymes and proteins required for prokaryotic DNA replication. 1+1+3

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2α | 1β¹ 2 1α 2β

1 Omega
1 Beta pair

WEST BENGAL STATE UNIVERSITY

B.Sc. Honours 5th Semester Examination, 2023-24

ZOOACOR12T-ZOOLOGY (CC12)

Time Allotted: 2 Hours | Full Marks: 40

The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.

1. Answer any ***eight*** questions from the following: 2×8 = 16

(a) What is a base analog and why are some mutagenic?

(b) Calculate the number of Barr bodies in female having the genotype of 2A+XXXX.

(c) Write down the sexual phenotypes of *Drosophila* and human having chromosome complement AA, XXY.

(d) What is horizontal gene transfer and how might it take place?

(e) State the difference between the dosage compensation mechanism between man and that of *Drosophila*.

(f) What do you mean by extrachromosomal inheritance? Give an example.

(g) What is competence? What is its role in transformation?

(h) What is the purpose of performing a test cross?

(i) What is haplotype?

(j) What do you mean by coefficient of coincidence?

(k) What is an intersex fly?

(l) State the function of TRA and TRA2.

2. Answer any ***three*** questions from the following:

(a) In humans, a dimple in the chin is a dominant characteristic controlled by a single gene. A man with a chin dimple and a woman who lacks the dimple produce a child who lacks a dimple. What is the man's genotype?

(b) What is Robertsonian translocation (RT)? How does RT lead to Down Syndrome?

(c) How does sex determination in *Drosophila* differ from sex determination in humans?

(d) Design an experiment to prove that crossing over leads to linkage.

(e) Distinguish between F^+, F^-, Hfr and F' cells.

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

(a) *Drosophila* females of wild-type appearance but heterozygous for three autosomal genes are mated with males showing the three corresponding autosomal recessive traits: glassy eyes, coal coloured bodies and striped thoraxes. One thousand (1000) progeny of this cross are distributed in the following phenotypic classes:

Wild type	27
Striped thorax	11
Coal body	484
Glassy eyes, coal body	8
Glassy eyes, striped thorax	441
Glassy eyes, coal body, striped thorax	29

Draw a genetic map based on these data.

(b) What is meant by missense mutation? Briefly describe the molecular basis of a human genetic disorder resulting from 8 such mutation. Add a note on its inheritance pattern. 1+3+1

(c) In a maternity ward, four babies become accidentally mixed up, the ABO types of the four babies are known to be O, A, B and AB. The ABO types of the four sets of parents are determined. Indicate which baby belongs to each set of parents:

(i) AB×O, 1

(ii) A×O, 2

(iii) A×AB and

(iv) O×O. 1

4-2 1 3

(d) What is polygenic inheritance? Assume that there are three genes (each with two alleles) for different shades of human skin colour; genes AA, BB, EE produce darkest skin and genes aa, bb, ee produce lightest skin. What would be the predictive skin colour allele combinations if genes assort independently? 1+4

(e) What is hybrid dysgenesis? Why it does not occur when crossing P strain females with M strain males? 3+2

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WEST BENGAL STATE UNIVERSITY

B.Sc. Honours 5th Semester Examination, 2023-24

ZOOADSE01T-ZOOLOGY (DSE1/2)

Time Allotted: 2 Hours | Full Marks: 40

The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.

1. Answer any ***eight*** from the following questions: 2×8 = 16

   (a) What is focalanimal sampling?

   (b) What is group selection?

   (c) Distinguish between open and closed instinct.

   (d) What is 'critical period' for imprinting?

   (e) What is meant by circalunar rhythm? Give example.

   (f) Name two pioneer Indian workers in the field of animal behaviour.

   (g) Define inclusive fitness.

   (h) Can sleep be considered as a behaviour? Why?

   (i) Mention the significance of tail wagging dance in honeybees.

   (j) What is chronobiology?

   (k) Give an example of second order conditioning.

   (l) Define habituation with example.

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

   (a) What are ultradian and infradian rhythms? Give examples. 3

   (b) What is haplodiploidy? Give an example of eusocial mammal. 2+1

   (c) What is reciprocal altruism? Explain with example. 3

   (d) What do you mean by handicap hypothesis? Explain with suitable example. 3

   (e) How does unconditional response converted to conditional response in associative learning? 3

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

   (a) What do you mean by FAP? Mention the characteristics of stereotyped behaviour. What is meant by 'Umwelt' in ethology? 2+2+1

   (b) Explain Hamilton's rule to explain altruism in social hymenopterans. 5

   (c) What do you mean by 'Zeitgeber'? What are meant by amplitude, phase and period in connection to biological oscillation? 2+3

   (d) Discuss the advantages and disadvantages of group living. 3+2

   (e) Explain the role of pineal gland in biological clock. What is SAD? What is oblique cultural transmission? 3+1+1

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WEST BENGAL STATE UNIVERSITY

B.Sc. Honours 5th Semester Examination, 2023-24

ZOOADSE03T-ZOOLOGY (DSE1/2)

Time Allotted: 2 Hours | Full Marks: 40

The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.

1. Answer any ***eight*** questions from the following: 2×8 = 16

(a) Give an example of a glycoprotein hormone and a tyrosine containing hormone.
(b) What is C19 steroid?
(c) How would you distinguish metestrus stage from estrus stage?
(d) Write the source and function of inhibin.
(e) Name the hormones secreted from the adrenal cortex.
(f) Write two important functions of oxytocin.
(g) Name any two hypothalamic nuclei and state their functions.
(h) Distinguish between type I and type II diabetes mellitus.
(i) What are thyrotrophs? State their functions.
(j) State the location and function of sertoli cells.
(k) What is G-protein? Write its function.
(l) What are catecholamines?

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

(a) Distinguish between estrus cycle and menstrual cycle. 3
(b) What do you mean by autocrine, paracrine and endocrine mode of signalling? 1+1+1
(c) What is LH surge? Mention its significance. 1+2
(d) Define "Bioassay". Why ELISA and RIA are considered as immunoassay? 1+2
(e) Establish the feedback control mechanism in TSH-Thyroxine axis. 3

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

(a) Classify hormones on the basis of chemical nature. What are prostaglandins? 4+1
(b) Describe the histological structure of endocrine pancreas with suitable diagram. 4+1
(c) Discuss the biosignaling mechanism of a hormone in a target cell that does not require a second messenger molecule. 5
(d) Describe the principle and procedure of Sandwich ELISA with proper illustration (any ***one*** method). 1+4
(e) Write notes on (any ***two***): $2\frac{1}{2}\times2 = 5$

(i) Cushing's disease
(ii) ABP (Androgen binding protein)
(iii) Corpus Luteum.

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