Unique Paper Code : 42231102_OC

Semester : I

Set : 1

Name of the Paper : Animal Diversity

Name of the Course : B.Sc. (P) Life Science, CBCS

Duration : 3 Hours

Marks : 75

Instruction for Students

Write your Roll No., Name of the paper, Course, Semester, and Date of examination on the first page of answer sheet.

There are two sections, Section A and Section B to be answered on separate answer sheets.

Answer any **TWO** questions from each section. **All questions carry equal marks**.

Substantiate your answer with diagrams wherever necessary.

Section A

Q1. Explain the life cycle of *Ascaris lumbricoides* with the help of well labelled diagram along with its parasitic adaptations. 18.75

Q2. Write general characteristics of phylum coelenterata and explain different types of polymorphism in Hydrozoa. 18.75

Q3. Write in details about regulation and different types of metamorphosis observed in the phylum arthropoda. 18.75

Section B

Q4. Discuss in details about the different theories which explains the origin of mammals. 18.75

Q5. Write the general characters of pisces. Explain in details the process of osmoregulation in fresh water and marine teleost. 18.75

Q6. . Discuss the general characters of reptiles along with the biting mechanism in snakes. 18.75

SET A

OPEN BOOK EXAMINATION (OBE) MODE

This question paper contains 1 printed page]

Sr. No. of Question Paper ..... **Roll No. .....**

Unique paper Code : 42234301_OC
Name of the paper : Physiology and Biochemistry
Name of the Course : B.Sc. (P) Life Sciences
Semester : III
Duration : 3 Hours
Maximum Marks : 75

Instructions for Candidates

- Attempt **4** questions in all including 2 questions from section A and 2 from Section B.
- All questions carry EQUAL MARKS
- Write your Roll No., Name of the paper, Course, Semester, and Date of examination on the first page of answer sheet.
- *Draw* neat and well labelled diagrams wherever necessary.

(Section A)

Q1. What is the smallest contractile unit of the muscle? How does the muscle proteins slide past each other to generate movement? **18.75**

Q2. Give a brief-account of the mechanism used to concentrate urine in the kidneys by the nephrons of the human excretory system? What is the structure and function of nephron? **18.75**

Q3. Carbohydrates are not chemically broken down in the stomach. How carbohydrates are digested and absorbed?Where does chymotrypsin take action? **18.75**

(Section B)

Q4. Give a detailed account of glycogenesis and glycogenolytic pathway. Explain how glycogenolysis is different from gluconeogenesis? **18.75**

Q5. Explain β-oxidation of fatty acids. **18.75**

Q6. What evidences suggest the formation of enzyme substrate complexes. Explain the relation between rate of reaction and concentration of substrate**.** **18.75**

SET- 'A'
B.Sc. Life Science / Semester III
Unique Paper Code: 42164301
Paper Title: Plant Anatomy and Embryology

Time: 3 + 1 Hours **Maximum Marks: 75**

(Write your University Roll Number and Paper Title and Unique Paper Code on top of the Answer Sheet)

Attempt *any four* questions in all. All questions carry equal marks (i.e., 18.75).

Q1. What do you understand by cambial zone? Using well-labeled diagrams describe how it is involved in the growth of a stem.

Q2. Discuss various anatomical adaptations in hydrophytes and xerophytes with the help of suitable examples and well-labeled diagrams.

Q3. While labeling the newly prepared slides of *Helianthus* plant parts, the museum curator mixed up the labels. How can he distinguish the slides of root and stem of the plant? Explain using well-labeled diagrams.

Q4. Discuss the significance of sexual reproduction? With the help of a flowchart, describe the process of sexual reproduction in an angiosperm.

Q5. What is the significance of cross pollination? Write a brief account of the various strategies adopted by angiosperms to transfer pollen from anther of one flower to stigma of another flower.

Q6. What is double fertilization? Describe the development of the two products of double fertilization during the formation of a dicotyledonous seed. Support your answer with well-labeled diagrams.

S.No. of Question Paper:……..

SET- 'A'
B.Sc. Life Sciences/ III Sem
Paper Name: Plant Anatomy and Embryology
Unique Paper Code: 42164301_OC

Time: 3 + 1 Hours **Maximum Marks: 75**

(Write your University Roll Number, Paper Title and Unique Paper Code on top of the Answer Sheet)

Attempt any four questions in all. All questions carry equal marks (18.75 marks each).

Q.1. Discuss different types of ovules found in angiosperms with respect to the presence and arrangement of different ovular structures.

Q.2. What features and adaptations regarding seed dispersal have helped flowering plants to conquer the diverse habitats of the world.

Q.3. Comment on the structure, functions and different types of endosperm. Give a brief account of embryo-endosperm relationship.

Q.4. What are permanent tissues? Classify permanent tissues and describe them with the help of suitable diagrams.

Q.5. Explain the structure of dicot stem and discuss secondary growth in dicot stem with the help of diagrams.

Q.6. Give an account of classification of stomata in dicots as proposed by Metcalfe and Chalk. Describe anatomical adaptations of hydrophytes with suitable examples and diagrams.

B.Sc. APPLIED LIFE SCIENCE Semester III
PAPER: FUNDAMENTALS OF PLANT SYSTEMATICS AND ECOLOGY
Unique Paper Code: 42174302_OC

Duration: 3 hours+ 1 hr for scanning & uploading **Max. Marks: 75**

(Write your University Roll Number and Paper Title & Code on top of the Answer Sheet)

Attempt four questions in all including two questions from each section. All questions carry equal marks (18.75).

SECTION A

Q.1. Give an outline of system of classification used for the general purpose classification. Enlist any five advantages of the system. What are the possible drawbacks of the system?

Q.2. Comment briefly on the importance of a botanical garden, the multiple access keys and double author citations.

Q.3. What is typification? Enlist the various kinds of 'types'. How do the paratypes differ from the neotypes. Give the full form of the abbreviations **DC**, ***nom.cons.***, **L.**, **APG** & **IAPT.**

SECTION B

Q.4**.** Define biotic interactions. Enumerate different kinds of biotic interactions which occur in nature. Explain any three positive interactions.

Q5. What is Soil? Discuss in details various factors and processes which help in the process of soil formation. With the help of a labelled diagram explain soil profile.

Q6. Discuss in details various analytical and synthetic characters used to study a community. How did Danish botanist C.C. Raunkiaer contribute to the community studies?

SET -III

Applied Life Science /V Sem
Paper title: Genetics and Plant Biotechnology
Unique Paper Code – (42167903)

Time: 3 hrs Max. Marks: 75

(Write Your University Roll No., Paper Title and Unique Paper Code on top of the Answer Sheets)

Attempts *FOUR* questions in all.

All questions carry equal marks (18.75)

1. What is extrachromosomal inheritance? Explain the variegation pattern in 4'Oclock plant. Make comparison between incomplete dominance, codominance and dominance?

2. Discuss the aneuploidy and euploidy of chromosome in detail. How many barr bodies are present in an individual with Down and Turner syndrome? Also mention the symptoms of these two syndromes.

3. Give the features of an ideal cloning vector. Explain the structure of Ti plasmid. How *Agrobacterium* mediated transformation is carried out in laboratory?

4. Discuss the different strategies followed for the development of stress resistance plants. Give the public perception to biotechnology.

5. Give experimental evidences to prove DNA as hereditary material. How it is organized in the nucleus?

6. A female drosophila heterozygous for three X-linked mutations (y, yellow body; B, bar eye shape; v,vermilion eye color) to wild type males. The F_1 females were backcrossed to male recessive for all the three genes, yielding the following results

1	Yellow, Bar, vermilion	270
2	wild type	311
3	Yellow	90
4	Bar, vermilion	110
5	Yellow, vermilion	83

6	Bar	90
7	Yellow, Bar	24
8	Vermilion	22

Determine the order of these three loci on the X chromosome and estimate the distance between them. Also calculate the coefficient of coincidence and interference.

Unique Paper Code : **42167905**

Name of the Course : **B. Sc. (P) Life Sciences**

Name of the Paper : **Bioinformatics**

Semester : **V**

Duration : **3 + 1 Hrs** Maximum Marks : **75**

Instructions for Candidates

Attempt *four* questions in all. All questions carry equal (18.75) marks.

Attempt all parts of the questions together.

Write your examination roll number on answer sheet.

Q1: Discuss importance of bioinformatics in biological sciences and discuss its applications in research? (8.75+10)

Q2: Discuss salient features of Biological databases and its types? (8.75+10)

Q3: Define Standard BLAST in detail and discuss its uses in bioinformatics? (10+8.75)

Q4: Write down the steps for construction of phylogenetic tree and discuss different methods of tree construction in detail. (10+8.75)

Q5: Describe salient features of protein databases. Discuss PIR database and the three layers of Uniprot database in detail. (8.75+5+5)

Q6: Discuss multiple sequence alignment in detail with the help of flow chart. Write its significance also. Name five important tools of multiple sequence alignment. (8.75+5+5)

SET -A

Unique Paper Code : **42167902**

Name of the Paper : **Cell and Molecular Biology**

Name of the Course : **B.Sc (Life Sciences)**

Semester : **V**

Duration : **4 Hours (3 hours for answering and 1 hour to download question paper and upload the Pdf of scanned answer sheets as one file)**

Maximum Marks : **75**

GUIDELINES TO ATTEMPT THE QUESTION PAPER

- ATTEMPT THE QUESTION PAPER ON NUMBERED A-4 SIZE SHEETS
- MENTION: NAME, ROLL NUMBER, DATE, AND EXAMINATION SUBJECT ON THE TOP
- YOU HAVE TO DOWNLOAD THE QUESTION PAPER, UPLOAD AND MAIL THE SCANNED ANSWER SHEETS AS A SINGLE PDF FILE WITHIN FOUR HOURS ONLY.

INSTRUCTIONS: Attempt any 4 questions. All questions carry equal marks.

Q1. Compare the working of light microscope with an electron microscope. What are the significant features of fluorescent microscopy? (Marks-18.75)

Q2. Distinguish between prokaryotic and eukaryotic cell. Describe in detail about the organelles involved in protein synthesis in eukaryotes. (Marks-18.75)

Q3. Explain the structure and function of the control centre of the cell. Draw well labelled diagrams to explain in detail the packaging of genetic material in eukaryotic cells.

(Marks-18.75)

Q4. Discuss various phases of cell cycle and give its significance. Explain in detail about the various stages of cell division involved in the formation of gametes.

(Marks-18.75)

Q5. What is central dogma of molecular biology? Discuss the process of formation of messenger RNA from DNA template in *Escherichia coli*. Explain the structure of tRNA with a

well labelled diagram.
(Marks-18.75)

Q6. Differentiate between the positive and negative control of gene regulation in inducible operon. Explain the salient features of genetic code.
(Marks-18.75)

SET - B

Unique Paper Code : **42167902**

Name of the Paper : **Cell and Molecular Biology**

Name of the Course : **B.Sc (Life Sciences)**

Semester : **V**

Duration : **4 Hours (3 hours for answering and 1 hour to download question paper and upload the Pdf of scanned answer sheets as one file)**

Maximum Marks : **75**

GUIDELINES TO ATTEMPT THE QUESTION PAPER

- ATTEMPT THE QUESTION PAPER ON NUMBERED A-4 SIZE SHEETS
- MENTION: NAME, ROLL NUMBER, DATE, AND EXAMINATION SUBJECT ON THE TOP
- YOU HAVE TO DOWNLOAD THE QUESTION PAPER, UPLOAD AND MAIL THE SCANNED ANSWER SHEETS AS A SINGLE PDF FILE WITHIN FOUR HOURS ONLY.

INSTRUCTIONS: Attempt any 4 questions. All questions carry equal marks.

Q1. Explain the principles and optics of confocal and fluorescence microscopy. Differentiate between transmission electron microscope and scanning electron microscope.

(Marks-18.75)

Q2. What are the major defining features that differentiate eukaryotic cells from their prokaryotic counterparts? Discuss the roles of semi-autonomous organelles in

endosymbiotic theory of the origin of eukaryotes.
(Marks-18.75)

Q3. Give a detailed account of the structure and functions of any <u>three</u> cell organelle.

(Marks-18.75)

Q4. Give an overview of cell cycle. How does a cell maintain its fidelity during the process? Explain the various stages of cell division that occur in somatic cells.

(Marks-18.75)

Q5. Give an account of the various cell components required for protein synthesis. Describe the complete process of translation in *Escherichia coli*.
(Marks-18.75)

Q6. Differentiate between an inducible and a repressible operon with illustrations. DNA is a genetic material – justify with an experimental evidence.
(Marks- 18.75)

SET -C

Unique Paper Code : **42167902**

Name of the Paper : **Cell and Molecular Biology**

Name of the Course : **B.Sc (Life Sciences)**

Semester : **V**

Duration : **4 Hours (3 hours for answering and 1 hour to download question paper and upload the Pdf of scanned answer sheets as one file)**

Maximum Marks : **75**

GUIDELINES TO ATTEMPT THE QUESTION PAPER

- ATTEMPT THE QUESTION PAPER ON NUMBERED A-4 SIZE SHEETS
- MENTION: NAME, ROLL NUMBER, DATE, AND EXAMINATION SUBJECT ON THE TOP
- YOU HAVE TO DOWNLOAD THE QUESTION PAPER, UPLOAD AND MAIL THE SCANNED ANSWER SHEETS AS A SINGLE PDF FILE WITHIN FOUR HOURS ONLY.

INSTRUCTIONS: Attempt any 4 questions. All questions carry equal marks.

Q1. Explain the techniques of freeze fracture and etching, negative staining, shadow casting and cryofixation with illustrations. (Marks-18.75)

Q2. Discuss the structure and functions of chloroplast, mitochondria and lysosomes. (Marks -18.75)

Q3. Describe the fluid mosaic model of cell membrane and state its functions. (Marks-18.75)

Q4. Write a detailed account of reduction division and its significance in biological science? (Marks-18.75)

Q5. Discuss the different types of RNA and their functions. Also distinguish between different forms of DNA. (Marks-18.75)

Q6. What is genetic code? How was it deciphered? Discuss the various properties of genetic code. (Marks-18.75)

SET-C

This question paper contains 1 printed page.

Sr. No. of Question Paper _____ Your Roll No.....

Name of the Course : B.Sc. (Prog.) Applied Life Sciences with Agrochemicals and Pest Management
Semester : V
Unique Paper Code : 42237907
Name of the Paper : General Entomology

Time: 3 Hours Maximum Marks: 75

Instructions for Candidates

1. Write your Roll No., name of the paper, course, semester and date of examination on the first page of your answer sheet.
2. Attempt **ANY FOUR** questions.
3. All questions carry equal marks.
4. Draw well labelled diagram wherever necessary.
5. Each question carries equal marks (18.75).

1. Give a broad outline classification of insects up to orders with suitable examples. Add a note on the characteristic features of any four economically important orders.
2. Do insects hibernate? If not, then how do they cope with adverse climatic conditions. Explain this process of suspended development in insects and differentiate it from hibernation? Add a note on parthenogenesis and its types.
3. Describe the structure and functions of the organs associated with insect digestion. Also explain the mechanism of this vital process.
4. Give an account of various types of metamorphic development patterns in insects. How does the neuroendocrine system help in its regulation?
5. How do insects process and excrete their nitrogenous waste? Explain the mechanism in aquatic and terrestrial insects.
6. Describe the general structure of insect head along with a suitable diagram. what is the role of antenna in insect survival? Diagrammatically explain different types of antenna found in insects with examples.

SET-B

This question paper contains 1 printed page.

Sr. No. of Question Paper _____ Your Roll No.....

Name of the Course : B.Sc. (Prog.) Applied Life Sciences with Agrochemicals and Pest Management
Semester : V
Unique Paper Code : 42237907
Name of the Paper : General Entomology

Time: 3 Hours Maximum Marks: 75

Instructions for Candidates

1. Write your Roll No., name of the paper, course, semester and date of examination on the first page of your answer sheet.
2. Attempt **ANY FOUR** questions.
3. All questions carry equal marks.
4. Draw well labelled diagram wherever necessary.
5. Each question carries equal marks (18.75).

1. How can you collect different insects and preserve them? Explain the rearing process for any 3 economically important insects.
2. Why are the antennae and mouthparts of insects very important for their survival? Diagrammatically explain different kinds of antennae and any 4 types of mouthparts found in insects with examples.
3. Insects have mosaic vision which help them to identify the slightest of the movements. Justify this statement with detailed structure of compound eyes and the different kinds of image formation.
4. Give an account of various types of metamorphic development patterns in insects. How does the neuroendocrine system help in its regulation?
5. How do insects process and excrete their nitrogenous waste? Explain the mechanism in aquatic and terrestrial insects.
6. Give a broad outline classification of insects up to orders with suitable examples. Add a note on the characteristic features of economically important orders.

Unique paper code	:	42177935
Name of the paper	:	DSE- Fungicides
Name of the Course	:	B.Sc (prog) Applied Life Sciences, Agrochemicals and pest management
Semester	:	V
Duration	:	3 Hours
Maximum Marks	:	75

Attempt any ***Four*** questions in all.
Question no.**1** is ***compulsory***.
Attempt ***Three*** questions from the rest.

Q.1. (a) Give the complete classification of mercury fungicides with suitable examples. Take any two examples of organomercury fungicides and comment on their mode of action and toxicity.

(b) Give in brief what are rodenticides. Give their classification. Comment on the action of Warfarin as rodenticide.

12, 9

Q.2. (a) Giving examples, write a short note on molluscicides. Give the synthesis of metaldehyde and its probable mode of action..

(b) Giving examples, write a short note on Nematicides Give the synthesis of metam-sodium , What is its mode of action?

9, 9

Q.3 (a) Give the classification of fungicides based on their Chemical Class with examples.

Contd…..page -2

(b) Define the following terms :

I. Fungistat
II. Antisporulant
III. Protective fungicides
IV. Curative fungicides
V. Contact fungicides
VI. Systemic fungicides.

9, 9

Q.4. (a) Dichlone belongs to which chemical class of fungicide? Write its structure and comment on its mode of action.

(b) Benomyl absorbed by plants is rapidly metabolized in the tissue fluids into MBC .What is the structure of MBC. Also comment on its fungicidal activity.

9, 9

Q.5. Attempt any *Three* :

(a) Write the various key points of the biological mode of action of fungicides which exert the potential effects on fungi to control fungal diseases.

(b) What is the structural unit of Dithiocarbamate group? Give the preparation of Nabam and write the chemical equation involved.

(c) Write a short note on Dinitrophenols as fungicides.

(d) Write a short note on copper fungicides.

6, 6, 6

Q.6**.** (a) What are fumigants? Explain giving at least four examples of your choice? Give the structure of these fumigants.

(b) List the various chemical and physical characteristics of fumigants. Explain any four of these characteristics in brief.

9, 9

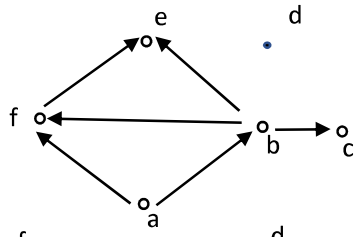
Name of Course	: **CBCS B.Sc. (Math Sci)- II / B.Sc. (Phy Sci)-II / B.Sc. (Life Sci)-II /Applied Sciences-II**
Unique Paper Code	: **42357502**
Name of Paper	: **DSE- Mechanics and Discrete Mathematics**
Semester	: **V**
Duration	: **3 hours**
Maximum Marks	: **75 Marks**

Attempt any four questions. All questions carry equal marks.

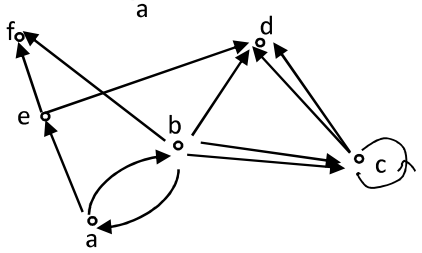
1. Define the radial and transverse components of velocity vector along plane curve. Give the examples and describe how to evaluate the magnitude of the resultant velocity.

Find in-degree and out-degree of each vertex in the following directed graphs as shown in figures:

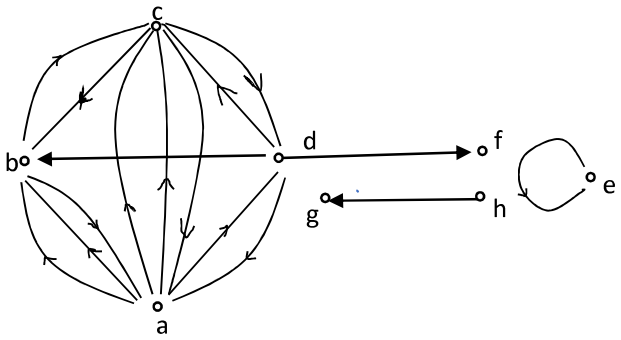
(i)



(ii)



(iii)



2. A particle moves with simple harmonic motion and its motion describe by the equation: $x = a\sin\omega t$, t is time as usual and a and ω are constants. Show that its phase:

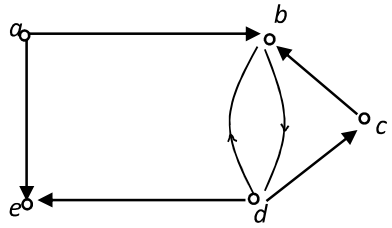
$$\phi = \tan^{-1}\left(\frac{x_0\omega}{v_0}\right)$$

and its amplitude:

$$a = \frac{\sqrt{x_0\omega^2 + v^2}}{\omega}$$

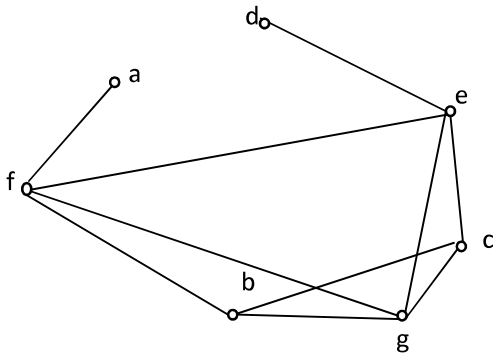
where $x = x_0$ and $\dot{x} = v_0$ when $t = 0$ (Initial conditions).

Find the number of paths of length 2 and 3 between vertex *a* and *d* of the following graph:



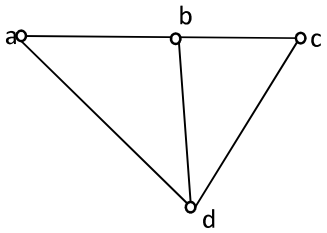
3. State Newton's laws of motion. Prove Newton's second law of motion.

Does the following graph has Hamiltonian path. If yes, find Hamiltonian path ?



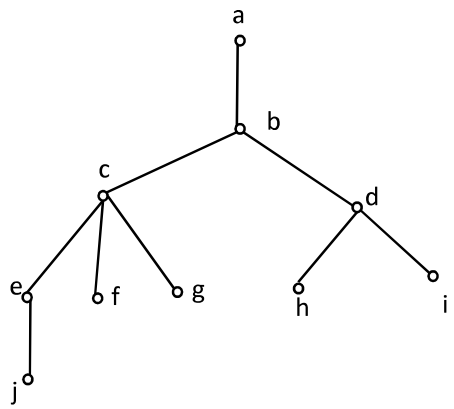
4. Let ABCD is a square of side 2a. Forces 4P, 3P, 2P, 4P Newtons act along the sides AB, CB, CD, AD respectively indicated by the order of letters. Find (i) The magnitude and direction (ii) The line of action of resultant.

How many spanning trees does the following graph have? Draw all of them.



5. A box is placed on inclined plane and has to be pulled upward direction. The angle of inclination is α and θ is the angle of pull, say P, to the horizontal. Find the direction and magnitude for the minimum pull P.

Given the tree with root at 'a' as shown below.



(i) Find the parents of c and h.

(ii) Find the children of d and e.

(iii) Find the descendents of c and e.

(iv) Find the siblings of f and h.

(v) Find the leaves.

(vi) Find the interval vertices.

(vii) Draw the subtree rooted at c.

(viii) What is the height of rooted tree.

6. Show that the centre of gravity of triangle is trisection of the median and also find the condition when centre of gravity coincides with that of three particles of the same weight placed at its corners.

How many vertices and how many edges do the following graphs have:

(i) $\mathbf{K}_n$ (ii) $\mathbf{C}_n$ (iii) $\mathbf{W}_n$ (iv) $\mathbf{K}_{m,n}$.

where m and n are natural numbers.

Unique Paper Code	:	42237903
Name of the Paper	:	DSE – Animal Biotechnology
Name of the Course	:	B.Sc. (Prog.) Life Sciences Examination, 2020-CBCS
Semester	:	V
Duration	:	3 hours
Maximum Marks	:	75 Marks

Instructions for Candidates

Write your Roll No., Name of the paper, Course, Semester, and Date of examination on the first page of answer sheet.

Attempt **ANY FOUR** questions. **All questions carry equal marks**.

Illustrate your answers with appropriate diagrams wherever necessary.

1. Describe how chimeric DNA is prepared and what different tools are required for the purpose. (18.75)
2. What are the important features required in a cloning vector? Explain one example each of the vectors used for a prokaryotic cell, plant cell and animal cell. (18.75)
3. Describe how biochips are used for studying the gene expression? Add a note on its applications. (18.75)
4. Describe the Chain termination method of DNA sequencing using the sequence 3' - ATGGCTACGTACCTAGATCCT –5' with all the steps involved in the process. Also enumerate the applications of the DNA sequencing technique. (18.75)
5. Discuss in detail about different strategies of production of Insect resistance plants. (18.75)
6. How does biotechnology help in the molecular diagnosis of diseases? Elaborate any one diagnostic test that has been developed for Sickle Cell Anaemia. (18.75)

Unique Paper Code	:	42237903
Name of the Paper	:	DSE – Animal Biotechnology
Name of the Course	:	B.Sc. (Prog.) Life Sciences Examination, 2020-CBCS
Semester	:	V
Duration	:	3 hours
Maximum Marks	:	75 Marks

Instructions for Candidates

Write your Roll No., Name of the paper, Course, Semester, and Date of examination on the first page of answer sheet.

Attempt **ANY FOUR** questions. **All questions carry equal marks**.

Illustrate your answers with appropriate diagrams wherever necessary.

1. Recombinant DNA Technology is a multidisciplinary science without overlapping boundaries. Discuss this statement with examples. (18.75)
2. Explain the various steps required to clone a gene of interest using pUC19 vector. Briefly explain the nomenclature of plasmid vectors with examples. (18.75)
3. Explain with diagram the technique by which protein identification is done. How it differs from Southern and Northern Blotting? (18.75)
4. What is the role of non-coding DNA region comprising of VNTRs and STRs in the process of DNA Fingerprinting? Add a note on its significance in forensic sciences. (18.75)
5. What gene manipulation strategies can be adopted for generating herbicide-resistant plants? Elaborate the strategy that was used for creating Roundup Ready crops that were resistant to glyphosate. (18.75)
6. A patient is suffered from a genetic disease that is the result of deletion of phenylalanine at position 508 in CFTR protein. This is the one of the most common lethal autosomal disorders in Europeans and their descendants. What is the name of this disorder? Which

molecular techniques are used to diagnose the occurrence of specific disorder in human at genetic level? Write the name of techniques and describe each. (18.75)

This question paper contains 1 page

Unique Paper Code : 42237905

Name of the Course **: B.Sc. (Prog.) Life Sciences (CBCS)**

Name of the Paper : DSE-Applied Zoology

Semester : V

Duration : 3 Hours

Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No., Course, Name of paper, Semester and Date of Examination on first page of answer sheet.
2. Draw the diagram, wherever necessary.
3. Attempt **FOUR** questions. Each question carries **equal** marks.

Q1. If a person is having the symptoms of high fever, chills, headache, abdominal discomfort, nausea, loose stools and loss of appetite and had undergone medical diagnosis of positive Widal test. Suggest the prophylaxis of the disease? Discuss its mode of transmission, control and prevention. **18** **3/4**

Q2. A vertebrate insect parasite leads to fatigue, fever with sweating and shivering, headache, muscle pain, diarrhoea, nausea and vomiting. Identify the disease and describe the pathogenicity and life cycle of the causative organism. **18** **3/4**

Q3. Compare the life cycle of the malarial parasite with the one that leads to lymphatic filariasis. Give medical importance, control and curative measures of the diseases. **18** **3/4**

Q4. Every year, farmers in our country face the problem of insect attacks on green crops. Discuss about the extent of damage, control measures and cure for any two crop pests. **18** **3/4**

Q5. Describe the principles and practices for sustainable dairy farming. Write all you know about the organic dairy farming practices and its advantages. **18** **3/4**

Q6. Justify if aquaculture is an Industry? What are the challenges and opportunities in aquaculture in India? **18** **3/4**

Name of the course:	B.Sc. (Prog.) Life sciences
Name of the paper:	DSE- Reproductive Biology
Semester:	V
Unique paper code:	32237910
Duration:	3 hours
Maximum Marks:	75

Instructions for candidates

Write your Roll no. on the top immediately on receipt of this question paper.
Answer any **FOUR** questions in all. All questions carry equal marks (18.75 marks each).
Draw well labelled diagrams wherever necessary.

Q1. Differentiate between steroids and peptide hormones elaborating on their mode of action. Add a note on the hypothalamo-hypophyseal portal system.

Q.2 Draw a well labelled diagram of T.S. of testis and explain in detail about the cellular functions and stem cell renewal in Testis of males.

Q.3 Give a detailed account of folliculogenesis. Add a note on role of gonadotropin in folliculogenesis.

Q.4 Discuss the hormonal regulation of menstrual cycle. How does the menstrual cycle differ from estrous cycle?

Q.5 What are the features of a good contraceptive? Discuss intrauterine devices in details with emphasis over their advancement over the years.

Q.6 What is Ferguson reflex? Discuss the role of prostaglandin in parturition.

This question paper contains 1 page

Unique Paper Code : 42237905

Name of the Course **: B.Sc. (Prog.) Life Sciences (CBCS)**

Name of the Paper : DSE-Applied Zoology

Semester : V

Duration : 3 Hours

Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No., Course, Name of paper, Semester and Date of Examination on first page of answer sheet.
2. Draw the diagram, wherever necessary.
3. Attempt **FOUR** questions. Each question carries **equal** marks.

Q1. Give a brief account of the tick borne disease that is found to be prevalent in refugee areas having symptoms of high fever, chills, headache, muscular and joint pain followed by a characteristic skin rash. How is this comparable to a bacterial disease that is transmitted to humans through the bite of infected black legged ticks? **18 3/4**

Q2. Give a detailed account of the pathogenicity and life cycle of the causative organism of a disease that is transmitted to humans by the bite of fly and shows the symptoms of headache, fever, joint pains, itching, confusion and impaired coordination. **18 3/4**

Q3. Compare the life cycle of the parasites which lead to Japanese encephalitis and break bone fever. Give medical importance, control and curative measures of the diseases. **18 3/4**

Q4. Every year, farmers in our country face the problem of insect attacks on cereals and legumes. Discuss about the extent of damage, control measures and cure for any two such pests. **18 3/4**

Q5. Write all you can think about practices, management, animal husbandry and milk production in establishing a profitable and successful dairy farm business plan. **18 3/4**

Q6. What are the basic principles in poultry husbandry? Explain management of different breeding strategies for improvement of poultry. How are high yielding breeds of poultry advantageous over indigenous breeds? **18 3/4**

Roll no. ……..

Unique Paper Code : 42177913

Name of the Paper : DSE: Molecules of Life

Name of the Course : B.Sc. Prog.

Semester : V

Duration : 3 hours

Maximum Marks : 75

Instructions for Candidate

1. Attempt any **four** questions in all.
2. Question no. 1 is **compulsory** carries 15 marks. All other questions are of 20 marks each.

1. Attempt any **fifteen (15**) of the following:

i) Hardening of oil on exposure to air and light is called_____.

ii) Fat and oils are ester of fatty acids with _____.

iii) What are fatty acids?

iv) Write the value of Respiratory coefficient (R. Q.) of palmitic acid.

v) In anaerobic respiration, the production of ATP takes place through_____.

vi) In glycolysis, a glucose molecule is split into two three carbon molecules called_____.

vii) Process of learning and memory are believed to be controlled by_____.

viii) In the formation of DNA and RNA, sugars are joined to the phosphate with the help of_____.

ix) We obtain nucleosides by joining one of the purines or pyrimidines to the sugar through_____ bond.

x) Our body does not allow the temperature to increase beyond_____.

xi) A high value of _____ indicates that the enzyme does not bind with the substrate.

xii) Denaturation of an enzyme _____ be reversed.

xiii) Give two methods of synthesis of α-amino acids.

xiv) Define isoelectric point.

xv) What are reducing and non-reducing sugars? Give an example of each case.

xvi) Prefix D-is given to fructose even though it is levorotatory. Explain? (1x15=15)

2. a) How will you convert glucose into fructose and fructose into glucose?

b) Explain the following terms giving suitable examples:

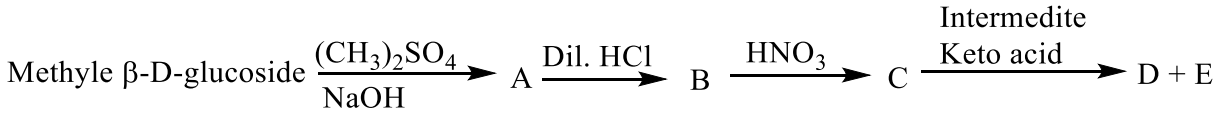
i) Denaturation of Proteins ii) Isoelectric point of amino acids.

c) What are the hydrolysis product of nucleic acid? Write the structure of any two purines and any two pyrimidines.

d) Define Iodine value. A triglyceride has a molecular weight of 790 and contains three double bonds. Calculate its iodine number. (5x4=20)

3. a) Write down the structure of phospholipids. What are lipid bilayers and how are they formed?

b) Identify compounds (structure) A, B, C, D and E in the following sequence of reactions:



c) What is the difference between nucleosides and nucleotides? Give the structure of Guanosine5′-triphosphate, dCTP and dGMP.

d) What are peptides? Write Merrifield solid phase synthesis for a dipeptide Gly-Phe.

(5x4=20)

4. a) What is ninhydrin test? Explain with mechanism.

b) How does DNA differ from RNA? Draw their structures.

c) Glucose and fructose give the same osazone. Explain by giving the reactions involved.

d) Explain Trans-esterification. Give the structures of two omega 3 and two omega 6 fatty acid. What is the role of omega 3 fatty acid in the human body? (5x4=20)

5. a) Draw the Haworth structure of Sucrose, Maltose, Lactose, cellobiose and cellulose.

b) What is the role of RNA in protein synthesis?

c) A pentapeptide on partial hydrolysis gave three tripeptides fragments: Gly-Val-Ala, Phe-Gly-Val, Val-Ala-Leu. Identify the sequence of the amino acid in the pentapeptide.

d) What is the structure of α- and β-glucose? How can its open chain structure be determined? (5x4=20)

6. a) Explain the various steps in classical peptide synthesis. What are its drawbacks?

b) What is enzyme inhibition? Explain competitive, non-competitive inhibition and allosteric inhibition.

c) What happens when fructose is heated with excess of phenylhydrazine? Give its mechanism.

d) Explain Glycolysis cycle. (5x4=20)

Roll No. ……..

Unique Paper Code : 42177913

Name of the Paper : DSE: Molecules of Life

Name of the Course : B.Sc. Prog.

Semester : V

Duration : 3 hours

Maximum Marks : 75

Instructions for Candidate

1. Attempt any **four** questions.
2. Question no. 1 is **compulsory** carries 15 marks. All other questions are of 20 marks each.

1. Attempt any **Five**: (3 x 5)

a) What do you mean by good and bad cholesterol? What are their effects on our body?

b) Differentiate between cofactor and coenzyme with example.

c) What is the fate of pyruvate in the biological system?

d) Give the name and structure of acidic and basic amino acids.

e) Give the full name of "DCC" and "*t*-Boc" and highlight their use in peptide synthesis.

f) Differentiate between fibrous and globular proteins with examples.

g) What is meant by reducing and non-reducing sugars? Give the structure and name of each.

2. (5 x 4)

a) Draw the Fischer and Haworth projection of β-D-fructofuranose and α-D-glucopyranose.

b) How will you convert:
   - Aldopentose into aldohexose
   - Glucose into fructose

c) What do you understand by stereochemical specificity and substrate specificity. Give suitable example of each.

d) Differentiate between fats and oil. Give the skeletal structure and the reaction of a lipid which on hydrolysis yields glycerol, oleic acid.

3. (5 x 4)

a) Write down the Merrifield solid phase synthesis for a dipeptide Phe-Gly.
b) Write the structure and mechanism of the product formed by the Edman degradation of polypeptide Leu-Gly-Ala-Phe-Tyr-Val. What fragment of peptide chain will leave after the degradation reaction?
c) How many types of reactions are involved in metabolism? Discuss briefly with an example of each type.
d) Give the chemical reaction that support the fact that glucose has a cyclic structure.

4. (5 x 4)

a) What is the difference between nucleosides and nucleotides? Give the structure of Guanosine-5′-triphosphate.
b) How many types of RNA are known which works collectively for protein synthesis?
c) What is glycolysis? Give the steps involved in the conversion of glucose to glyceraldehyde during glycolysis.
d) What is denaturation of proteins. Explain with suitable examples.

5. (5 x 4)

a) Define saponification number. Calculate the saponification number of glyceryl tripalmitate having Mol. Wt. 806 (Mol. Wt. of KOH = 56).
b) What is Chargaff's rule? Draw structure of fragment of DNA showing A-T and G-C pairing.
c) Give the mechanism for the formation of glucosazone. Explain why glucose and fructose give same osazone derivative.
d) Differentiate between glycolipids and phospholipids. What is their significant role in biological system?

6. Write short notes on any **four** of the following: (5 x 4)

a) Secondary structure of proteins
b) Mutarotation
c) Transcription and translation
d) Starch and Cellulose
e) Kreb Cycle

Roll No. ……..

Unique Paper Code : 42177913

Name of the Paper : DSE: Molecules of Life

Name of the Course : B.Sc. Prog.

Semester : V

Duration : 3 hours

Maximum Marks : 75

Instructions for Candidate

1. Attempt any **four** questions.
2. Question no. 1 is **compulsory** carries 15 marks. All other questions are of 20 marks each.

1. Attempt any **five**: (3 x 5)

   a) Why do both glucose and fructose give positive Tollens and Fehling tests?

   b) Define the terms anomers and epimers with the help of example.

   c) How many types of reactions are involved in metabolism? Discuss briefly with an example of each type.

   d) What two factors commonly affect the activity of an enzyme?

   e) Name the method and reagent used to determine N-terminal and C- terminal amino acid in proteins.

   f) What are essential and non-essential amino acids? Give one examples of each.

   g) Name the nucleic bases present in RNA. Give the structure of any two.

2. (5 x 4)

a) What are disaccharides? Give the structure (Howarth projection) and systematic name of Maltose.
b) Write Merrifield solid phase synthesis for a dipeptide Tyr-Ala.
c) What is enzyme inhibition? Explain allosteric inhibition.
d) How will you convert:
   1. Glucose into mannose
   2. Glucose into n-hexane

3. (5 x 4)

a) Give the mechanism for the formation of glucosazone. Name the rearrangement that take place during its formation.
b) Use DNFB to distinguish between Ala-Phe and Phe-Ala. Give the reactions involved.
c) A pentapeptide on partial hydrolysis gave three tripeptides fragments: Gly-Val-Ala, Phe-Gly-Val, Val-Ala-Leu. Identify the sequence of the amino acid in the pentapeptide.
d) What is "rancidity" of oils and fats.

4. (5 x 4)

a) What is denaturation of proteins. Explain with suitable examples.
b) What is the difference between nucleosides and nucleotides? Give the structure of Guanosine-5′-triphosphate.
c) What is the significance of iodine number? Calculate the iodine number of glyceryl trioleate having Mol. Wt. 884 (Mol. Wt. of Iodine = 127).
d) Differentiate between apoenzyme and holoenzyme with example.

5. (5 x 4)

a) What are triglycerides and phospholipids? Give its biological importance.
b) Give the structures of omega-3 and omega-6 fatty acids. Discuss their important roles in biological system.
c) Explain the role of different types of RNA's used for protein biosynthesis.
d) What is the structure and function of ATP?

6. Write short notes on any **four** of the following: (5 x 4)

a) Globular and Fibrous proteins
b) Genetic code
c) Starch and Cellulose
d) Mutarotation
e) Tertiary structure of proteins

This question paper contains 1 page

Unique Paper Code : 42237905

Name of the Course **: B.Sc. (Prog.) Life Sciences (CBCS)**

Name of the Paper : DSE-Applied Zoology

Semester : V

Duration : 3 Hours

Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No., Course, Name of paper, Semester and Date of Examination on first page of answer sheet.
2. Draw the diagram, wherever necessary.
3. Attempt **FOUR** questions. Each question carries **equal** marks.

Q1. If a person is having symptoms of cough with phlegm (sometimes blood-tinged), shortness of breath, weight loss, night sweats, low grade fever, swollen lymph nodes and loss of appetite. Give etiology of the disease with mode of transmission. What could be the possible preventive and prophylactic measures? **18 3/4**

Q2. If a person is having bloody loose faeces, colic pain, stomach cramping and dysentery along with fever. Explain which disease he/she is suffering from? Discuss the pathogenicity and complete life cycle of the parasite. **18 3/4**

Q3. Give the common and scientific name of the ectoparasite that leads to an infectious disease with intense itching of skin and allergic reaction attributed to unhygienic conditions. Identify the disease. Give clinical significance, factors affecting infestation, control and treatment of the same. **18 3/4**

Q4. A handsome quantity of food grains are damaged in the store houses due to the infestation of insects. Discuss the symptoms, damage, control and cure of such two potential pests in details. **18 3/4**

Q5. Describe the prevailing good dairy farming practices in our country and suggest measures that can be implemented to achieve the desired outcome. **18 3/4**

Q6. “Genetic technologies have improved aquaculture industry tremendously” Justify the statement with suitable examples. **18 3/4**