

MAHATMA GANDHI UNIVERSITY, KOTTAYAM

MGU-UGP (HONOURS)

FIFTH SEMESTER THEORY EXAMINATION MODEL QUESTION PAPER 2026

(2024 ADMISSION ONWARDS)

B.Sc (HONS) BIOLOGICAL TECHNIQUES & SPECIMEN PREPARATION

MG5DSCBTS300- DEVELOPMENTAL BIOLOGY

Duration: 1.5 hrs

Maximum Marks: 50

Students should attempt at least one question from each course outcome to enhance their overall outcome attainability.

Part A

Multiple Choice Questions

Answer All Questions

Each question carries 1 mark

1. Developmental biology is the study of [K] [1]
a) cell metabolism. b) formation and development of organism from zygote to adult
c) classification of organisms d) ecology of population
2. The term Ontogeny refers to [U][1]
a) Evolution of species b) development of an individual organism c) study of genes d) population growth
3. The process by which an organism develops from an unfertilized egg is called [K] [2]
a) Fertilization b) Gastrulation c) organogenesis d) parthenogenesis
4. The experimental organizer in Spemann's experiment was [U] [3]
a) Animal pole b) Dorsal lip of blastopore c) vegetal pole d) Neural tube
5. The cortical reaction helps prevent [U] [2]
a) Polyspermy b) cleavage c) gastrulation d) Implantation
6. A scientist wants to produce genetically identical animals. Which technique would be most appropriate? [U][3]
a) Embryo transfer b) cross fertilization c) amniocentesis d) cloning
7. Damage to the mesoderm during gastrulation would most directly affect the development of? [U][4]
a) Nervous tissue only b) Muscles and connective tissues c) Epidermis only d) Digestive epithelium only
8. The hollow embryonic stage formed after cleavage is called [K][2]
a) Blastula b) Gastrula c) Neural tube d) morula
9. The main function of the notochord during development is to [U][4]
a) Produce blood cells b) Induce development of the nervous system c) Form the epidermis
d) Form the digestive tract
10. Gene action during development mainly determines? [U][5]
a) Cell specialization b) Cleavage only c) Water balance d) Fertilization

[1 x 10= 10]

Part B

Short questions Type

Answer any 10 Questions

Each question carries 2 marks

11. What is parthenogenesis? Give examples [K] [2]
12. What is the significance of the cortical reaction? [K] [2]
13. Explain the process of regeneration [K] [4]
14. Differentiate between blastula and gastrula? [K] [2]
15. Why is the dorsal lip of the blastopore called the organizer? [U][3]
16. Describe the importance of prenatal diagnosis [U] [3]
17. What are the different types of cloning? [K][4]
18. Explain Spemanns constriction experiments. [K] [3]
19. What are the major benefits of stem cell research? [K][3]
20. Describe the pattern of cleavage in the frog embryo. [K][4]
21. Explain different morphological and anatomical changes take place in frog metamorphosis [K][4]
22. Define blastula. Explain different types of blastula. [K][2]

[2 x 10= 20]

Part C

Short Essay Type Questions

Answer any 5 Questions

Each question carries 4marks

23. With suitable diagrams explain various types of morphogenetic movements seen in fertilized egg [U][2]
24. Explain gene action in cell differentiation with special reference to *Drosophila* [U] [5]
25. Discuss the major theories proposed in the history of embryology. [U][1]
26. Discuss the benefits and ethical concerns associated with cloning. [U] [4]
27. Explain how prenatal diagnosis can be applied for the detection of genetic abnormalities. [U][3]
28. Give an account of hormonal control of human reproduction [K] [2]
29. Compare and analyse the major differences between the estrous and menstrual cycles. [An][2]
30. Explain the mechanism involved in fertilization. [K][2]

[4 x 5= 20]

QP Code

Reg.No :

Name :

MAHATMA GANDHI UNIVERSITY, KOTTAYAM
MGU-UGP (HONOURS) REGULAR EXAMINATION 2026
FIFTH SEMESTER
DSC-MG5DSCBTS301- MOLECULAR BIOLOGY
(2024 ADMISSION ONWARDS)

Duration: 1.5 Hours

Maximum Marks: 50

Remember(K), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C), Skill(S), Interest(I) and Appreciation(Ap)

Students should attempt at least one question from each course outcome to enhance their overall outcome attainability.

Part A

MCQ

Answer all questions

Each question carries 1 marks

1. Who demonstrated that DNA contains equal amounts of adenine and thymine and guanine and cytosine? [K/CO1]
a) Friedrich Miescher b) Erwin Chargaff
c) Francis Crick d) Oswald Avery
2. Which enzyme joins Okazaki fragments? [K/CO1]
a) Primase b) DNA ligase
c) Helicase d) Topoisomerase
3. Riboswitches commonly respond to: [K/CO4]
a) Small molecules b) DNA polymerase
c) Ribosomes only d) Histones
4. In prokaryotes, promoter recognition is primarily carried out by: [K/CO2]
a) Sigma factor b) Ribosome
c) DNA ligase d) Helicase
5. AUG generally codes for: [K/CO1]
a) Glycine b) Methionine
c) Valine d) Alanine
6. A major challenge in nucleic acid therapy is: [K/CO5]
a) Delivery into target cells b) Lack of nucleotides
c) Absence of RNA d) Lack of amino acids

7. During transcription, RNA is synthesized in the: [K/CO2]
a) 3' → 5' direction b) 5' → 3' direction
c) Both directions d) Random direction
8. Which RNA acts as an adaptor between mRNA codons and amino acids? [K/CO1]
a) mRNA b) tRNA
c) rRNA d) miRNA
9. siRNA stands for: [K/CO4]
a) Small interfering RNA b) Single intracellular RNA
c) Small initiating RNA d) Synthetic inhibitory RNA
10. A major challenge in nucleic acid therapy is: [K/CO5]
a) Delivery into target cells b) Lack of nucleotides
c) Absence of RNA d) Lack of amino acids

[1x10 = 10]

Part B

Short Answer Questions

Answer any **10** questions

Each question carries **2** marks

11. What is the basic structural unit of DNA and RNA? [K/CO1]
12. What is bacterial transformation? [K/CO1]
13. What is the function of primase? [K/CO2]
14. Differentiate between introns and exons [U/CO1]
15. Mention any two characteristics of enhancers. [K/CO2]
16. What is photoreactivation? [K/CO2]
17. Mention two contributions of Har Gobind Khorana. [K/CO1]
18. List the major stages of translation [K/CO2]
19. What is the function of aminoacyl-tRNA synthetase? [K/CO1]
20. Define a riboswitch [K/CO4]
21. What is gene therapy? [K/CO5]

22. Mention two major achievements of the Human Genome Project.

[K/CO5]

[2x10 = 20]

Part C

Short Essay Questions

Answer any **5** questions

Each question carries **4** marks

23. Trace the major historical developments from Miescher to Watson and Crick in the discovery of DNA structure.

[K/CO1]

24. Differentiate between theta, rolling circle and D-loop replication

[U/CO2]

25. Explain Base Excision Repair (BER).

[U/CO2]

26. Explain the process of transcription in prokaryotes.

[U/CO2]

27. Describe the structure and regulation of the lac operon.

[U/CO2]

28. Explain the mechanism and functions of microRNA

[U/CO4]

29. Discuss the ethical, legal and social implications of the Human Genome Project.

[U/CO5]

[4x5 = 20]

MAHATMA GANDHI UNIVERSITY, KOTTAYAM
MGU- UGP (HONOURS)

FIFTH SEMESTER EXAMINATION

2024 ADMISSION ONWARDS

GENETICS MG5DSCBTS302

Total:70 marks

Time: 2 hours

Students should attempt at least one question from each course outcome to enhance their overall outcome availability.

Part A

Multiple Choice Questions

Answer all questions, each question carries 1 mark

1. Which cross is used to identify the genotype of a plant. [K] [CO2]
[A] Test cross [B] Reciprocal cross [C] Back cross [D] None of the above
2. What is the phenotypic ratio of a typical Mendelian cross. [U] [CO2]
[A] 9:3:3:1 [B] 3:1 [C] 1:2:1 [D] Both A and B
3. Pick the odd one out [K] [CO1]
[A] Flower colour [B] Seed colour [C] Seed shape [D] Shape of the pollen
4. What is the percentage of off springs with the genotype tt, in the cross Tt x Tt [U] [CO1]
[A] 25 [B] 50 [C] 75 [D] 100
5. Plumage colour in white leghorn is due to [K] [CO4]
[A] Recessive epistasis [B] Lethality [C] Pleiotropy [D] Dominant epistasis
6. Who discovered the phenomenon linkage? [K] [CO4]
[A] T.H.Morgan [B] C.B.Bridges [C] A.H. Stuartevant [D] Bateson and Punnet
7. Male honey bees are [K] [CO3]
[A] Haploid [B] Diploid [C] Triploid [D] None of the above
8. How many linkage groups are there in humans [U] [CO1]
[A] 23 [B] 46 [C] 22 [D] 44
9. In human karyotype, the number of autosomes [U] [CO4]
[A] 44 [B] 22 [C] 23 [D] 46

10. ZW-ZZ system is seen in [K] [CO4]

[A]Chickens [B] Butterflies [C] Drosophila [D] Grass hopper

Part B

Short answer questions

Answer any 10 questions, each question carries 3 marks

11. Differentiate genotype and phenotype [U] [CO2]

12. What are reciprocal cross and back cross. [U] [CO1]

13. What are complementary genes? Give an example [K] [CO2]

14. Write briefly on lethal genes with an example. [U] [CO1]

15. What is genic balance theory? [U] [CO3]

16. Explain environmental influence on sex determination. [U] [CO1]

17. Differentiate sex linked inheritance, sex limited characters and sex influenced characters. [U] [CO1]

18. Explain polygenic inheritance with an example. [U] [CO1]

19. What are the characteristics of multiple alleles? [U] [CO1]

20. Define Barr body. What are free martins? [K] [CO2]

21. What is Lyon hypothesis? [U] [CO2]

22. State Mendel's laws of independent assortment. [K] [CO4]

Part C

Short essay questions

Answer any 6 questions, each question carries 5 marks

23. Describe test cross with an example. [U] [CO1]

24. Explain dominant and recessive epistasis with examples. [K] [CO2]

25. Explain multiple allelism with an example. [U] [CO1]

26. Describe in detail the phenomenon linkage with an example. [K] [CO3]

27. Describe in detail human karyotyping. [U] [CO3]

28. Explain in detail inborn errors of metabolism. [K] [CO4]

29. Explain the different theories of sex determination. [U] [CO4]

30. Explain in detail the different chromosomal abnormalities. [K] [CO4]

XXXXXX

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MAHATMA GANDHI UNIVERSITY, KOTTAYAM

MGU-UGP (HONOURS) REGULAR EXAMINATION October 2026

FIFTH SEMESTER

Discipline Specific Core Course (DSC) - MG5DSCZGY300, MG5DSCZIM300 -

ANIMAL DIVERSITY CHORDATA II

(2024 ADMISSION ONWARDS)

Duration: 1 hour 30 minutes

Maximum Marks: 50

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create(C), Skill(S), Interest (I) and Appreciation (Ap)

Students should attempt at least one question from each course outcome to enhance their overall outcome attainability.

PART A

Multiple Choice Questions

Answer **ALL** questions.

Each question carries **1** mark.

1. Which of the following superorders includes flightless birds such as *Struthio*? (K)/(CO 1)
(a) Neognathae (b) Paleognathae (c) Archaeornithes (d) Odontognathae
2. In *Columba livia*, the thin-walled, dilated part of the oesophagus used for temporary food storage is the: (K)/(CO 2)
(a) Gizzard (b) Proventriculus (c) Crop (d) Caecum
3. The Malabar Grey Hornbill is an endemic bird species associated with which region? (K)/(CO 3)
(a) Eastern Ghats (b) Western Ghats (c) Himalayas (d) Sundarbans
4. Egg-laying mammals like *Platypus* belong to which order? (K)/(CO 1)
(a) Tachyglossa (b) Platypoda (c) Metatheria (d) Macroscelidea
5. The process of re-ingesting soft faecal pellets to maximize nutrient absorption in rabbits is known as: (U)/(CO 2)
(a) Primary digestion (b) Ruminant digestion (c) Coprophagy (Secondary digestion) (d) Mastication
6. Which of the following aquatic mammals belongs to the Order Sirenia? (K)/(CO 3)
(a) *Delphinus* (b) *Dugong* (c) *Pteropus* (d) *Procavia*

7. *Archaeopteryx* serves as an evolutionary bridge between reptiles and birds and belongs to the subclass: (K)/(CO 1)
 (a) Neornithes (b) Prototheria (c) Archaeornithes (d) Theria
8. To which mammalian order does the armadillo belong? (K)/(CO 1)
 (a) Xenarthra (b) Pholidota (c) Tubulidentata (d) Erinaceomorpha
9. Which gland is uniquely specialized in mammals for nourishing offspring? (U)/(CO 2)
 (a) Sebaceous gland (b) Mammary gland (c) Harderian gland (d) Scent gland
10. Tree shrews are categorized under which order of Class Mammalia? (K)/(CO 1)
 (a) Macroscelidea (b) Soricomorpha (c) Scandentia (d) Hyracoidea
11. Pneumatic bones in birds serve primarily to aid in: (U)/(CO 3)
 (a) Digestion (b) Reduction of body mass for flight (c) Excretion (d) Reproduction
12. In the comparative study of vertebrates, mesonephric kidneys are characteristic of adult: (An)/(CO 2)
 (a) *Euphlyctis* (b) Pigeon (c) Rabbit (d) Both Pigeon and Rabbit

PART B

Short Answer Questions

Answer any 6 questions

Each question carries 3 marks

13. State three distinct reptilian characteristics present in *Archaeopteryx*. (U)/(CO 1)
14. Explain the dental formula and heterodont dentition of the rabbit. (U)/(CO 2)
15. Mention three structural flight adaptations found in the skeletal framework of birds. (U)/(CO 3)
16. Describe the key characteristics of Subclass Prototheria with suitable examples. (K)/(CO 1)
17. Briefly explain the physiological significance of secondary digestion in rabbits. (U)/(CO 2)
18. List three distinct mammalian orders under Eutheria along with one representative example for each. (K)/(CO 1)
19. Give a brief account on excretory system of birds using suitable type specimen. (U)/(CO 2)
20. Differentiate the structure of locomotor organs among *Euphlyctis*, Pigeon, and Rabbit. (An)/(CO 2)

PART C

Short Essay Questions

Answer any 4 questions

Each question carries 5 marks.

21. Give a classification of Subclass Neornithes up to superorders, highlighting key diagnostic features and examples. (U)/(CO 1)

22. Describe the respiratory system of *Columba livia* and explain the mechanism of double respiration. (U)/ (CO 2)
23. Mention your understanding of the term 'comparative anatomy'.
Also explain how this benefits the study of various organisms. (An)/(CO 2)
24. Describe the axial and appendicular skeleton of the rabbit, excluding the skull. (An)/(CO 2)
25. Discuss the anatomical and physiological adaptations of aquatic mammals using examples from Sirenia and Cetacea. (U)/ (CO 3)
26. Give a comparative account of the heart and aortic arches in *Euphlyctis*, Pigeon, and Rabbit. (An)/(CO 2)

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MAHATMA GANDHI UNIVERSITY, KOTTAYAM
MGU-UGP (HONOURS) REGULAR EXAMINATION
SEMESTER V
DSC- MG5DSCZGY301-CELL AND MOLECULAR BIOLOGY
MODEL QUESTION PAPER
(2024 ADMISSION ONWARDS)

Duration: 1 hour 30 minutes

Max. Marks: 50

*Remember(K), Understand(U), Apply(A), Analyse (An), Evaluate(E), Create(C), Skill(S),
Interest(I) and Appreciation (Ap)*

**Students should attempt at least one question from each course outcome to enhance
their overall outcome attainability.**

PART A

Answer all questions. Each question carries 1 mark each

1.Function of t-RNA during translation is [Remember]/[CO1]

- A) Form the structural core of the ribosome
- B) Catalyse formation of peptide bonds
- C) Carry specific amino acid to specific anticodon of mRNA
- D) Act as template for DNA synthesis

2. In Danielli -Davson Model of plasma membrane the lipid layer is placed between [Understand]/[CO2]

- A) Two carbohydrates layers
- B) Two protein layers
- C) Two nucleic acid layers
- D) One carbohydrate and one protein layer

3.The capacity of cancer cells to break away from primary growth and carried by blood or lymph to other parts of the body is [Understand]/[CO2]

- A) Monoclonal origin
- B) Benign
- C) Metastasis
- D) Fibronectin

4. Cytokines are a type of [Remember]/[CO1]

- A) Paracrine signalling molecules B) Autocrine signalling molecules
C) Endocrine signalling molecules D) None of the above

5. In molecular term muton is [Understand]/[CO2]

- A) Single nucleotide pair B) Whole gene
C) Set of 3 codons D) Chromosome segment

6. Cell theory was proposed by [Remember]/[CO1]

- A) Daniel and Davson C) Robert Hook and Hertwig
B) J.D.Watson and F.H.C Crick D) M.J. Schleiden and T.Schwann

7. In ABO blood grouping system, cell recognition is determined by [Understand]/[CO2]

- A) Lipid bilayer on cell surface B) Carbohydrate on glycocalyx
C) Intracellular hormone receptors D) Cytoskeletal elements

8. The first two bases of a codon have a precise pairing with the bases of the anti-codon of t-RNA, while pairing of between the third base of the codon may base pair with more than one type of codon, this concept is called [Understand]/[CO2]

- A) Degeneracy B) Universality C) Unambiguous D) Wobble

9. Prions are made of [Understand]/[CO2]

- A) A small piece of DNA wrapped in protein
B) A single strand of RNA without a protein coat
C) A misfolded protein without any nucleic acid (DNA or RNA)
D) A lipid membrane encloses host cell enzymes

10. During osmosis, water tend to move across a plasma membrane towards [Understand]/[CO2]

- A) Higher solute concentration B) Lower solute concentration
C) Equal solute concentration D) All are correct

11. Ribosome production factory of the cell is [Understand]/[CO2]

- A) Nucleolus C) Nucleus
B) Chromatin D) Endoplasmic reticulum

12. During translation, the ribosome moves along the m RNA in the direction of [Understand]/[CO2]

- A) 3' → 5' B) 5' → 3' C) 5' → 5' D) 3' → 3'

[1x12 = 12]

Part B

Short Answer Questions. Answer any **6** questions. Each question carries **3** marks

- | | |
|---|--------------------|
| 13. Describe the structural organization of nuclear pore complex. | [Understand]/[CO2] |
| 14. Give an account on the facilitated diffusion | [Understand]/[CO2] |
| 15. State the characteristic features of genetic code | [Remember]/[CO1] |
| 16. Comment on helicase, ligase and Okazaki fragments | [Understand]/[CO2] |
| 17. Contrast desmosomes and gap junctions | [Remember]/[CO1] |
| 18. List out the functions of Golgi complex. | [Remember]/[CO1] |
| 19. Illustrate reverse transcription with an example | [Understand]/[CO2] |
| 20. Explain the basic structural frame work of microtubule. | [Understand]/[CO2] |

[3x6 = 18]

Part C

Short Essay Questions. Answer any **4** questions. Each question carries **5** marks

- | | |
|---|--------------------|
| 21. Compare active transport, passive transport and bulk transport | [Understand]/[CO2] |
| 22. Describe DNA replication in prokaryotes | [Understand]/[CO2] |
| 23. Summarise the electron transport chain of mitochondria | [Understand]/[CO2] |
| 24. Define Operon concept. Explain inducible operon with suitable example | [Understand]/[CO2] |
| 25. Illustrate the cell signalling pathway by cAMP with suitable example | [Understand]/[CO2] |
| 26. Discuss in detail the events of cell cycle. | [Understand]/[CO2] |

[5x4 = 20]

QP Code

Reg.No :

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MAHATMA GANDHI UNIVERSITY, KOTTAYAM
MGU-UGP (HONOURS) MODEL QUESTION PAPER
SEMESTER V

DSC - MG5DSCZGY302, MG5DSCZIM301 - FUNDAMENTALS OF GENETICS
(2024 ADMISSION ONWARDS)

Duration: 2 hours

Maximum Marks: 70

Remember(K), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C), Skill(S), Interest(I) and Appreciation(Ap)
Students should attempt at least one question from each course outcome to enhance their overall outcome attainability.

Part A

MCQ

Answer all questions

Each question carries 1 mark

1. In $Aa \times Aa$, what is the expected genotypic ratio? [A] / [CO1]
(a) 1 : 2 : 1 (b) 3 : 1
(c) 1 : 1 (d) 9 : 3 : 3 : 1
2. In codominance, a heterozygote shows: [U] / [CO1]
(a) Both alleles expressed (b) Intermediate phenotype
(c) Dominant allele only (d) Recessive allele only
3. The genotype of blood group AB is: [K] / [CO1]
(a) $I^A I^A$ (b) $I^A I^B$
(c) $I^B i$ (d) ii
4. Complete linkage produces: [U] / [CO2]
(a) Parental types only (b) Equal four classes
(c) Recombinants only (d) More recombinants
5. In the ZW-ZZ system, the heterogametic sex is: [K] / [CO2]
(a) Female, ZW (b) Male, ZZ
(c) Female, ZZ (d) Male, ZW
6. A mutation arising in a germ cell is a: [K] / [CO3]
(a) Germinal mutation (b) Somatic mutation
(c) Structural mutation (d) Numerical mutation
7. The condensed, less active chromatin is: [K] / [CO4]
(a) Heterochromatin (b) Euchromatin
(c) Nucleosome (d) Chromatid
8. Which order shows increasing chromatin packing? [U] / [CO4]
(a) DNA $\rightarrow$ nucleosome $\rightarrow$ solenoid (b) Solenoid $\rightarrow$ DNA $\rightarrow$ nucleosome
(c) Nucleosome $\rightarrow$ DNA $\rightarrow$ solenoid (d) DNA $\rightarrow$ solenoid $\rightarrow$ nucleosome
9. Trisomy 21 causes: [K] / [CO5]
(a) Down syndrome (b) Edward syndrome
(c) Turner syndrome (d) Cri du chat syndrome
10. A karyotype 47,XXY indicates: [U] / [CO5]
(a) Klinefelter syndrome (b) Turner syndrome
(c) Down syndrome (d) Cri du chat syndrome

[1 x 10 = 10]

Part B

Short Answer Questions

Answer any 10 questions

Each question carries 3 marks

11. State Mendel's law of segregation and law of independent assortment. [K] / [CO1]

- | | | |
|-----|--|-------------|
| 12. | Distinguish a test cross, a back cross and a reciprocal cross by stating the type of mating involved in each. | [U] / [CO1] |
| 13. | An F ₂ ratio of 9:7 is obtained in a dihybrid cross. Identify the type of gene interaction and explain the basis of this ratio. | [A] / [CO1] |
| 14. | Define sex-limited, sex-influenced and holandric inheritance. | [K] / [CO1] |
| 15. | Name the type of sex determination in honey bees and state the ploidy of males and females. | [K] / [CO2] |
| 16. | Explain the role of the SRY gene in human gonadal development. | [U] / [CO2] |
| 17. | A somatic nucleus contains two X chromosomes. Predict the number of Barr bodies and justify your answer using the Lyon hypothesis. | [A] / [CO2] |
| 18. | Name any two structural chromosomal aberrations and one numerical chromosomal aberration. | [K] / [CO3] |
| 19. | Explain how a tautomeric shift can result in a base substitution mutation. | [U] / [CO3] |
| 20. | Explain how addition or deletion of nucleotides can produce a frame-shift mutation. | [U] / [CO3] |
| 21. | Differentiate polytene and lampbrush chromosomes with reference to their occurrence and one structural feature. | [U] / [CO4] |
| 22. | Briefly explain the genetic basis of sickle cell anemia, cystic fibrosis and Tay-Sachs disease. | [U] / [CO5] |

[3 x 10 = 30]

Part C

Short Essay Questions

Answer any 6 questions

Each question carries 5 marks

- | | | |
|-----|--|-------------|
| 23. | A dihybrid F ₁ plant with genotype RrYy is test-crossed with rrry. Assuming independent assortment, predict the phenotypic classes and their expected ratio. State the Mendelian principle illustrated. | [A] / [CO1] |
| 24. | Explain polygenic inheritance and pleiotropism with one suitable example each. Briefly state the role of modifying genes. | [U] / [CO1] |
| 25. | In a two-point test cross, the progeny are AB = 410, ab = 390, Ab = 100 and aB = 100. Identify the parental and recombinant classes, calculate the recombination frequency and determine the map distance between genes A and B. | [A] / [CO2] |
| 26. | Explain the genic balance theory of sex determination in Drosophila. How does the X:A ratio determine male, female and intersex conditions? | [U] / [CO2] |
| 27. | Describe the CIB method used to detect X-linked recessive lethal mutations in Drosophila. | [U] / [CO3] |
| 28. | List the standard pedigree symbols and conventions for male, female, affected individual, carrier, mating and line of descent. | [K] / [CO4] |
| 29. | Explain the genetic basis of phenylketonuria, alkaptonuria and albinism. | [U] / [CO5] |
| 30. | List the major objectives of the Human Genome Project. Define genetic counselling, eugenics and euthenics. | [K] / [CO5] |

[5 x 6 = 30]

MAHATMA GANDHI UNIVERSITY, KOTTAYAM
MGU-UGPP (HONOURS)
FIFTH SEMESTER EXAMINATION
(2024 ADMISSION ONWARDS)

MG5DSEZIM302 – FOOD AND DAIRY MICROBIOLOGY

Duration :1.5 hrs

Maximum Marks :50

Students should attempt atleast one question from each course outcome to enhance their overall out come attainability.

Part A
Fill in the blanks
Answer **All** Questions
Each question carries **1** marks

1. The major mineral in milk is [U] [CO1]
2. Bacteriocins are usually produced by [A] [CO3]
3. HACCP stands for Hazard Analysis and Control Points.[U]
[CO5]
4. Antibiotics may be.....or
bacteriostatic [U][CO3]
5. Mould growth on bread is favoured by high [K] [CO1]
6. The separation of curd from whey is an important step in the manufacture
of [U][CO4]
7. The process of removing moisture from food is called [U] [CO2]
8. The main protein responsible for curd formation in cheese making
is[A] [CO4]
9. Pencillin was discovered by [A] [CO3]
10. The most common producers of aflatoxins are species of [U]
[CO5]

[1 × 10 =10]

Part B

Short Questions

Answer any **10** Questions

Each question carries **2** Marks

11. Differentiate between food intoxication and food infection. [K] [CO5]
12. Define IMVIC Test. [U][CO5]
13. Define bacteriocins and give one example. [U][CO3]
14. Describe the role of probiotics in improving gastrointestinal health and immunity. [A] [CO4]
15. Write a short note on internal and external egg spoilage. [A] [CO1]
16. Name two microorganisms that cause food infections. [A][CO5]
17. What is meant by starter culture in cheese production? Why? [U] [CO4]
18. Mention two advantages of canning. [U] [CO2]
19. Explain the role of pasteurization in milk preservation. [U] [CO1]
20. What is canning? [K] [CO2]
21. Define enterotoxin. [U] [CO5]
22. Differentiate between bactericidal and bacteriostatic antibiotics. [U] [CO3]

[2 × 10 =20]

Part –C

Short Essay Type Questions

Answer **5** Questions

Each question carries **4** marks

23. Discuss the role of heat processing in the preservation of canned foods. [U] [CO1]
24. Explain the role of contaminated food, water, poultry, eggs, and meat in the transmission of Salmonella. [U] [CO5]
25. What are bacteriocins? Describe their characteristics and role in food preservation. [A] [CO3]
26. Explain the principle, methods, advantages and disadvantages of drying as a method of food preservation. [K] [CO2]

27. Describe the chemical composition of milk and discuss the functions of each component. [K] [CO1]

28. Define food intoxication and describe its causes. [A] [CO5]

29. Outline the nutritional composition and health benefits of lassi. [U] [CO4]

[4 ×5 =20]

MAHATMA GANDHI UNIVERSITY, KOTTAYAM

MGU-UGP (HONOURS)

FIFTH SEMESTER EXAMINATION

(2025 ADMISSION ONWARDS)

MG5DSEBTS300- IMMUNOLOGY

Duration: 2 hrs

Maximum Marks: 70

Students should attempt at least one question from each course outcome to enhance their overall outcome attainability.

Part A

Multiple Choice Questions

Answer All Questions

Each question carries 1 mark

1. Antibody diversity is primarily generated by [K] [CO3]
a) DNA replication b) V (D)J recombination c) RNA splicing d) Protein phosphorylation
2. Which Immunoglobulin class is termed as secretory antibody? [K] [CO3]
a) IgM b) IgD c) IgA d) IgE
3. Which of the following is a secondary lymphoid organ? [K] [CO2]
a) Thymus b) Spleen c) Bone marrow d) Bursa of Fabricius
4. B cell maturation takes place in [K] [CO2]
a) Thymus b) Spleen c) Bone Marrow d) Lymph node
5. An antigenic determinant recognised by an antibody or T cell receptor is [U] [CO3]
a) Paratope b) Epitope c) Isotype d) Idiotyp
6. CD4+ T cells recognise antigen presented by: [U] [CO1]
a) MHC Class I b) MHC Class II c) IgG d) MHC Class III
7. Failure of the immune system to distinguish self and non-self may result in [K] [CO5]
a) Autoimmunity b) Hypersensitivity c) Tolerance d) Immunodeficiency
8. Which of the following is an example of secondary immunodeficiency? [K] [CO5]
a) Severe combined immunodeficiency b) HIV infection c) DiGeorge syndrome
d) X-linked agammaglobulinemia
9. Type IV hypersensitivity is also known as [K] [CO5]
a) Immediate hypersensitivity b) Antibody-mediated hypersensitivity c) Delayed-type hypersensitivity d) Anaphylactic hypersensitivity
10. NK cells mainly kill: [U] [CO1]
a) Virus-infected cells b) Platelets c) RBCs d) Bacteria in the intestine

[1 x 10 = 10]

Part B

Short Questions

Answer 10 Questions

Each question carries 3 marks

11. Comment on major events that occur during B cell maturation. [U] [CO2]
12. What are the subsets of T cells? [K] [CO2]
13. What are adjuvants? Write any two examples. [U] [CO3]
14. Explain different types of infection. [K] [CO1]
15. Write a short note on hybridoma technology. [U] [CO4]
16. Compare the structure and functions of IgG and IgM. [U] [CO3]
17. Comment on the role of MHC in antigen processing and presentation. [U] [CO1]
18. Explain the principle and applications of the ELISA technique. [U] [CO5]
19. Write a short note on Graves' disease. [K] [CO5]
20. Discuss tumour antigens. [U] [CO5, CO6]
21. Compare live attenuated and inactivated vaccines. [U] [CO6]
22. What is Erythroblastosis fetalis? [K] [CO5]

[3 x 10= 30]

Part C

Short Essay

Answer 6 Questions

Each question carries 5 marks

23. Explain the structure and functions of secondary lymphoid organs. [U] [CO2]
24. Discuss different types of acquired immunity. [K] [CO1]
25. Give a comprehensive account of the basic structure of immunoglobulin. [U] [CO3]
26. Discuss different types of antigens in detail. [K] [CO3]
27. Explain agglutination reactions and their types. [K] [CO4]
28. Give a detailed account of organ-specific autoimmune disorders. [U] [CO5]
29. Discuss the mechanism of Type 1 hypersensitivity reactions with suitable examples. [U] [CO5]
30. Classify vaccines based on their composition. [U] [CO6]

[5 x 6= 30]

QP Code

Reg.No :

Name :

MAHATMA GANDHI UNIVERSITY, KOTTAYAM
MGU-UGP (HONOURS) REGULAR EXAMINATION 2026

FIFTH SEMESTER

ELECTIVE- MG5DSEBTS301- INTRODUCTION TO FORENSIC BIOLOGY

(2024 ADMISSION ONWARDS)

Duration: 2 Hours

Maximum Marks: 70

Remember(K), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C), Skill(S), Interest(I) and Appreciation(Ap)

Students should attempt at least one question from each course outcome to enhance their overall outcome attainability.

Part A

MCQ

Answer all questions

Each question carries 1 marks

1. The principle that “every contact leaves a trace” was proposed by: [K] / [CO1]
a) Hans Gross b) Edmond Locard c) Francis Galton d) William Herschel
2. _____ in forensic science mainly deals with the examination of Blood and other biological fluids [K] / [CO3]
a) Serology b) Toxicology c) Anthropology d) Chemistry
3. Mass spectrometry identifies compounds primarily based on their: [K] / [CO5]
a) Colour b) Mass-to-charge ratio c) Solubility d) Melting point
4. Which technique is commonly used to identify an individual based on their DNA ? [K] / [CO2]
a) Chromatography b) DNAprofiling c) Spectroscopy d) Centrifugation
5. Which technique is commonly used for the identification of unknown chemical compounds? [K] / [CO3]
a) Chromatography b) Microscopy c) Electrophoresis d) Centrifugation
6. Forensic toxicology primarily deals with the detection and identification of: [K] / [CO2]
a) Drugs and toxic substances b) Microorganisms c) Plant pigments d) Proteins
7. Toxicological findings are primarily interpreted by considering the concentration of a substance along with: [U] / [CO5]
a) Clinical and circumstantial evidence b) Sample colour alone c) Body weight alone d) Age of the laboratory instrument
8. Which organ is primarily responsible for the metabolism of many drugs? [K] / [CO3]
a) Heart b) Liver c) Lung d) Spleen
9. The scientific study of human skeletal remains in a forensic context is known as: [K] / [CO1]
a) Forensic anthropology b) Forensic toxicology c) Forensic chemistry d) Forensic serology
10. Maintaining the documented history of the handling of evidence is known as: [K] / [CO4]
a) Chain of custody b) Cross-examination c) Peer review d) Profiling

[1x10 = 10]

Part B

Short Answer Questions
Answer any **10** questions
Each question carries **3** marks

- | | |
|---|-------------|
| 11. What factors should be considered while interpreting biological evidence in a criminal investigation? | [U] / [CO3] |
| 12. Briefly describe the historical development of forensic science. | [U] / [CO1] |
| 13. What is spectroscopy? Mention any two applications of spectroscopy in forensic analysis. | [K] / [CO5] |
| 14. What is forensic biology? Mention any two types of biological evidence examined in forensic investigations. | [K] / [CO2] |
| 15. Define forensic toxicology and mention any two biological samples used for toxicological analysis. | [K] / [CO2] |
| 16. Mention any three techniques used for the identification of drugs in forensic samples. | [U] / [CO5] |
| 17. Explain the effects of drug use on the central nervous system. | [U] / [CO3] |
| 18. Define forensic anthropology and mention any two applications in criminal investigations. | [K] / [CO1] |
| 19. Mention any three skeletal features used for estimating sex from human skeletal remains. | [K] / [CO5] |
| 20. What is chain of custody? Mention its importance in forensic investigations. | [K] / [CO4] |
| 21. Mention any three analytical techniques used in forensic chemistry and state their applications. | [K] / [CO3] |
| 22. Explain the role of a forensic scientist as an expert witness in court. | [U] / [CO4] |

[3x10 = 30]

Part C

Short Essay Questions
Answer any **6** questions
Each question carries **5** marks

- | | |
|---|-------------|
| 23. Describe the basic steps involved in DNA profiling and explain its importance in criminal investigations. | [U] / [CO2] |
| 24. Explain how chromatographic techniques are used for the identification and analysis of drugs in forensic investigations. | [U] / [CO5] |
| 25. Explain the principles and forensic applications of serology in the identification and analysis of biological evidence. | [U] / [CO3] |
| 26. Explain the significance of human skeletal remains in the identification of unknown individuals during criminal investigations. | [U] / [CO1] |
| 27. Describe the major analytical techniques used for the identification of drugs in forensic samples. | [U] / [CO5] |
| 28. Describe how drugs affect the central nervous and hepatic systems. | [U] / [CO3] |

29. Discuss the ethical responsibilities of forensic scientists.

[U] / [CO4]

30. Explain the major legal considerations involved in the collection, preservation, analysis, and presentation of forensic evidence.

[U] / [CO4]

[5x6 = 30]

QP Code

Reg. No.....

Name.....

MAHATMA GANDHI UNIVERSITY, KOTTAYAM
MGU-UGP (HONOURS) Regular EXAMINATION OCTOBER 2026
Fifth SEMESTER

Discipline Specific Elective Course (DSE) – MG5DSEZGY300, MG5DSEZIM300

BIOTECHNOLOGY: PRINCIPLES AND PRACTICES

(2024 ADMISSION ONWARDS)

Duration: 2 hours

Maximum Marks: 70

***Remember(K), Understand(U), Apply(A), Analyse (An), Evaluate(E), Create(C), Skill(S), Interest(I) and
Appreciation (Ap)***

Students should attempt at least one question from each course outcome to enhance their overall outcome attainability.

Part A

MCQ

Answer **all** questions

Each question carries **1** marks

1. Select the enzyme which is known as "Molecular Glue".
a) DNA Ligase b) RNA Polymerases
c) DNA Polymerases d) Restriction Enzymes [U]/ [CO1]
2. BAC can accept inserts of around
a) 100kb b) 10kb
c) 30kb d) 300kb [U]/[CO1]
3. Name the technique separates DNA fragments primarily on the basis of size.
a) Northern blotting b) PCR
c) Southern blotting d) Agarose gel electrophoresis [U]/[CO1]
4. Primers in PCR determine the-----

- a) Target region to be amplified b) Colour of the DNA
 - c) Size of the gel d) Charge of the electrode [U]/[CO1]

5. Select the treatment commonly used to remove proteins during DNA extraction.

 - a) Proteinase treatment b) To separate DNA from cellular components
 - c) To sequence RNA d) To amplify DNA automatically [U]/[CO1]

6. The enzyme that joins the desired gene to the vector is-----

 - a) Restriction endonuclease b) Helicase
 - c) Primase d) DNA Ligase [U]/[CO1]

7. In colony hybridisation, bacterial colonies are transferred onto a -----

 - a) Membrane such as nitrocellulose or nylon membrane b) Plastic plate
 - c) Glass slide d) Microtiter plate [U]/[CO1]

8. The chemical used in transfection is -----

 - a) DEAE Dextran b) EDTA
 - c) SDS d) Phenol [U]/[CO1]

9. Insulin is secreted by which cells of the pancreas?

 - a)a) Alpha cells b) Beta cells
 - c) Delta cells d) Acinar cells [K]/[CO3]

10. What is the primary goal of regenerative medicine?

 - a) Destroy damaged tissues b) Repair or replace damaged cells and tissues
 - c) Prevent cell division d) Increase drug toxicity [An]/[CO3]

[1x10=10]

Part B

Short Answer Questions

Answer any **10** questions

Each question carries **3** marks

11. Describe Cry proteins and their significance in Bt plants [K]/[CO3]
12. Discuss the role of growth hormone (somatotropin) in increasing milk production in cows [An]/[CO3]
13. Define bioremediation. Mention two advantages of bioremediation over conventional methods of

- pollution control [An]/[CO3]
14. Define the terms 'sticky ends' and 'blunt ends' [K]/[CO1]
15. Define the term biotechnology and who coined the term Biotechnology? State the original context in which the term was used ? [K]/[CO1]
16. Write a short note on artificial chromosomes. [U]/[CO1]
17. Describe Northern blotting? Mention any two applications of Northern blotting. [U]/[CO1]
18. Explain DNA sequencing. Describe the principle of Sanger's chain termination method and mention One application. [U]/[CO1]
19. What is proteome identification? Explain how proteins are identified and sequenced using proteomic techniques. [U]/[CO1]
20. Differentiate between gene gun and electroporation. [U]/[CO1]
21. Comment on media used in animal cell culture. [U]/[CO2]
22. What are stem cells? Mention their major uses. [U]/[CO2]

[3x10=30]

Part C

Short Essay Questions

Answer any **6** questions

Each question carries **5** marks

23. Explain the production of transgenic mice and transgenic *C. elegans* and discuss their application in genetic engineering. [U]/[CO2]
24. What is CRISPR-Cas9? Explain its mechanism and application in genetic engineering [U]/[CO2]
25. Explain the role of biotechnology in human welfare, with special reference to the production and Application of antibiotics and vaccines. [An]/[CO3]
26. Explain DNA finger printing and its application. [An]/ [CO3]
27. Explain the production of single cell protein through fermentation biotechnology and discuss its application. [An]/[CO3]
28. What are GMOs? Discuss their potential impacts on biodiversity. [U]/[CO4]
29. What is biopiracy? Explain its causes, effects and measures to prevent biopiracy with

suitable example.

[U]/[CO4]

30. Explain the different types of IPR and their role in protecting biological resources and traditional knowledge.

[U]/ [CO4]

[5x6=30]

QPCode

Reg.No :

Name :

MAHATMA GANDHI UNIVERSITY, KOTTAYAM
MGU-UGP (HONOURS) REGULAR EXAMINATION OCTOBER 2026
Semester V
DSE – MG5DSEZGY301, MG5DSEZIM301 - WILDLIFE MANAGEMET
(2024 ADMISSION ONWARDS)

Duration: 2 hours

Maximum Marks: 70

Remember(K), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C), Skill(S), Interest(I) and Appreciation(Ap)

Students should attempt at least one question from each course outcome to enhance their overall outcome attainability.

Part A

MCQ

Answer all questions

Each question carries **1** marks

1. The gradual and orderly change in the composition of a forest community over time is called [Understand] / [CO1]
a) Stratification b) Forest succession c) Zonation d) Migration
2. Which of the following indices is commonly used to measure species diversity? [Remember] / [CO 1]
a) Shannon–Wiener index b) Canopy index c) Leaf area index d) Basal area index
3. Which of the following is a characteristic feature used in the classification of forests? [Remember] / [CO1]
a) Vegetation type b) Animal behavior c) Soil organisms only d) Wildlife population only
4. The scientific name of the bonnet macaque is [Understand] / [CO 2]
a) *Macaca mulatta* b) *Macaca radiate* c) *Macaca fascicularis* d) *Macaca nemestrina*
5. The tiger and leopard belong to the order [Remember] / [CO 2]
a) Primates b) Carnivora c) Proboscidea d) Artiodactyla
6. Project Elephant was initiated primarily for the conservation of [Understand] / [CO 3]
a) Tigers b) Elephants c) Crocodiles d) Rhinoceroses

- | | |
|---|-----------------------|
| 7. Which of the following is an example of in-situ conservation?
a) Zoo b) National Park c) Aquarium d) Captive breeding centre | [Understand] / [CO 3] |
| 8. CITES mainly regulates
a) International trade in wildlife species b) Forest succession c) Remote sensing activities d) Forest volume estimation | [Remember] / [CO 3] |
| 9. A remote sensing system that uses its own source of electromagnetic energy is called
a) Passive remote sensing b) Active remote sensing c) Aerial photography d) Visual observation | [Understand] / [CO 4] |
| 10. GPS is primarily used for determining
a) Geographic position b) Species richness c) Tree volume d) Forest succession | [Understand] / [CO 4] |

[1x10 = 10]

Part B

Short Answer Questions

Answer any **10** questions

Each question carries **3** marks

- | | |
|---|----------------------|
| 11. Explain the structure and functioning of a forest ecosystem. | [Understand] / [CO1] |
| 12. Explain forest succession and mention its major stages. | [Understand] / [CO1] |
| 13. Explain the significance of Shannon–Wiener and Simpson diversity indices. | [Remember] / [CO1] |
| 14. Explain the important biological characteristics of the bonnet macaque (<i>Macaca radiata</i>). | [Understand] / [CO2] |
| 15. Describe the major ecological adaptations of elephants. | [Understand] / [CO2] |
| 16. Explain the ecological roles of tiger and leopard as large carnivores. | [Understand] / [CO2] |
| 17. Explain the major causes of human–elephant conflict. | [Understand] / [CO3] |
| 18. Explain the difference between in-situ and ex-situ conservation with examples. | [Understand] / [CO3] |
| 19. What are the major threats faced by wildlife? Explain any three. | [Understand] / [CO3] |
| 20. Define remote sensing and explain its fundamental principle. | [Understand] / [CO4] |
| 21. Differentiate between active and passive remote sensing based on the source of energy. | [Understand] / [CO4] |

22. Explain the applications of GIS, GPS and radio collaring in wildlife studies. [Understand] / [CO4]
[3x10 = 30]

Part C

Short Essay Questions

Answer any **6** questions

Each question carries **5** marks

23. Explain the different types of forests with reference to their classification, distribution, composition and structure. [Remember] / [CO1]
24. Explain the concept of biodiversity hotspots and discuss the significance of the Western Ghats as a biodiversity hotspot. [Understand] / [CO1]
25. Describe the biology, ecology and behaviour of the bonnet macaque (*Macaca radiata*). [Understand] / [CO2]
26. Explain the biology and ecological significance of elephants, tiger and leopard. [Understand] / [CO4]
27. Discuss human–wildlife conflict with reference to elephant and bonnet macaque. Explain the major causes, impacts and suitable mitigation measures. [Understand] / [CO3]
28. Explain the management of protected areas. Discuss National Parks, Wildlife Sanctuaries, Tiger Reserves, Biosphere Reserves, Community Reserves and Ramsar Sites. [Understand] / [CO3]
29. Explain the fundamental principles and major stages of remote sensing. Discuss its classification based on energy source and platform. [Understand] / [CO4]
30. Explain aerial and space remote sensing. Discuss the major merits, limitations and recent developments of remote sensing, with applications in forest and wildlife management. [Understand] / [CO4]

[5x6 = 30]

MAHATMA GANDHI UNIVERSITY, KOTTAYAM
FIFTH SEMESTER
MGU-UGP (HONOURS) REGULAR EXAMINATION
DISCIPLINE SPECIFIC ELECTIVE COURSE: MG5DSEZGY302, MG5DSEZIM302
CLIMATE CHANGE AND DISASTER RISK REDUCTION
(2024 ADMISSION ONWARDS)
MODEL QUESTION PAPER

Duration :2 hrs

Maximum Marks:70

Students should attempt at least one question from each CO to enhance their overall outcome attainability

PART-A

Multiple Choice Questions (1 Mark Each). All questions compulsory

1. Which gas is a major greenhouse gas emitted from fossil fuel combustion? [K] [CO1]
 - a) Helium
 - b) Carbon dioxide
 - c) Nitrogen
 - d) Oxygen
2. A series of massive waves due to sudden displacement of water mainly from underwater earthquake is [U] [CO1]
 - a) Landslides
 - b) Drought
 - c) Tsunami
 - d) Cyclone
3. Disaster Risk Reduction mainly aims to [U] [CO3]
 - a) Increase hazards
 - b) Reduce disaster losses
 - c) Stop rainfall
 - d) Promote pollution
4. A potentially damaging event or phenomenon is called [K] [CO3]
 - a) Recovery
 - b) Hazard
 - c) Relief
 - d) Reconstruction
5. GPS is mainly used for [U] [CO3]
 - a) Water purification
 - b) Waste management
 - c) Weather forecasting
 - d) Location tracking

6. An approach that promotes economic progress while protecting and conserving nature and natural resources is..... [A] [CO4]
- Brown economy
 - Green growth
 - Grey economy
 - Industrial regression
7. The main objective of Kyoto protocol is [K] [CO5]
- Reduction of emission of greenhouse gases
 - Disaster management
 - Coastal zone management
 - Biodiversity conservation
8. A technology widely used in disaster risk mapping in Kerala is [A] [CO5]
- Blockchain technology
 - GIS and remote sensing
 - Nanotechnology
 - Biotechnology
9. Eco-grief deals with [U] [CO2]
- Stress due to industrial pollution
 - Fear of earthquakes
 - Fear of technology
 - Grief caused by degradation of home environment
10. Threat to India's water security is contributed by [U] [CO2]
- Intensifying droughts
 - Extreme floods
 - Sea level rise
 - All off the above

(10x1=10 Marks)

PART-B

Short Answer Questions (3 Marks Each). Answer Any 10 out of 12

- Name three adverse effects of acid rain. [K] [CO1]
- Differentiate between carbon footprint and carbon trading. [U] [CO1]
- What is safety auditing? [U] [CO3]
- State any three risks faced by children during disasters. [K] [CO2]
- Mention any three psycho-social effects of extreme heat. [U][CO2]
- Discuss the role of Post-Disaster Needs Assessment (PDNA) in recovery planning. [U] [CO3]
- Give a brief account on disaster safe designs and constructions. [U] [CO3]

18. Differentiate between response and relief in disaster management. [U] [CO3]
19. Write a note on early warning systems. [K] [CO4]
20. What are the objectives of Integrated Coastal Zone Management (ICZM)? [U] [CO4]
21. Which is the technology employed for pre-disaster vulnerability assessment? [A] [CO4]
22. How is data analytics used in predicting and managing disasters? [A] [CO5]

(10x3= 30 Marks)

PART-C

Short Essay Questions (5 Marks Each). Answer Any 6 out of 8

23. Describe the causes and adverse effects of wildfire. [U] [CO1]
24. Discuss the psycho-social impacts of droughts and depletion of ground water. [U] [CO2]
25. Highlight the effects of climate change on agriculture and food security. [U] [CO2]
26. Describe the role of Environmental Impact Assessment (EIA) in disaster risk reduction. [U] [CO3]
27. Examine the importance of disaster-safe designs and land use planning. [U] [CO3]
28. Explain the principles and importance of Integrated Water Resources Management (IWRM). [U] [CO4]
29. Discuss the major international treaties and agreements formed to combat climate change [U] [CO4]
30. Examine successful disaster management cases in Kerala. [A] [CO5]

(6x5= 30 Marks)

QPCode

Reg.No :

Name :

MAHATMA GANDHI UNIVERSITY, KOTTAYAM
MGU-UGP (HONOURS) EXAMINATION 2026
Fifth SEMESTER
SKILL ENHANCEMENT COURSE (SEC) – MG5SECBTS300 –
ENTREPRENEURSHIP IN BIOCHEMISTRY
(2024 ADMISSION ONWARDS)

Duration: 1 Hour 30 Minutes

Maximum Marks: 50

Remember(K), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C), Skill(S), Interest(I) and Appreciation(Ap)

Students should attempt at least one question from each course outcome to enhance their overall outcome attainability.

Part A MCQ

Answer all questions

Each question carries 1 marks

1. Which of the following is a nutritional deficiency disorder? [K /] [CO1]
a) Scurvy b) Hypertension c) Obesity d) Diabetes mellitus
2. What is the primary objective of preventive healthcare? [K /] [CO1]
a) Treating diseases after they develop b) Preventing diseases and promoting health c) Performing surgical procedures d) Providing emergency treatment only
3. Which of the following is commonly used as a herbal food supplement? [K /] [CO1]
a) Turmeric b) Plastic c) Cement d) Petroleum
4. Which of the following is an example of a lifestyle disorder? [K /] [CO1]
a) Diabetes mellitus b) Scurvy c) Rickets d) Goitre
5. What distinguishes a functional food from a conventional food? [U /] [CO2]
a) It provides only basic nutrition b) It provides health benefits beyond basic nutrition c) It is used only as a medicine d) It has no nutritional value
6. What does USP of a nutraceutical product stand for? [K/] [CO3]
a) Unique Selling Point b) Universal Safety Procedure c) Unit Standard Protocol d) Uniform Storage Plan
7. What is the primary purpose of Good Manufacturing Practices (GMP)? [U /] [CO3]
a) Ensuring consistent product quality and safety b) Increasing the colour of a product c) Reducing the nutritional value of a product d) Designing advertisements only
8. What information does a label claim generally provide? [K /] [CO3]
a) Health or nutritional characteristics of a product b) Colour of the manufacturing plant c) Salary of employees d) Location of competitors
9. What is the main focus of biochemical entrepreneurship? [U/] [CO4]
a) Applying biochemical knowledge to develop products and enterprises b) Constructing roads and bridges c) Conducting political campaigns d) Performing routine clerical work
10. Which factor is important for the success of a biochemical venture? [U/]

a) Innovation and proper market understanding b) Ignoring customer needs c) Lack of [CO4]
quality control d) Avoiding technological advancement

[1x10 = 10]

Part B

Short Answer Questions

Answer any **10** questions

Each question carries **2** marks

- | | |
|---|-------------|
| 11. Classify the major groups of nutrients. | [K/] [CO1] |
| 12. What are herbal food supplements? Give two examples. | [K /] [CO1] |
| 13. What is meant by preventive healthcare? | [K /] [CO1] |
| 14. Explain two effects of an imbalanced diet. | [U /] [CO1] |
| 15. What are rejuvenative herbs? | [K /] [CO1] |
| 16. Define dietary supplements and functional foods. | [K /] [CO2] |
| 17. Explain the importance of phytochemicals in nutraceutical products. | [U /] [CO2] |
| 18. What is a Unique Selling Point (USP)? | [K /] [CO3] |
| 19. What is New Product Development (NPD)? | [K /] [CO3] |
| 20. What is Good Manufacturing Practice (GMP)? | [K /] [CO3] |
| 21. What is meant by net quantity and expiration date on a product label? | [U /] [CO3] |
| 22. Define biochemical entrepreneurship. | [K /] [CO4] |

[2x10 = 20]

Part C

Short Essay Questions

Answer any **5** questions.

Each question carries **4** marks

- | | |
|---|-------------|
| 23. Explain the role of nutrition and preventive healthcare in maintaining holistic wellness. | [U /] [CO1] |
| 24. Explain the major lifestyle disorders associated with imbalanced diet, overeating and undernourishment. | [U /] [CO1] |
| 25. Explain the role of rejuvenative herbs and commonly used Indian herbs in preventive healthcare and daily supplementation. | [U /] [CO1] |
| 26. Explain the major categories of nutraceutical products and their importance in health and disease management. | [U /] [CO2] |
| 27. Explain the importance of New Product Development (NPD), GMP and quality management in the nutraceutical industry. | [U /] [CO3] |
| 28. Explain the important requirements of nutraceutical labelling, including label claims, net quantity, expiration date, gluten-free labelling and shelf-life stability. | [U /] [CO3] |
| 29. Explain the scope and development of biochemical entrepreneurship and describe the major factors contributing to the success or failure of a biochemical venture. | [U /] [CO4] |

[4x5 = 20]

MAHATMA GANDHI UNIVERSITY, KOTTAYAM
MGU-UGP (HONOURS) REGULAR EXAMINATION OCTOBER 2026
Semester V
SEC – MG5SECZGY300, MG5SECZIM300
FOOD AND WATER QUALITY MANAGEMENT
(2024 ADMISSION ONWARDS)

Duration: 1 hour 30 minutes

Maximum Marks: 50

Remember(K), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C), Skill(S), Interest(I) and Appreciation(Ap)

Students should attempt at least one question from each course outcome to enhance their overall outcome attainability.

Part A

MCQ

Answer all questions

Each question carries **1** marks

1. Which toxic metal is associated with Minamata disease? [U] / [CO1]
a) Lead b) Mercury c) Cadmium d) Arsenic
2. Which of the following is a natural preservative? [U] / [CO1]
a) Vinegar b) Tartrazine c) Saccharine d) BHA
3. The Food Safety and Standards Act enacted in [K] / [CO2]
a) 1954 b) 1986 c) 2006 d) 2011
4. Which body regulates food safety in India? [K] / [CO2]
a) BIS b) AGMARK c) FSSAI d) NABL
5. Agmark certification is mainly used for. [U] / [CO2]
a) Electronic Goods b) Agricultural Products c) Medicines d) Textiles
6. Which among the following is an intrinsic factor of food spoilage [U] / [CO3]
a) Temperature b) Relative humidity c) pH d) Presence of bacteria

7. Bacteria causing spoilage of vegetables. [U] / [CO3]
a) *Erwinia* b) *Corynebacterium* c) *Yersinia* d) *Shigella*
8. Which among the following water quality parameter is measured by gravimetric method? [U] / [CO3]
a) Turbidity b) Temperature c) Total Dissolved Solids d) Total hardness
9. Which spoilage causes flat cans, black discoloration of food, and a rotten egg smell? [U] / [CO4]
a) Hydrogen Swell b) Putrefactive anaerobes c) T.A. Spoilage
d) Sulphide stinker spoilage
10. The principle behind freeze drying is. [U] / [CO 4]
a) Coagulation b) Sublimation c) Autolysis d) Desorption
11. The Principle of drying relies on the simultaneous transfer of which two factors? [U] / [CO4]
a) Heat and Mass b) Temperature and Pressure c) Velocity and Volume
d) Moisture and Density
12. FDA approved material widely used for shrink packaging in the food industry is. [U] / [CO4]
a) POF b) PLA c) PHA d) PVC

[1x12 = 12]

Part B

Short Answer Questions

Answer any **6** questions

Each question carries **3** marks

13. What are the acute health effects of food adulteration? [U] / [CO1]
14. What are artificial sweeteners? Give two examples and mention their uses. [U] / [CO1]
15. Explain the objectives of FSSA 2006. [U] / [CO2]

- | | |
|---|-------------|
| 16. Explain the scope and significance of quality management system. | [U] / [CO2] |
| 17. What is physical spoilage of food? Give examples. | [U] / [CO3] |
| 18. Explain microbial spoilage of Dairy products. | [U] / [CO3] |
| 19. What is Cryogenic freezing? Mention its principle and advantages. | [U] / [CO4] |
| 20. Distinguish between intelligent packaging and active packaging | [U] / [CO4] |

[3x6 = 18]

Part C

Short Essay Questions

Answer any **4** questions

Each question carries **5** marks

- | | |
|--|-------------|
| 21. Discuss the common food adulterants and methods used for their detection. | [U] / [CO1] |
| 22. Describe the major provisions of FSS Regulations 2011. | [U] / [CO2] |
| 23. Explain the intrinsic factors of food spoilage | [U] / [CO3] |
| 24. Explain the Physical parameters of water quality analysis | [U] / [CO3] |
| 25. Explain the factors affecting the rate of Drying and Dehydration | [U] / [CO4] |
| 26. Differentiate between Modified Atmosphere Packaging (MAP) and Controlled Atmosphere Packaging(CAP) | [U] / [CO4] |

[5x4 = 20]

Reg. No:

Name:

MAHATMA GANDHI UNIVERSITY, KOTTAYAM

MGU-UGP (HONOURS) EXAMINATION

FIFTH SEMESTER

Skill Enhancement Course (SEC) – MG5SECZGY301: AQUARIUM FABRICATION AND SETTING

(For those opting Aquaculture as Minor)

Duration: 1.5 Hours

Maximum Marks: 50

Learning Domains: Remember (K), Understand (U), Apply (A), Analyze (An), Evaluate (E), Create (C), Skill (S)

Students should attempt questions ensuring coverage of all Course Outcomes (CO1 to CO4).

Part A (Multiple Choice Questions)

Answer all questions. Each question carries 1 mark.

1. Which of the following materials offers superior clarity and seamless curved edges for custom tank designs? [K] / [CO1]

- | | |
|-------------------------|------------------------|
| a) Annealed Float Glass | b) Cast Acrylic Sheet |
| c) Tempered Glass | d) Polycarbonate Sheet |

2. A Paludarium is a specialized aquarium system designed to integrate: [K] / [CO1]

- | | |
|--|--|
| a) Marine corals and deep-water macroalgae | b) Both terrestrial (land) and aquatic semi-submerged environments |
| c) Low-temperature coldwater stenohaline organisms | |
- d) High-turbidity brackish mangrove mud substrates

3. Which filtration component is exclusively used in saltwater marine systems to remove dissolved organic proteins via micro-foaming? [K] / [CO2]

- | | |
|------------------------------|--------------------|
| a) Hang-On-Back (HOB) Filter | b) Sponge Filter |
| c) Under Gravel Filter (UGF) | d) Protein Skimmer |

4. In an established aquarium biological filter, *Nitrosomonas* bacteria primarily oxidize: [U] / [CO2]

- | | |
|----------------------------|---|
| a) Nitrate to Nitrogen gas | b) Toxic Ammonia into Nitrite |
| c) Nitrite into Nitrate | d) Molecular Oxygen into Carbon Dioxide |

5. Ceramic rings and porous sintered glass media in a canister filter serve primarily as: [K] / [CO2]

- | | |
|------------------------------------|---------------------------|
| a) Chemical adsorbents | b) Mechanical strainers |
| c) Biological nitrifying substrate | d) Water-softening resins |

6.Which lighting spectrum and type is most energy-efficient and widely preferred for modern high-tech planted aquariums? [K] / [CO2]

- a) Incandescent tungsten bulbs
- b) Metal Halide fixtures
- c) Full-spectrum LED systems
- d) Standard T12 fluorescent tubes

7.In the placement hierarchy of aquascaping layout design, *Vallisneria spiralis* is typically classified as a: [U] / [CO3]

- a) Foreground carpet plant
- b) Midground accent plant
- c) Background tall plant
- d) Surface floating bio-cover

8.Which live food organism is most suitable as the first feed for tiny newly hatched fish fry that cannot consume *Artemia* nauplii? [K] / [CO3]

- a) *Tubifex* worms
- b) Bloodworms (*Chironomus* larvae)
- c) Infusoria (Ciliates)
- d) Adult *Daphnia magna*

9.The process of gradually equalizing water temperature and chemistry before releasing new fish into a display tank is known as: [U] / [CO3]

- a) Nitrogen Cycling
- b) Acclimatization
- c) Biological Conditioning
- d) Prophylactic Dip

10.What is the fundamental cause of "New Tank Syndrome" in newly fabricated, uncycled aquaria? [U] / [CO4]

- a) Depletion of trace minerals
- b) Accumulation of toxic Ammonia and Nitrite due to absence of nitrifiers
- c) Excessive proliferation of green hair algae
- d) Sudden depletion of carbonate hardness (KH)

11.White Spot Disease (Ich) in freshwater tropical fish is caused by the ciliate protozoan: [K] / [CO4]

- a) *Ichthyophthirius multifiliis*
- b) *Saprolegnia parasitica*
- c) *Aeromonas hydrophila*
- d) *Dactylogyrus vastator*

12.Conditioning ornamental fishes prior to long-distance transportation involves: [U] / [CO4]

- a) Heavy feeding with high-protein live worms
- b) Starvation for 24–48 hours to minimize metabolic waste excretion
- c) Raising the water temperature by 5°C
- d) Adding excessive antibiotic doses into shipping bags

1x12 = 12

Part B (Short Answer Questions)

Answer any 6 out of 8 questions. Each question carries 3 marks.

13. Compare glass and acrylic as tank construction materials based on optical clarity, scratch resistance, and structural adaptability. [U] / [CO1]

14. Distinguish between a Fish-Only with Live Rock (FOWLR) tank and a specialized Reef Tank. [U] / [CO1]

15. Outline the working mechanism and utility of a Hang-On-Back (HOB) filter in home aquaria. [U] / [CO2]
16. Describe the biochemical steps involved in the aquarium Nitrogen Cycle. [U] / [CO2]
17. Explain the standard stepwise protocol for introducing newly purchased fish into a seasoned aquarium. [A] / [CO3]
18. Outline the standardized laboratory/home culture procedure for *Daphnia* or *Moina*. [S] / [CO3]
19. State the major causative factors for excessive algae blooms in freshwater tanks and suggest three preventive measures. [U] / [CO4]
20. Explain the essential packaging steps followed during the live transport of ornamental fishes in sealed polythene bags. [A] / [CO4]

6x3= 18

Part C (Short Essay Questions)

Answer any 4 out of 6 questions. Each question carries 5 marks.

21. Classify aquariums based on water salinity and design concepts (Freshwater community, Biotope, Nano, Paludarium, and Reef systems). [U] / [CO1]
22. Provide a detailed account of essential water quality parameters pH, Dissolved Oxygen, Ammonia, Nitrite, Nitrate, and Hardness) and their acceptable ranges for tropical fish maintenance. [U] / [CO2]
23. Detail the stepwise construction and fabrication of an all-glass rectangular freshwater aquarium, including glass cutting, silicone application, curing, and leak-testing. [A, U] / [CO3]
24. Classify aquatic plants based on their placement zones in aqua scaping (foreground, midground, background, and floating) and explain their physiological role in biological balance. [U] / [CO3]
25. Describe the etiology, symptoms, and therapeutic treatment protocols for one bacterial and one fungal disease commonly encountered in tropical ornamental fishes. [U, A] / [CO4]
26. Discuss the commercial aspects, conditioning strategies, oxygenation methods, and modern packing technologies used in the ornamental fish export and domestic marketing sector. [U, A] / [CO4]

4x5=20
