

**MAHATMA GANDHI UNIVERSITY, KOTTAYAM
MGU- UGP (HONOURS)**

FOURTH SEMESTER EXAMINATION

2024 ADMISSION ONWARDS

MG4DSCBTS200

GENETIC ENGINEERING AND PLANT TISSUE CULTURE

Time: 1.5 hours

Total: 50 marks

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

Part A

Fill in the blanks

Answer all questions

Each question carries 1 mark

1. The technique used to amplify DNA in vitro is called _____. [K] [CO2]
2. A plant cell without a cell wall is called a _____. [K] [CO8]
3. _____ enzyme is used to add phosphate groups to DNA ends. [K] [CO2]
4. The temperature used for the denaturation step in PCR is approximately _____ °C. [K] [CO2]
5. _____ blotting is used to detect specific RNA molecules. [K] [CO3]
6. Storage of plant cells in liquid nitrogen is known as _____. [K] [CO8]
7. _____ medium is widely used for plant tissue culture. [K] [CO5]
8. The ability of plant cells to regenerate into a complete plant is known as _____. [U] [CO5]
9. _____ hormone is required for shoot proliferation. [K] [CO5]
10. Phenol–chloroform extraction helps in the removal of _____ from DNA samples. [K] [CO2]

Short answer questions

Answer any 10 questions

Each question carries 2 marks

11. Define genetic engineering and mention one of its applications. [U] [CO1]
12. What is the role of restriction endonucleases in recombinant DNA technology? [U] [CO1]
13. Mention any two methods used for DNA quantification. [K] [CO2]
14. What is the difference between a genomic library and a cDNA library? [U] [CO2]
15. State the principle of Polymerase Chain Reaction (PCR). [U] [CO2]
16. What are cloning vectors? Give two examples. [K] [CO1]
17. What is somatic embryogenesis? [U] [CO8]
18. What is callus culture? [U] [CO7]
19. Mention the application of plant transformation for enhanced quality. [U] [CO4]
20. Write a short note on CRISPR-Cas9 technology. [U] [CO4]
21. Mention two applications of protoplast culture. [K] [CO8]
22. State the importance of growth regulators in tissue culture. [U] [CO5]

Short essay questions

Answer any 5 questions

Each question carries 4 marks

23. Explain the basic steps involved in the isolation and purification of DNA from biological samples. [U] [CO2]
24. Explain the different hybridization techniques in genetic engineering. [U] [CO2]
25. Explain the applications of Genetic Engineering. [U] [CO4]
26. Describe the major types of cloning vectors used in genetic engineering. [U] [CO1]
27. Explain protoplast isolation and fusion techniques. [U] [CO8]
28. Describe the main components of plant tissue culture media. [U] [CO5]
29. Explain the concept and importance of germplasm conservation. [U] [CO8]

MAHATMA GANDHI UNIVERSITY, KOTTAYAM

MGU- UGP (HONOURS)

FOURTH SEMESTER EXAMINATION- PRACTICAL

MG4DSCBTS201

CELL BIOLOGY

2024 ADMISSION ONWARDS

Time: 2 hours

Total: 35 marks

PART A (25 marks)

1. Prepare a neat squash preparation of onion root tip. (6 marks)

- a) Preparation and identification of any two mitotic stages. (2 marks)
- b) Comment on identified stages, (2 marks)
- c) Sketch and label the identified stages. (2 marks) (CO3)

2. Prepare a smear of human buccal epithelium and identify the Barr body and Comment (4 marks)

- a) Prepare a smear of human buccal epithelium. (2marks)
- b) Identify the Barr body and comment.(2marks)(CO3)

3. Using a Micrometer, measure the breadth of human hair. Write down the principle & procedure. (7marks)

- a) Principle&Procedure (4marks)
- b)Calibration& result (3 marks)(CO3)

4. Comment on the following (3 marks)(CO3)

- a) Identify and comment on: (Any tissue / Cell organelles/Polytene chromosome).(1 mark)
- b) Identify and comment on the given stage of meiosis. (1mark)
- c) Identify the given spotters and comment.(1 mark)

5. Viva - 5 marks

PART B (10 marks)

1. Record - 10 marks(CO3)

**MAHATMA GANDHI UNIVERSITY,
KOTTAYAM**

MGU-UGP(HONOURS)ZOOLOGY
FOURTH SEMESTER EXAMINATION
(2024 Admission Onwards)

**DSC A- PRACTICAL MODEL QUESTION PAPER (2026)
MG4DSCZGY200 – ANIMAL DIVERSITY- CHORDATA I**

Duration: 2 hrs.

Maximum Marks: 35

(Provide diagram wherever necessary)

Part A

- 1. Identify the given dissection provided. Sketch and label any 8 parts. (Frog viscera/ Frog 9th & 1st Spinal nerve/ Frog brain/ Frog sciatic plexus / Frog arterial system / Frog digestive system) (Photographs/diagrams/ dissected & preserved specimens, each/models may be used for study). [CO 4]**

Identification	-1 mark
Sketch	-5 marks
Label any 8 parts	-4 mark

Or

Identification of labelled parts of the given dissection and mention its function. (Frog Viscera/ Frog brain / Frog sciatic plexus/ Frog arterial system / Frog digestive system)

(Photographs/diagrams/fresh or preserved specimens may be used). [CO 4]

Identification	-5mark	
Function	-5marks	10 marks

- 2. Mounting of placoid scale. [CO 4]**

Mounting	-4marks	
Sketch	-1mark	5 marks

- 3. Make a neat proportionate sketch of the specimen provided. Label any three parts and give the scale you have used. [CO 4]**

Sketch (Neat scientific drawing)	-3marks
Labelling of any two parts	-1mark
Writing of scale used	-1mark

Or

Identify, sketch and label the given section.

(T. S of *Amphioxus* through pharynx/intestine) [CO 4]

Identification	- 1mark	
Sketch	- 2marks	
Labelling	- 2 marks	5 marks

4. Identify and comment on the following. [CO 4]

5marks

a) Identify the given specimen up to the level of class/order using the key.

2 marks

b) Identify and classify the given specimen (Phylum, Class, Genus and Species)
(Protochordata, Pisces, Amphibia, Reptilia)

1 mark

c) Identify and comment on the bone provided (Frog vertebrae – typical/
atlas/8th/9th/ Pectoral girdle of frog / Pelvic girdle of frog / Turtle or Tortoise -
plastron/ carapace). (Identification -1mark, Comment-1mark)

2 marks

5. Certified Record along with group activity report.

10 marks

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MAHATMA GANDHI UNIVERSITY, KOTTAYAM
MGU-UGP- ZOOLOGY (HONOURS)-FOURTH SEMESTER PRACTICAL EXAMINATION
MODEL QUESTION PAPER
(2024 Admission onwards)
DSC-A – MG4DSCZGY201
BIOLOGICAL CHEMISTRY (PRACTICAL)

Duration: 2 hrs.

Maximum Marks: 35

Certified Record – 10 Marks

Part A [Understand] [CO-1]
Each question carries 3 marks

I. Identify the given model. (Glucose/ Fructose) **(3 marks)**
a) Identification- (1 marks)
b) Sketch & Label the ball-and-stick model highlighting all functional groups (2 marks)

II. Identify and comment on the given 3D structure (DNA double helix/RNA (mRNA or tRNA/ protein) **(3 marks)**

Part B [Understand] [CO-5]

III. Perform qualitative tests to identify the presence of carbohydrates, proteins, and lipids in the given unknown samples. Record your observations and inferences. **(15 marks)**
Performance- 2 marks, Reporting with reasons- 3 mark for each biomolecule identification

IV. You are provided with a sample on which the urease test has been performed. Observe the sample carefully. Report your observations (2 marks) and write the inference (2 marks)- **(4 marks)**

MAHATMA GANDHI UNIVERSITY, KOTTAYAM
MGU-UGP ZOOLOGY (HONOURS)
FOURTH SEMESTER PRACTICAL EXAMINATION

DSC-B – MG4DSCZGY202 - FUNCTIONAL ZOOLOGY (PRACTICAL)

Duration: 2 hrs.

Maximum Marks: 35

Certified Record – 10 marks

I. Identify the given instrument. (Any One)

(Identification- 1 mark; Comment on principle and use- 3 marks)

(4 marks)

[Skill] [CO:5]

II. Determine the blood group and Rh factor

(Principle- 2 marks; Preparation and result- 3 marks)

(5 marks)

[Skill and Analyse] [CO:5]

III. Prepare human blood smear and identify any two leucocytes.

a. Preparation and Identification of any two leucocytes- 6 marks

b. Sketch and label the identified leucocytes- 4 marks

(10 marks)

[Skill and Analyse] [CO:5]

IV. Identify the experiment and comment with reasons

(Identification- 2 marks; Comment with reasons- 4 marks)

(6 marks)

[Analyse] [CO:5]

OR

Write down the principle and procedure of Haemoglobin estimation.

(6 marks)

[Skill] [CO:5]

MG4DSCZGY203 – Biological Basis of Behaviour IV
Practical Model Question Paper

Duration: 2 hrs

Maximum Marks: 35

Certified record: 10 marks

Part A (12 Marks)

1. a) Identify and Comment on functions of any two White blood cells
Identification – 2 marks, Comment – 4 marks (Understand; CO: 5)

- b) Identify and comment on the functions of any three parts of male/female reproductive system (6 Marks)
Identification – 3mark, Comment – 3 marks (Evaluate; CO: 5)

2x6=12 marks

Part B (6 Marks)

- 2 a) Sketch and label the immunoglobulin (Ig G). (2 marks)
Sketch – 1 mark, Labelling – 1 mark (Understand; CO: 5)

- b) Identify and Comment on the lymphoid organs provided (Thymus, Bone marrow, Lymph node, Spleen) (2 marks)
Identification – 1 mark, Comment – 1 mark (Understand; CO: 5)

- c) Identify and comment on the clinical symptoms of autoimmune disorder provided (Myasthema gravis, Systemic lupus erythematosus, Rheumatoid arthritis) (2 marks)
Identification – 1 mark, Comment – 1 mark (Understand; CO: 5)
(3x 2=6 marks)

Part C (7 Marks)

4. Identify and comment on the hypersensitivity reactions using model situation provided

Example: A patient develops **sneezing, itching of eyes, runny nose, and wheezing** immediately after exposure to **house dust or pollen**. Identify the type and comment on
(Evaluate; CO: 5)

(1x7=7 marks)

MAHATMA GANDHI UNIVERSITY, KOTTAYAM
MGU-UGPP (HONOURS)
FOURTH SEMESTER PRACTICAL EXAMINATION
(2024 ADMISSION ONWARDS)
MG4DSCZIM201 – INDUSTRIAL MICROBIOLOGY AND FERMENTATION
TECHNOLOGY

Duration :2 hrs

Maximum Marks :35

Certified Record- **10 Marks**

1. Estimation of citric acid by using *Aspergillus niger*. [An][6] **8 Marks**
Principle & Procedure 4 Marks
Observation & Result 4 Marks
2. Perform Immobilization of yeast cell. [An][4] **8 Marks**
Principle & Procedure 4 marks
Performance & Result 4 marks
3. Perform Gram staining [An][3] **4 Marks**
Principle & Procedure 2 marks
Performance & Result 2 marks
4. Identify the given fermenter & state any one industrial application. [U][CO6] **2 Marks**
5. Identify the industrial product given and comment on organism producing it.
[U][CO3] **2 Marks**
6. Viva. [U][CO6] **1Marks**

MAHATMA GANDHI UNIVERSITY, KOTTAYAM
MGU-UGP (HONOURS)
FOURTH SEMESTER PRACTICAL EXAMINATION
(2024 ADMISSION ONWARDS)
MG4DSEZIM201 - MEDICAL MICROBIOLOGY

Duration : 2 hrs

Maximum marks :35

Certified Record : 10 marks

- | | | |
|---|------------|-------------------|
| 1) Isolation of microbial flora from given sample | [An] [CO6] | 6 marks |
| Principle and Procedure | | 3 marks |
| Performance and Result | | 3 marks |
|
 | | |
| 2) Perform antibiotic sensitivity test | [An] [CO6] | 6 marks |
| Principle and Procedure | | 3 marks |
| Performance and Result | | 3 marks |
|
 | | |
| 3) Identify and comment on given spotters | [U] [CO6] | (4 x 2 = 8 marks) |
| A. Staining method. | | |
| B. Microbes causing Urinary tract infection. | | |
| C. Fungal sample. | | |
| D. Microorganism causing skin infection. | | |
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| 4) Viva based on Industrial Visit | [U] [CO6] | 2 marks |
| 5) Report | [U] [CO6] | 3 marks |

MAHATMA GANDHI UNIVERSITY, KOTTAYAM
MGU-UGP (HONOURS)
FOURTH SEMESTER PRACTICAL EXAMINATION
(2024 ADMISSION ONWARDS)

**MG4DSEZIM202 – MICROBIAL QUALITY CONTROL IN FOOD &
PHARMACEUTICAL INDUSTRY**

Duration: 2 Hour

Maximum Marks: 35

1. Certified Record **[10 marks]**

2. Perform quality testing of milk using the Resazurin test. **[An][CO6] [2 x 3 = 6 Marks]**
 - (a) Principle and Performance
 - (b) Result and Record

3. Detection of microorganisms from the given sample. **[An][CO5] [2 x 3 = 6 Marks]**
 - (a) Principle and Procedure
 - (b) Performance and Result

4. Identify and comment on the given spotters. **[U][CO5] [4 x 2 = 8 Marks]**
 - (a) Instrument
 - (b) Adulterant test
 - (c) Food spoilage microorganism
 - (d) Culture medium

5. Viva **[U][CO5] [5 Marks]**