

# B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

## September / October 2023 Supplementary Examinations

**Programme: B.E.**

**Branch: Biotechnology**

**Course Code: 19BT8HSBEB**

**Course: BIOETHICS AND BIOSAFETY**

**Semester: VIII**

**Duration: 3 hrs.**

**Max Marks: 100**

**Date: 30.09.2023**

**Instructions:** 1. Answer any FIVE full questions, choosing one full question from each unit.  
2. Missing data, if any, may be suitably assumed.

### UNIT - I

1 a) A. In 2002, a joint venture between Monsanto and Mahyco introduced a GM crop in India which could resist Bollworms. Identify and describe the principal mechanism involved in GM crop production. Highlight the major positive impacts it has caused till now in our country. **10**

b) Assume that Mint plant (*Mentha piperita*) is native to India and nowhere grown in other parts. The plant has successfully used from ancestral time for treatment of pathogenic infections. In the year 2020, a private company is consisting maximum proportion of Mint in it, recommend for COVID treatment and patent the product. **05**

i. Highlight the important public issues that could be raised from the above case.  
ii. Can the patent given be reverted and denied monopoly? Justify your decision.

c) Explain the challenges that are posed to Indian biotechnological research institutes for the welfare of the society. **05**

### UNIT - II

2 a) Observe the following images concerned with biotechnological processes and answer suitably. **10**



i. Draw the major ethical, theological, legal and technical issues.  
ii. Which of the two you could decide as outcome of extreme genetic engineering and justify your decision?

**Important Note:** Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

- b) Explain the importance of benefits outweighing risks in various BT processes and products. **05**
- c) List the key issues that could be brought about by technology transfers across the globe with relevance to biotechnology. **05**

**OR**

3 a) Consider the following hypothetical case studies and answer the questions. **10**

Case study 1: Assume that gene profiling technique for a person comes into clinical practice. A geneticist directly does the gene profiling of a person (patient of age 25) who visits his/her clinic by just enquiring about health rather than going ahead with therapeutic intervention. Few days later a housekeeping person in clinic was seen to be sharing the details of the patients report with other hospital staff.

Case study 2: In public hospital a government medical practitioner examines over 50 patients in an hour and prescribes the drugs which are available only in private shops. Further the patients were supposed to revisit the hospital after a week with the same condition of illness. Meanwhile the same practitioner in his private clinic examines just 5 patients in one hour and prescribes medication. These patients get cured of the complication within 3days.

- i) Which codes of medical ethics does the geneticist and medical practitioner failed to adopt in professional practice and discuss the same.
- ii) Interpret the major impacts caused on patients as a result of such medical treatments.

b) List the major ELSI that were raised against the public revelation and open for public utility of HGP outcomes. **05**

c) “Human embryonic stem cells are the potential source for stem cell therapy but draws huge opposition from the society”. Discuss. **05**

**UNIT - III**

4 a) Dr. Craig Venter for the first time created a synthetic cell using four bottles of chemicals.

- i. Name the organism and briefly mention the procedure involved
- ii. Discuss the potential benefits claimed by the scientist.
- iii. Infer the serious threats and potential issues that could be the outcome of such technology.

b) “Labelling of biotechnological food products helps society to make decision”. Justify with suitable examples. **05**

c) Comment on the moral treatment of animals explored for biotechnological research. **05**

**UNIT - IV**

5 a) Assume that a virus which is indigenous to US is been shifted to India under the Indo-US collaborative research program. The virus is known to cause the disease in a variety of sheep found in US different from Indian varieties. There exist the efficient vaccine as well as potential cure for the disease. Which BSL do you recommend for handling this non-indigenous virus in **10**

India and why? Describe the essential containment facilities of BSL of your choice in this context.

b) Discuss the major economic impacts caused in the past due to deliberate use of WMDs against targeted countries. **05**

c) “Any strain that is to be more (or less) hazardous than the parent (wild type) strain should be handled at a higher (or lower) containment level than that is appropriate for the RG of the parent organism”. Justify the statement with suitable examples. **05**

**OR**

6 a) Assume that a microbiologist is teaching in an academic institute that runs a general UG program in BT with basic infrastructure. He/she is interested to execute research involving microbes *Enterobacter aerogenes*, *Salmonella typhi* and *Shigella sp.* that do not come under GRAS. **10**

- i. Will the proposed research work gets approved from the concerned authority. Justify your decision.
- ii. Classify the mentioned microbes under particular RG with factors considered for classification.
- iii. Assume that the same microbes are labelled as GRAS by the culture depository, can the scientist go ahead with planned research using basic infrastructure. Discuss.

b) Comment on safety assessment of GM foods. **05**

c) Draw the important biosafety issues raised with use of human subjects in clinical trials. **05**

**UNIT – V**

7 a) What are transgenic plants? Explain the national guidelines that are in place for genetic engineering of plants in India. **10**

b) Discuss in detail the protocol that lay down the norms and guidelines for the trans boundary movement of LMOs. **10**

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