BIOTECHNOLOGY PAPER 1
(THEORY)

Maximum Marks: 70

Time Allowed: Three hours

*(Candidates are allowed **additional 15 minutes** for **only** reading the paper. They must **NOT** start writing during this time).*

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*Answer all questions in **Section A, Section B** and **Section C.***

The intended marks for questions or parts of questions are given in brackets [ ].

SECTION A – 14 MARKS

Question 1

(i) _____ is used in dairy industry to make cheese. **[1]**

(ii) _____ are extra chromosomal, circular, self-replicating molecules. **[1]**

(iii) In gel electrophoresis, the gel is composed of _____. **[1]**

(a) Nitrocellulose

(b) Agarose

(c) Phospholipids

(d) Sodium nitride

(iv) When a monochromatic beam passes through a homogenous solution, its intensity decreases as the thickness of solution increases. Which one of the following laws states this? **[1]**

(a) Beer's Law

(b) Lambert's Law

(c) Hooke's Law

(d) Beer Lambert Law

(v) State whether the following statements are True or False. Give a reason in support of your answer.

(a) In Sanger's DNA sequencing method, all the ddNTPs are labelled with coloured substances. **[1]**

(b) Helicase enzyme is used for repairing the DNA molecule. **[1]**

(vi) Define the following:

(a) Cosmids **[1]**

(b) Tissue engineering **[1]**

(vii) Differentiate between the following:

(a) *Primer* and *Primase* **[1]**

(b) dNTP and ddNTP **[1]**

(viii) Expand the following:

(a) DDBJ **[1]**

(b) NHGRI **[1]**

(ix) **Assertion:** Haploid production by gynogenesis is a difficult task. **[1]**

Reason: Isolation of unfertilized ovaries and ovules is not easy.

(a) Assertion and Reason are true and Reason is correct explanation for assertion.

(b) Assertion and Reason are true but Reason is not the correct explanation for assertion.

(c) Assertion is true but Reason is false.

(d) Both Assertion and Reason are false.

(x) **Assertion:** Membrane filters are used for sterilizing enzymes, hormones and antibiotics during cell culture technique. **[1]**

Reason: Enzymes, hormones and antibiotics are heat sensitive.

(a) Assertion and Reason are true and Reason is correct explanation for assertion.

(b) Assertion and Reason are true but Reason is not the correct explanation for assertion.

(c) Assertion is true but Reason is false.

(d) Both Assertion and Reason are false.

SECTION B – 28 MARKS

Question 2 **[4]**

Write short notes on the following:

(i) Objectives of HGP

(ii) DNA Microarray

Question 3 **[4]**

(i) Briefly explain the following:

(a) Western blotting

(b) *In vitro* pollination

OR

(ii) Briefly explain the following:

(a) The sterilization of vitamins

(b) The sterilization of transfer area

Question 4 **[4]**

State *any two* differences between the following:

(i) mRNA and tRNA

(ii) Genomic library and cDNA libraray

Question 5 **[4]**

(i) Discuss the process of gel electrophoresis.

OR

(ii) Discuss the process of DNA isolation from animal cell.

Question 6 **[4]**

Give reasons for the following:

(i) hnRNA is called Cindrella RNA.

(ii) *Agrobacterium* is called natural genetic engineer.

Question 7 **[4]**

How are *Flavor Savor* tomatoes produced? Explain.

Question 8 **[4]**

Explain the process of micropropagation.

SECTION C – 28 MARKS

Question 9

(i) Explain 3 – D model of DNA with the help of diagram. **[4]**

(ii) Mention *any three* differences between DNA and RNA. **[3]**

OR

(i) How is rDNA molecule constructed? **[4]**

(ii) Write short notes on NCBI and EMBL. **[3]**

Question 10

(i) Discuss triploid production. Mention its application. **[4]**

(ii) Explain the process of somatic hybridization. **[3]**

Question 11

(i) ***Figure 1*** shows an important process. Study the figure given below and answer the questions that follow: **[4]**

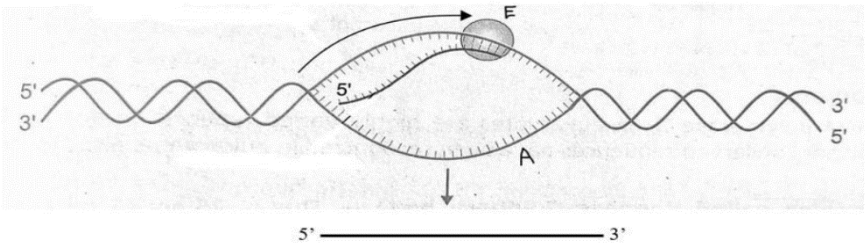

Figure 1.

(a) Identify the process shown in ***Figure 1***.

(b) What is the strand A known as?

(c) Which factor helps the enzyme E to begin the process shown in the figure? Write the name of enzyme E involved in the process?

(d) If the sequence of strand A is 5' – A T G C A C T A G C T A C G – 3', then what should be sequence on the newly formed strand?

(ii) ***Figure 2*** shows an important process. Study the figure given below and answer the questions that follow: **[3]**

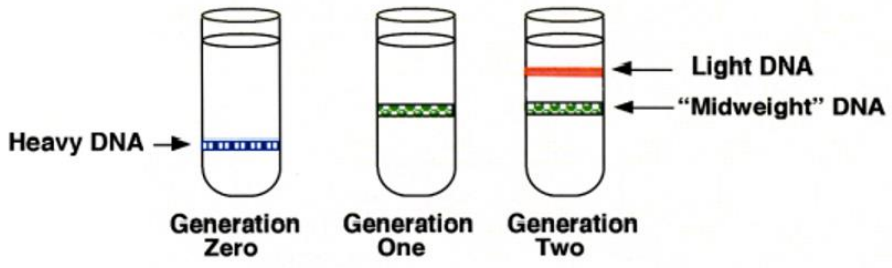

Figure 2

(a) What is represented by heavy band in generation zero of ***Figure 2***.

(b) Which method was used to determine the density of DNA?

(c) What is the result for generation 1?

Question 12

Read the following passage and answer the questions that follow:

At a crime spot, the police discovered that the victim had few hairs in his closed fist. They suspected them as the hair of the criminal and sent these to the forensic laboratory for testing. However, the sample collected was considered insufficient by the forensic team.

(i) Name the technique that is used at the beginning of the process for testing. Explain the technique. **[3]**

(ii) '…the sample collected was considered insufficient.' Name the technique used to increase the amount of sample collected for testing. **[1]**

(iii) Explain the technique used for increasing the amount of sample for testing. **[3]**