

CLASS : 12th (Sr. Secondary)

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MARKING INSTRUCTIONS AND MODEL ANSWERS

BIOTECHNOLOGY

ACADEMIC/OPEN

(Only for Fresh Candidates)

उप-परीक्षक मूल्यांकन निर्देशों का ध्यानपूर्वक अवलोकन करके उत्तर-पुस्तिकाओं का मूल्यांकन करें। यदि परीक्षार्थी ने प्रश्न पूर्ण व सही हल किया है तो उसके पूर्ण अंक दें।

General Instructions :

- (i) *Examiners are advised to go through the general as well as specific instructions before taking up evaluation of the answer-books.*
- (ii) *Instructions given in the marking scheme are to be followed strictly so that there may be uniformity in evaluation.*
- (iii) *Mistakes in the answers are to be underlined or encircled.*
- (iv) *Examiners need not hesitate in awarding full marks to the examinee if the answer/s is/are absolutely correct.*

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- (v) *Examiners are requested to ensure that every answer is seriously and honestly gone through before it is awarded mark/s. It will ensure the authenticity as their evaluation and enhance the reputation of the Institution.*
- (vi) *A question having parts is to be evaluated and awarded partwise.*
- (vii) *If an examinee writes an acceptable answer which is not given in the marking scheme, he or she may be awarded marks only after consultation with the head-examiner.*
- (viii) *If an examinee attempts an extra question, that answer deserving higher award should be retained and the other scored out.*
- (ix) *Word limit wherever prescribed, if violated upto 10%. On both sides, may be ignored. If the violation exceeds 10%, 1 mark may be deducted.*
- (x) *Head-examiners will approve the standard of marking of the examiners under them only after ensuring the non-violation of the instructions given in the marking scheme.*
- (xi) *Head-examiners and examiners are once again requested and advised to ensure the authenticity of their evaluation by going through the answers seriously, sincerely and honestly. The advice, if not heeded to, will bring a bad name to them and the Institution.*

महत्त्वपूर्ण निर्देश :

- (i) अंक-योजना का उद्देश्य मूल्यांकन को अधिकाधिक वस्तुनिष्ठ बनाना है। अंक-योजना में दिए गए उत्तर-बिन्दु अन्तिम नहीं हैं। ये सुझावात्मक एवं सांकेतिक हैं। यदि परीक्षार्थी ने इनसे भिन्न, किन्तु उपयुक्त उत्तर दिए हैं, तो उसे उपयुक्त अंक दिए जाएँ।
- (ii) शुद्ध, सार्थक एवं सटीक उत्तरों को यथायोग्य अधिमान दिए जाएँ।
- (iii) परीक्षार्थी द्वारा अपेक्षा के अनुरूप सही उत्तर लिखने पर उसे पूर्णांक दिए जाएँ।
- (iv) वर्तनीगत अशुद्धियों एवं विषयांतर की स्थिति में अधिक अंक देकर प्रोत्साहित न करें।
- (v) भाषा-क्षमता एवं अभिव्यक्ति-कौशल पर ध्यान दिया जाए।
- (vi) मुख्य-परीक्षकों/उप-परीक्षकों को उत्तर-पुस्तिकाओं का मूल्यांकन करने के लिए केवल Marking Instructions/Guidelines दी जा रही है, यदि मूल्यांकन निर्देश में किसी प्रकार की त्रुटि हो, प्रश्न का उत्तर स्पष्ट न हो, मूल्यांकन निर्देश में दिए गए उत्तर से अलग कोई और भी उत्तर सही हो तो परीक्षक, मुख्य-परीक्षक से विचार-विमर्श करके उस प्रश्न का मूल्यांकन अपने विवेक अनुसार करें।

SECTION – A**(Objective Type Questions)**

- | | | |
|--------|----------------------|---|
| 1. (i) | (b) 3.3 gm | 1 |
| | (ii) (b) 30 – 40 kb | 1 |
| | (iii) (d) DNA | 1 |
| | (iv) (c) Homosapiens | 1 |
| | (v) (a) Lysine | 1 |

- (vi) (d) All of these 1
- (vii) (a) Bacteria 1
- (viii) (c) Both (a) and (b) 1
- (ix) It measures the amount of protein nitrogen that is retained by the body from a given amount of protein nitrogen that has been consumed. 1
- (x) H. Winkler 1
- (xi) Deutsche Sammlung von Microorganism and Zellkulturen 1
- (xii) Murashige and skoog. 1

SECTION – B**(Very Short Answer Type Questions)**

2. Parathion 1
Malathion 1
3. The vector for use in eukaryotic cells are constructed such that they can exist in both eukaryotic cells and *E-coli*. These are called shuttle vectors. 1
- The vectors which contain signals necessary for initiation and termination of transcription and translation to produce recombinant proteins are called expression vector. 1
4. A curator is one who reviews and checks newly submitted data ensuring all mandatory

information has been provided, that biological features are adequately described and that the conceptual translation of any coding regions obey universal translation rules. 2

- 5.** Genome size - 14,000,000 1
 predicted genes - 6000 1
- 6.** L-Lysine - *Corynebacterium glutamicum* 1
 Vitamin B₁₂ - *Propionibacterium shormanii* 1
- 7.** Callus refers to an unorganized mass of cells, which are generally parenchymatous in nature. Generally auxins are added to culture medium for callus induction, it is used for plant regeneration, preparation of single cell suspensions and protoplasts, genetic information studies. 2
- 8.** (i) It utilizes the long term preservation of cells and tissues at ultra-low temperature (– 196°C in liquid nitrogen).
 (ii) In this cryoprotectants such as dimethyl sulfoxide, glycerol, praline and mannitol are used. 1 + 1 = 2
- 9.** (i) Protect the tissue culture from the operator (i.e. a sterile environment). 1
 (ii) Protecting operator from tissue culture (in situations of potential infection risk). 1

- 10.** It is invaluable for visualizing cell culture. It allow the cells at bottom to be visualized because the optical system is at bottom with the light source on the top. 2

SECTION – C**(Short Answer Type Questions)**

- 11.** The branched chain amino acids must be present in muscle cells to promote protein synthesis. These BCAA help increase the bioavailability of high complex carbohydrates intake and are absorbed by muscle cells for anabolic muscle building activity. One of the theories is the during exercise the BCAA's are released from skeletal muscles, the carbon part is used as fuel and the nitrogen part is used to make alanine which then goes to liver where it is turned into glucose for energy. BCAA reduce muscle breakdown and act as an energy source during and after exercise. 3
- 12.** The specificity site of chymotrypsin (enzyme is specific to aromatic residues) is again a large space created in the enzyme shape lined by hydrophobic residues which therefore only allow bulky aromatic, hydrophobic amino acids to bind. This binding brings the susceptible peptide bonds close to the attaching serine 195 residue. 3

- 13.** In this cell take up DNA from surrounding environment. Many cell types, including *E-coli*, yeast and mammalian cells, do not naturally transform, however, simple clinical treatments can make all of these cell types competent for transformation. In 1970 Mandel and Higa found that *E-coli* cells become markedly competent to take up external DNA when these cells are suspended in cold calcium clack. 3
- 14.** (a) **Denaturing** : The DNA is heated to high temperature (usually 94°C) resulting in the separation of the two strands . Each single strand of the target DNA then acts as a template for a protein synthesis. 1
- (b) **Annealing** : Two oligs nucleotide primers anneal or hybridize to each of the single stranded template DNA since the sequence of the primers is complementary to the 3' end of the template DNA. 1
- (c) **Extension** : In this Taq DNA polymerase synthesizes the DNA region between the primers, using dNTPs and Mg⁺⁺. The optimum temperature for this step is 70°C. 1
- 15.** Eukaryotic cells have organelles such as mitochondria and chloroplast. These organelles

have their own store house of information in the form of organelle DNA. organelle DNA codes for a few genes. The coding information for the rest of the genes reside in nuclear DNA of the same cell.

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SECTION – D

(Long Answer Type Questions)

- 16.** See Page No. **114** of Text-Book of Biotechnology,
Class - XII, CBSE 5

OR

See Page No. **103** of Text-Book of Biotechnology,
Class - XII, CBSE

- 17.** See Page No. **133-134** of Text-Book of
Biotechnology, Class - XII, CBSE 5

OR

See Page No. **134-135** of Text-Book of
Biotechnology, Class - XII, CBSE

- 18.** See Page No. **150-151** of Text-Book of
Biotechnology, Class - XII, CBSE 5

OR

See Page No. **145** of Text-Book of Biotechnology,
Class - XII, CBSE

