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MARKING INSTRUCTIONS AND MODEL ANSWERS

जैव प्रौद्योगिकी

BIOTECHNOLOGY

ACADEMIC/OPEN

(Only for Fresh/Re-appear 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.

(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 headed 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 अंतिम 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

1. (i) (b) 1

(ii) (b) 1

(iii) (d) 1

(iv) (b) 1

(v) (a) 1

(vi) Phosphorylation

(vii) 5000

(viii) Scopolamine

(ix) Hypoxia

(x) Tissue from which variants obtained is from gametophytic origin i.e. pollen or egg cell. 1

(xi) Combining certain features of plasmid and the 'cos' sites of phage lamba. 1

(xii) When cells take up DNA from the surrounding environment. 1

SECTION – B

2. It includes :

(i) Jaundice

(ii) Infected skin leisons, those of the gene to urinary tract with purulent secretions.

(iii) Gonorrhea

(iv) Epilepsy $\frac{1}{2} \times 4 = 2$

3. (i) Haemophilus influenza.

(ii) $5' - A \overset{\downarrow}{-} A - G - C - T - T - 3'$

$3' - T - T - C - G - A \underset{\uparrow}{-} A - 5'$ $1 \times 2 = 2$

4. (i) It monitors the whole genome on a single chip to have better picture of interactions among thousands of gene simultaneously.

(ii) It has large no. of DNA molecules spotted in a systematic order on a solid substrate & it helps in preferential binding of complementary single stranded nucleic acids. $1 \times 2 = 2$

5. Fermentation

↓

Isolation of metabolite from cell.

↓

Concentration/Initial purification.

↓

Intermediate/Metabolite specific purification.

↓

Final purification.

↓

Formulation. 2

6. (i) Bacteria grow by binary fission.

(ii) Yeast ..... by Budding.

(iii) Fungi grows by chain elongation & branching.

(iv) Virus grows by No regular growth pattern.

$\frac{1}{2} \times 4 = 2$

7. (i) Various biochemical and metabolic studies.

(ii) Fusion of two somatic cells to form somatic hybrids.

(iii) Formation of cybrid (Fusion of enucleated & nucleated protoplasts)

(iv) Genetic manipulation $\frac{1}{2} \times 4 = 2$

8. (i) Morphological marker based on phenotypic expression i.e. flower colour, seed colour, height & leaf shape etc.

(ii) Biochemical marker based on detection of natural enzymes being produced. Each individual variety has its own isozymes profile & detected by electro phoresis on starch gel. $1 \times 2 = 2$

9. (i) For visualizing cell cultures in situ & allows the cells at bottom to be visualized. 2

(ii) Gives an immediate idea of health & growth of cell culture under visualization. 2

10. (i) Stem cell which retain the capacity to self renew.

(ii) Progenitor cells have limited self renewal capacity & have greater capacity to differentiate.

(iii) Precursor cells which have no capacity to self renew & are differentiated.

(iv) Mature cells are completely differentiated.

$\frac{1}{2} \times 4 = 2$

SECTION – C

11. Hydrophobic interaction : If a non polar molecule which can not participate in hydrogen bonding or in electrostatic interactions with the water molecules, is added into water a, no of hydrogen bonds will be broken & not replaced; there will be an energy cost to putting non polar

molecules into water. Water therefore forces these molecules out of solution to minimize the surface of contact. This hydrophobic force is most important in maintaining shape of protein molecule. 3

12. These are interferons, inter leukins, tumor necrosis factor and colony stimulating factors. The interferon family of INF alpha, beta and gamma have therapeutic application.

Interferon alpha used for Hepatitis C Interferon beta used for multiple sclerosis Interferon Gamma is used for chronic granulomatous disease. 3

13. Structural genomics involves high-through put DNA sequencing followed by assembly, organization and management of DNA sequences. It represents an initial phase of genome analysis to construct a high resolution genetic, physical or transcript maps of the organism. Ultimate physical map is its complete DNA sequence of an organism. They also determine three dimensional structures of all proteins. 3

14. (i) It provides a basis for discovery of all the genes, i.e. an inventory of genes.

(ii) Sequence shows the relationship between genes.

(iii) It provides a set of tools for future experimentation.

(iv) Provides an index to draw and organize all genetic information about the organism.

(v) Whole genome sequence is an archive for the future.

(vi) Contain all genetic information required to make the organism. ½ × 6 = 3

15. Plant regeneration path ways :

(i) **Organogenesis :** is formation of organs from the cultured explants. Formation of roots and shoot first on the cultured tissue depends on the relative conc. of auxin & Cytokinin. high auxin conc. promotes rooting while high cytokinin promotes shoot formation.

(ii) **Somatic Embryo genesis :** Totipotent cells under go Embryonic pathway to form somatic embryo. Which regenerate into complete plant. 3

SECTION – D

16. See page No. **67-69** A text book of biotechnology Class-XII. 5

OR

See page No. **94** A text book of biotechnology Class-XII. 5

17. See page No. **106** A text book of biotechnology Class-XII. 5

OR

See page No. **105** A text book of biotechnology Class-XII. 5

18. See page No. **149** A text book of biotechnology Class-XII. 5