GATEWAY
EDUCATION
Delhi-NCR, Sonipat

- Mock Test
- Notes
- Assignments
- Career Counseling
- How to Select Perfect Course/College after 12th?

MOCK TEST-2

Class XII

BIOLOGY

Programs at Gateway: B.Tech CSE | B.Tech CSE (AI & ML) | B.Pharm | B.Arch
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Class - XIITH

BIOLOGY

MOCK EXAMS-2

Serial Number: 2

Time: 3 Hours

Maximum Marks: 70

Exam Date: _____

General Instructions:

Read the following instructions carefully and follow them:

(i) This question paper contains 33 questions. All questions are compulsory.
(ii) Question paper is divided into five sections A, B, C, D and E.
(iii) Section A questions number 1 to 16 are multiple choice type questions. Each question carries 1 mark.
(iv) Section B questions number 17 to 21 are very short answer type questions. Each question carries 2 marks.
(v) Section C questions number 22 to 28 are short answer type questions. Each question carries 3 marks.
(vi) Section D questions number 29 and 30 are case-based questions. Each question carries 4 marks. Each question has subparts with internal choice in one of the subparts.
(vii) Section E questions number 31 to 33 are long answer type questions. Each question carries 5 marks.
(viii) There is no overall choice. However, an internal choice has been provided in Sections B, C and D of the question paper. A candidate has to write answer for only one of the alternatives in such questions.
(ix) Wherever necessary, neat and properly labelled diagrams should be drawn.

SECTION: A

Questions no. 1 to 16 are Multiple Choice Type Questions, carrying 1 mark each. (16X1=16)

1.Which of the following features correctly show the mechanism of sex-determination in honey bees?

(i) A zygote formed from the union of a sperm and an egg develops into a male.

(ii) Males have half the number of chromosomes as that of females.

(ii) The females are diploid having 32 chromosomes.

(iv) Males have a father and can produce sons.

(a) (i) and ii) (b) (ii) and iii) (c) (i) and (iv) (d) (ii) and (iv)

2.When an amino acid is coded by more than one codon, the genetic code is said to be:

(a) Universal (b) Punctuated (c) Comma less (d) Degenerate

3.Which of the following is an example that carries out biological control of plant pests?

(a) Nucleopolyhedrovirus (b) Bacillus thuringiensis (c) Trichoderma sp. (d) All of these

4. A mixtures of DNA fragments P, Q, R and S was subjected to agarose gel electrophoresis. The molecular weights of the fragments are as follows.

R > S, S - P = Q, Q > P. The positions of these fragments in the gel from cathode to anode end will be

(a) P-Q-R- S (b) R-S - Q-P (c) Q-P-S- R (d) P-S - Q-R

5.Golden rice is a transgenic plant or a GMO, where the introduced gene is meant for biosynthesis of

(a) Vitamin B (b) Vitamin A (c) Vitamin C (d) Omega-3

6.The frequency of recombination between two genes on a chromosome as a measure of distance between the two genes, was explained by

(a) Sutton and Boveri (b) T.H. Morgan (c) Alfred Sturtevant (d) Mendel

7.Given below is a sequence of bases in mRNA of a bacterial cell. Identify the amino acid that would be interpreted at codon position 3 and codon position 5, during the process of its translation.

3' AUC AGG UUU GUG AUG GUA GGA 5'

(a) Phenylalanine, Methionine (b) Cystein, Glycine (c) Alanine, Proline (d) Serine, Valine

8.Which among the following is a correctly-matched pair?

(a) Mycorrhizae - Mineral uptake from the soil (b) Azospirillum - Symbiotic N_2- fixing bacterium

(c) Rhizobium - Parasitic in the roots of legumes (d) Azotobacter - Free-living N,-fixing cyanobacterium.

9.Introduction of an alien DNA into a plant host cell, is achieved by

(a) making them competent with bivalent cations (b) using microinjection.

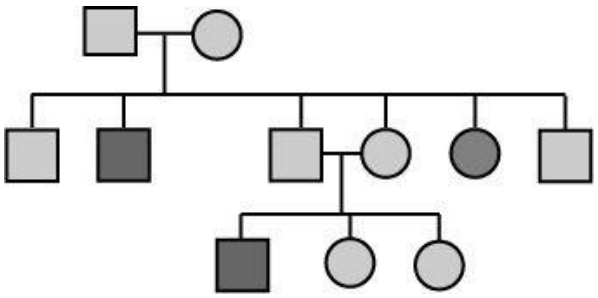
(c) using gene gun (d) using lysozyme and chitinase.

10.ELISA technique is based on the principle of

(a) DNA replication (b) antigen-antibody interaction

(c) pathogen-antigen interaction (d) antigen-protein interaction

11.Study the pedigree given below and select the probable mode of inheritance and a human trait that follows this pattern of inheritance.



(a) Autosomal recessive, sickle cell anaemia (b) Sex linked recessive, Haemophilia

(c) Autosomal dominant, Myotonic dystrophy (d) Sex linked dominant, colour blindness

12.Escherichia coli cells with a mutated z gene in the lac operon cannot grow in a medium containing only lactose as the source of energy, because

(a) they cannot transport lactose from the medium into the cells

(b) the lac operon is constitutively active in these cells

(c) they cannot synthesise functional B-galactosidase for hydrolysis of lactose

(d) all of these

Question No. 13 to 16 consist of two statements - Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

A. Both A and R are true and R is the correct explanation of A.

B. Both A and R are true and R is not the correct explanation of A.

C. A is true but R is false.

D. A is False but R is true.

13.Assertion (A): PCR is a powerful technique to identify genetic disorders.

Reason (R): PCR can detect mutations in low amounts of DNA.

14.Assertion (A): Ribosomal RNA is synthesized in the nucleus of the cell.

Reason (R): It is translated with the enzyme RNA polymerase III.

15.Assertion (A): During gel electrophoresis, DNA moves towards the anode.

Reason (R): DNA is positively charged.

16.Assertion (A): The Genetically modified (GM) crops contain and express one or more useful foreign gene(s).

Reason (R): Genetically modified crops are generally pest-resistant.

SECTION: B

17. Who postulated an adapter molecule to link the genetic code and the amino acids? What are its functions?

18. (a) Write two closely linked genes that control α-Thalassemia**.**

(b) Differentiate between Thalassemia and Sickle cell anaemia on the basis of their effect on globin molecule of haemoglobin.

19. (a) Give an example of a viral biocontrol agent.

(b) Why are they considered to be desirable, when an ecologically sensitive area is being treated.

20. Draw a diagram of a typical agarose gel electrophoresis, showing migration of undigested and digested sets of DNA fragments. Label:

(a) the digested and undigested DNA fragments.

(b) Anode and cathode end of the plate

Mention the role of electrophoresis in biotechnology.

21.(a) Name the first transgenic cow developed.

(b) Explain the improvement in the quality of the product produced by it.

SECTION: C

22.What is tissue culture? Explain how, from a virus-infected banana plant, virus-free banana plants can be grown by this technique.

23. How did Matthew Meselson and Franklin Stahl experimentally prove that DNA replication is semiconservative? Explain.

24. (a) A patient had suffered myocardial infarction and clots were found in his blood vessels. Name a 'clot buster that can be used to dissolve the clots and the microorganism from which it is obtained.

(b)A woman had just undergone a kidney transplant. A bioactive molecular drug is administered to oppose kidney rejection by the body. What is the bioactive molecule? Name the microbe from which this is extracted.

(c) What do doctors prescribe to lower the blood cholesterol level in patients with high blood cholesterol? Name the source organism from which this drug can be obtained.

25.(a) How many types of RNA polymerases are there in a eukaryotic cell? Mention which one of them transcribes hnRNA.

(b) Write the changes the hnRNA undergoes before it leaves the nucleus as mRNA.

26.Honeybees produce their young ones only by sexual reproduction. Inspite of this, we find both haploid and diploid individuals in the colony. Analyse the reasons behind their formation**.**

27. Choose any three microbes, from the following which are suited for organic farming, which is in great demand these days for various reasons. Mention one application of each one chosen:

Mycorrhizae, Monascus, Anabaena, Rhizobium, Methanobacterium, Trichoderma

28. Many copies of a gene of interest are required to study the detailed sequencing of bases in it. Name and explain the process that can help in developing large number of copies of this gene of interest.

SECTION: D

Question No. 29 and 30 are case - based questions. Each question has subparts with internal choice in one subpart.

29. Read the following passage and answer the questions that follow:

The diversity of rice in India is one of the richest in the world. There are an estimated 200,000 varieties of rice in India alone. Among these, Basmati rice is distinct for its unique aroma and flavour. In 1997, an American company got patent rights on Basmati rice, which allowed the company to sell a 'new' variety of Basmati in the U.S and abroad.

(a) How many documented varieties of Basmati are grown in India?

(b) Name and define the term given to such unauthorised practices.

(c)(i) What is the 'new' variety of Basmati, developed by the U.S. company?

(ii) Name two other medicinal plants for which the MNCs have been attempting to get patents.

Or

(c) What has the Indian Government done to prevent such deeds?

30. Read the following passage and answer the questions that follow:

Sewage is generated in large quantities every day in cities and towns. It contains large amount of organic matter and microbes, many of which are pathogenic. This cannot be discharged directly into natural water bodies like rivers and streams. Hence, sewage is treated in Sewage Treatment Plants (STPs) to make it less polluting.

Microbes play a major role in treating waste water in the STPs. This technology has been practised for more than a century now, in almost all parts of the globe. Till date, no man-made technology has been able to rival the microbial treatment of sewage.

(a) What is sewage?

(b) Name the two types of microbes that are naturally present in the sewage and carry out the sewage treatment.

(c) Name the two stages in which the treatment of sewage is carried out and mention the major/key difference between the two.

Or

(c) Write the different components of activated sludge. Explain the different ways it can be used further in sewage treatment process.

SECTION: E

31. Explain how an antibiotic-resistance gene in a cloning vector (plasmid pBR322) help in selecting the recombinants from the non-recombinants**.**

Or

Bioreactors are the containment vehicles of any biotechnology-based production process. For large scale production and for economic reasons the final success of biotechnological process depends on the efficiency of the bioreactor.

Answer the following questions w.r.t. the given paragraph:

(a) List the operational guidelines that must be adhered to so as to achieve optimisation of the bioreactor system. Enlist any four.

b) Mention the phase of the growth we refer to in the statement "Optimisation of growth and metabolic activity of the cells".

(c) Is the biological product formed in the bioreactor suitable for the intended use immediate? Give reason in support of your answer.

32. A criminal blew himself up in a local market, when the was chased by the cops. His face was beyond recognition. Suggest and describe a modern technique that can help establish his identity.

Or

Following collision of two trains, a large number of passengers were killed. A majority of them are beyond recognition. Authorities want to hand over the dead to their relatives. Name a modern scientific method and write the procedure that would help in the identification of kinship.

33. Describe the dihybrid crosses carried on Drosophila melanogaster by Morgan and his group. How did they explain linkage, recombination and gene mapping on the basis of their observation?

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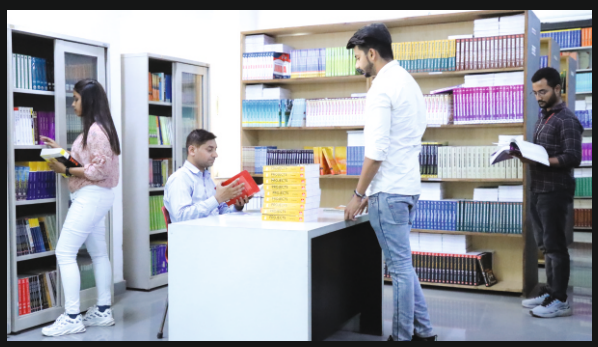

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