



PRINCE ACADEMY

OF HIGHER EDUCATION

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SAMPLE PAPER SET - 03 (2024-25)

Time : 03 : 00 Hours

CLASS :- XII-BIOLOGY (044)

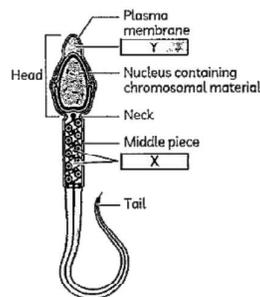
M.M. : 70

General Instructions:

- (1) All questions are compulsory.
- (2) The question paper has five sections and 33 questions. All questions are compulsory.
- (3) Section-A has 16 questions of 1 mark each; Section-B has 5 questions of 2 marks each; Section-C has 7 questions of 3 marks each; Section-D has 2 case-based questions of 4 marks each; and Section-E has 3 questions of 5 marks each.
- (4) There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.
- (5) Wherever necessary, neat and properly labeled diagrams should be drawn.

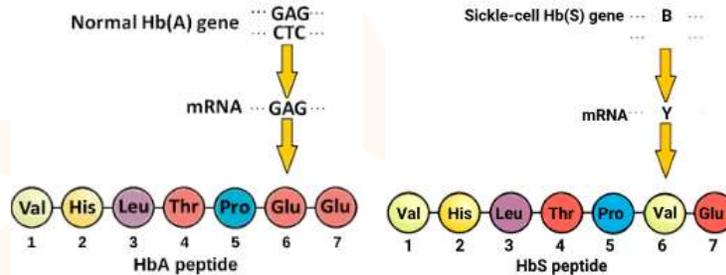
SECTION - A

1. In a typical angiosperm embryo sac, the egg apparatus consists of -
 - (a) One egg cell & two polar nuclei
 - (b) One egg cell & two synergids
 - (c) One egg cell & three antipodals
 - (d) One egg cell, synergids, polar nuclei & antipodals
2. Observe the diagram & identify the part that contains various enzymes that helps in fertilisation of the ovum-



- (a) Nucleus
 - (b) Middle piece
 - (c) Acrosome
 - (d) Neck
3. Some organisms do not have father and thus cannot have sons, but have a grandfather and can have grandsons. Such phenomenon is termed as -
 - (a) Male heterogamety
 - (b) Female Heterogamety
 - (c) Haplodiploid sex-determination
 - (d) XO type sex-determination

4. A genetic disorder which is caused due to the presence of an additional copy of X chromosome resulting into a karyotype of 47, XXY. Such an individual has overall masculine development, however, the feminine (development of breast, i.e., Gynaecomastia) is also expressed. Identify the disorder from options given below -
- (a) Down's Syndrome (b) Klinefelter's Syndrome
(c) Phenylketonuria (d) Turner's Syndrome
5. Which of the following statement is not correct for RNA -
- (a) Every nucleotide residue has an additional -OH group present at 2'-position in the ribose.
(b) The 5-methyl uracil is found at the place of thymine.
(c) RNA being unstable, mutate at a faster rate than DNA.
(d) RNA is labile and easily degradable.
6. Which of the following option has all three stop terminator codons -
- (a) AUG, UAG, UAA (b) UAA, UAG, UGA (c) AUG, UGA, UAG (d) UAA, UGA, AUG
7. Identify the type of mutation shown in given picture -



- (a) Frameshift insertion Mutation (b) Frameshift deletion Mutation
(c) Point Mutation (d) None of the above.
8. Identify the full form of SNPs -
- (a) Single Nucleotide Polymorphism (b) Simple Nucleotide Polymorphism
(c) Small Nucleotide Polymorphism (d) Sectioned Nucleotide Polymorphism
9. 'Single Step Large Mutation' is termed as -
- (a) Founder Effect (b) Saltation (c) Genetic Drift (d) Gene Migration
10. Propionibacterium sharmanii is a microbe responsible for production of -
- (a) Swiss Cheese (b) Roquefort Cheese (c) American Cheese (d) None of the above
11. Which of the following is not correctly matched -
- (a) Aspergillus niger - Aspartic Acid
(b) Acetobacter aceti - Acetic Acid
(c) Clostridium butylicum Butyric Acid
(d) Lactobacillus- Lactic Acid
12. We can see bright orange-coloured bands of DNA in a stained gel exposed to UV light. The compound used for staining of separated DNA fragments is -
- (a) Sodium bromide (b) Ethidium bromide (c) Sodium iodide (d) Ethidium iodide

For Questions number (13-16) , two statements are given - one labelled as Assertion (A) and the other labelled as Reason (R) . Select the correct answer to these questions from the codes (a), (b), (c) , and (d) as given below.

(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).

(b) Both Assertion (A) and Reason (R) are true, but Reason(R) is not the correct explanation of the Assertion(A).

(c) Assertion (A) is true, but Reason (R) is false.

(d) Assertion (A) is false, but Reason (R) is true.

13. Assertion (A): Cleistogamous flowers produce assured seed-set even in the absence of pollinators.
Reason (R): Cleistogamous flowers do not open at all.
14. Assertion (A): The replication of DNA was termed as semiconservative.
Reason (R): The two strands would separate and act as a template for the synthesis of new complementary strands.
15. Assertion (A): BOD is not helpful in measuring water pollution.
Reason (R): BOD refers to the amount of the oxygen that would be consumed if all the organic matter in one litre of water were oxidised by bacteria
16. Assertion (A): Origin of replication (ori) must be present in the vector used in rDNA technology.
Reason (R): In a chromosome there is a specific DNA sequence called the origin of replication, which is responsible for initiating replication.

SECTION - B

17. (i) During fertilisation, a sperm comes in contact with an outer layer of the ovum and induces changes in the membrane that block the entry of additional sperms. Identify this layer.
(ii) The morula continues to divide and transforms into a special structure which has an outer layer called trophoblast and an inner group of cells attached to trophoblast called the inner cell mass. Name that special structure.

OR

Define the following terms in brief-

(a) Foetal Ejection Reflex

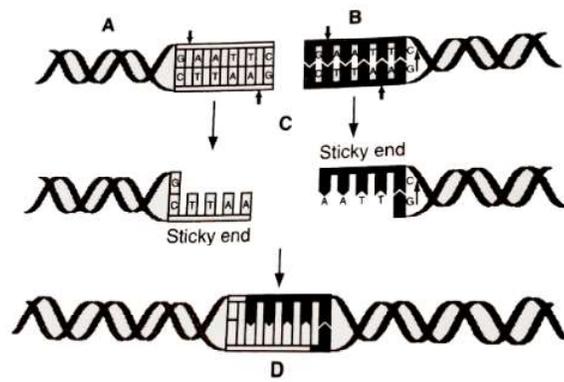
(b) Colostrum

18. A very low level of expression of lac operon has to be present in the cell all the time. Why?

OR

Explain the phenomenon of aminoacylation of tRNA in brief.

19. In the diagram given below same restriction endonuclease enzymes are used to cut Vector DNA & Foreign DNA both. Explain the reason in brief.



20. The rate of decomposition is controlled by chemical composition of detritus. Discuss in brief.
21. (a) Name of the property of cells by virtue of which contact with other cells inhibits their uncontrolled growth.
- (b) Name the tumours which are a mass of proliferating cells called neoplastic or tumour cells. These cells grow very rapidly, invading and damaging the surrounding normal tissues.

OR

Write full form of following abbreviations -

- i. ELISA
- ii. MALT

SECTION - C

22. Identify the following & give suitable term for it -
- (a) A genetic mechanism that prevents self-pollen (from the same flower or other flowers of the same plant) from fertilising the ovules by inhibiting pollen germination or pollen tube growth in the pistil.
 - (b) The most resistant organic material known which can withstand high temperatures and strong acids and alkali. No enzyme that degrades it is so far known.
 - (c) A form of asexual reproduction that mimics sexual reproduction.
23. Write location & function of the following -
- (a) Sertoli cells
 - (b) Spermatogonia
 - (c) Leydig cells
24. Explain the reason why possibility of a female becoming a haemophilic is extremely rare with the help of a schematic diagram.
25. Elaborate the processing of hnRNA into mRNA with the help of suitable diagrams.
26. Explain any three methods to deliver recombinant DNA into competent host.
27. (a) How the Mediterranean orchid *Ophrys* employs 'sexual deceit' to get pollination done by a species of bee? Explain in brief.
- (b) Brood parasitism in birds is a fascinating example of parasitism. Elaborate it in brief with the help of suitable example.

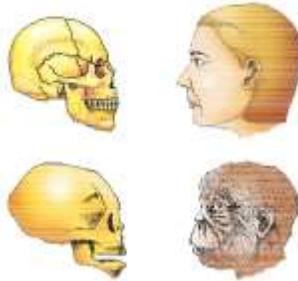
28. Fill in the blanks -

Name of organism	Product obtained	Use of product obtained
Trichoderma polysporum	a	immunosuppressive agent
Monascus purpureus	Statins	b
c	Streptokinase	Clot buster

SECTION - D

Q.no. 29 and 30 are case based questions. Each question has sub-parts with internal choice in one sub-part.

29. About 15 mya, primates called Dryopithecus and Ramapithecus were existing. They were hairy and walked like gorillas and chimpanzees. Ramapithecus was more man-like while Dryopithecus was more ape-like. Few fossils of man-like bones have been discovered in Ethiopia and Tanzania. These revealed hominid features leading to the belief that about 3-4 mya, man-like primates walked in eastern Africa.



i. Which of the following probably did not eat meat -

- (a) Homo sapiens
- (b) Homo habilis
- (c) Homo erectus
- (d) Homo neanderthalensis

ii. Which of the following is correct for Neanderthal man -

- 1. They probably did not eat meat.
- 2. They used hides to protect their body and buried their dead
- 3. They lived in near east and central Asia with a brain size of 1400cc

- (a) 1 & 2 (b) 2 & 3 (c) 1 & 3 (d) 1, 2 & 3

iii. Explain the ability of pre-historic humans (Homo sapiens) which differentiate them from other human species.

OR

How the story of evolution of modern man appears to parallel evolution of human brain and language. Explain in brief.

30. The advancements made in biological science have armed us to effectively deal with many infectious diseases. The use of vaccines and immunisation programmes have enabled us to completely eradicate a deadly disease like smallpox. A large number of other infectious diseases like polio,

diphtheria, pneumonia and tetanus have been controlled to a large extent by the use of vaccines.

(a) The B-lymphocytes produce an army of proteins in response to pathogens into our blood to fight with them. Name that protein which gives us immunity.

(b) If a person is infected with some deadly microbes to which quick immune response is required as in tetanus, we need to directly inject the preformed antibodies, or antitoxin (a preparation containing antibodies to the toxin). Write type of immunisation in this case.

(c) An antibody is represented as H_2L_2 . Elaborate this abbreviation with the help of diagram of an antibody molecule.

OR

Differentiate between active and passive immunity in brief.

SECTION - E

31. (a) Write the name of genes responsible to control cotton bollworms & corn borer.

(b) How cotton plant is prevented from various worms by using rDNA technology?

(c) Why does insecticidal toxin not kill the Bacillus?

OR

i. Why insulin taken from animal source is not suitable for all diabetic patients?

ii. What are the challenges faced during developing insulin through biotechnology? How scientists of Eli Lilly company have solved this problem?

32. (a) What do you understand by 'biodiversity hot spot'? How many of them are present in India? Explain.

(b) Why should we conserve biodiversity? Give reasons to justify your answer.

OR

The accelerated rates of species extinctions that the world is facing now are largely due to human activities. Elaborate the major causes termed as "The Evil Quartet" for this biodiversity losses.

33. (a) Natural contraceptive methods work on the principle of avoiding chances of ovum and sperms meeting. Explain any three natural methods to avoid pregnancy.

(b) Why statutory ban on amniocentesis is imposed in India?

OR

Expand & elaborate the following procedures used as ART (Assisted Reproductive Technologies) -

i. ZIFT

ii. IUT

iii. GIFT

iv. ICSI

v. IUI

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