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BOARD SAMPLE PAPER- I (2025-26)

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. Choose the option that gives the correct number of pollen grains that will be formed after 325 microspore mother cells undergo microsporgenesis.

(a) 325 (b) 650 (c) 1300 (d) 975

2. Given below are two columns. In Column 1 the names of four contraceptive devices are given and in Column II the modes of action of the contraceptives are given. Select the option where the contraceptive devices are correctly matched with their respective modes of action.

Column I (Contraceptive devices)	**Column II (Modes of action)**
P. Lippes loop	i. Inhibition of ovulation
Q. Multiload 375	ii. Phagocytosis of sperms in uterus
R. Subcutaneous Implant	iii. Causes thickening of cervical mucous
S. Saheli	iv. Makes cervix hostile to sperms

Options:

(a) P-ii. Q-iv, R-iii, S-i (b) P-i, Q-ii, R-iii, S-iv (c) P-iii. Q-i. R-iv, S-ii (d) P-iv, Q-iii. R-ii, S-i

3. 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 character (development of breast, i.e., Gynaecomastia) is also expressed. Identify the disorder from options given below -

(a) Down Syndrome (b) Klinefelter Syndrome

(c) Phenylketonuria (d) Turner Syndrome

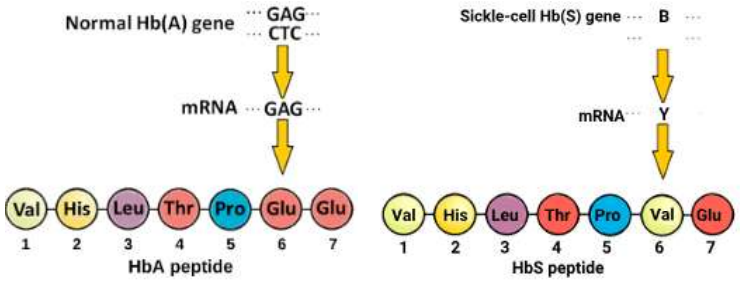
4. In which one of the following options does the endocrine gland correctly match with its hormonal secretion and its function?

	Endocrine Gland	Hormone	Function
(a)	Sertoli cells	Testosterone	Development of secondary sexual
(b)	Placenta	Estrogen	Initiates secretion of milk
(c)	Leydig cells	Androgen	Initiates the production of sperms
(d)	Ovary	FSH	Stimulates follicular development

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.

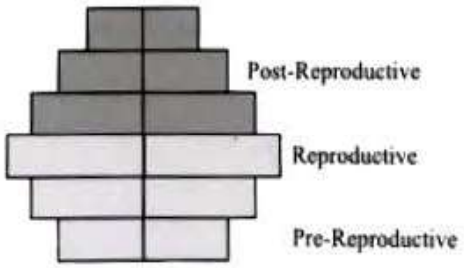
6. The organism used in construction of the first artificial recombinant DNA by Cohen and Boyer in 1972 was :
(a) E. coli
(b) Salmonella typhimurium
(c) Agrobacterium tumefaciens
(d) Bacillus thuringiensis

7. Identify the type of mutation shown in given picture -



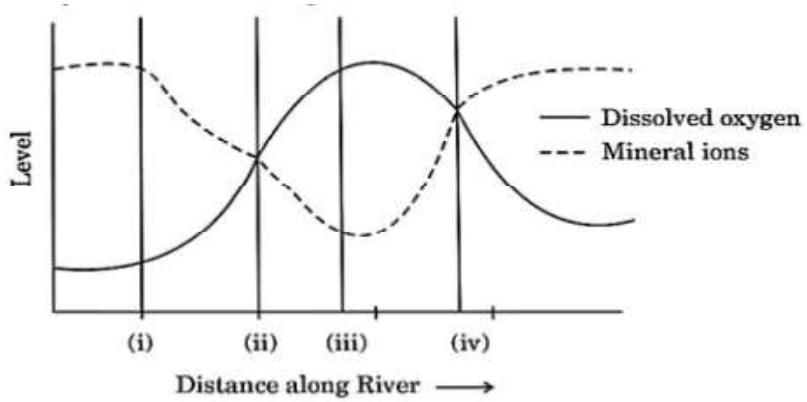
(a) Frameshift insertion Mutation
(b) Frameshift deletion Mutation
(c) Point Mutation
(d) None of the above

8. The status of the human population reflected in the human age pyramid given below is:



(a) Declining population
(b) Stable population
(c) Expanding population
(d) Extinct population

9. The graph plotted below is based on the data collected by biology students with respect to the levels of oxygen at the specific points in the river flowing outside their city. Which point in the graph indicates the entry of untreated sewage in the river?



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

10. Who among the following challenged the patent right granted to the University of Mississippi Medical Centre for use of turmeric in wound healing?
(a) Mr. Ajay Phadke (b) Ms. Vandana Shiva (c) Dr. Venugopalan (d) Dr. R. A. Mashelkar

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):** Endosperm is completely consumed during the development of embryo in ex-albuminous seeds.
Reason (R): Castor, pea and beans are all examples of ex-albuminous seeds.

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):** A patient of ADA deficiency undergoing treatment for gene therapy requires periodic infusion of genetically engineered lymphocytes.
Reason (R): Lymphocytes are immortal.

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

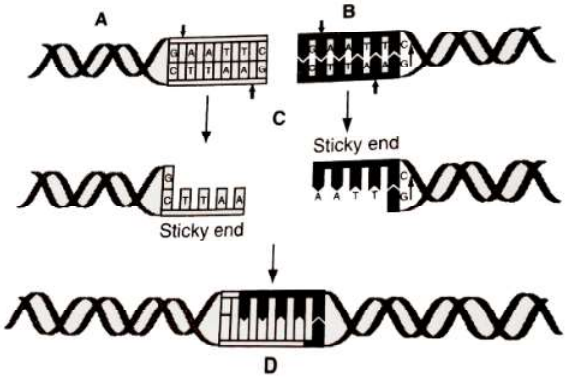
Define the following terms in brief-
(a) Foetal Ejection Reflex (b) Colostrum

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 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. Flowering plants with hermaphrodite flowers have developed many reproductive strategies to ensure cross-pollination. Study the given outbreeding devices adopted by certain flowering plants and answer the questions that follow.

Stigma / Pollen grains	Pollen grains of Plant A	Pollen grains of Plant B	Pollen grains of Plant C
Stigma of Plant A	×	√	√
Stigma of Plant B	√	×	√
Stigma of Plant C	√	√	×

Note :

All plants belong to the same species.

× - No pollen tube growth/inhibition of pollen germination of stigma.

√ - Pollen germination on stigma.

(a) Name and define the outbreeding device described in the above table.

(b) Explain what would have been the disadvantage to the plant in the absence of the given strategy.

23. Write location & function of the following with the help of well labelled diagram of T.S of testis.

(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. Answer the following questions with respect to the sex determining mechanism observed in honey bee.

(a) Name the type of sex determination system observed in honey bee.

(b) Fill in the blanks (i), (ii) and (iii) in the given question.

Parent	Male
* Type of cell division involved during gamete formation in males	(i) _____
* Number of chromosomes in the gametes	(ii) _____
* Number of chromosomes in the diploid cell of the progeny	(iii) _____

(c) What will be the sex and chromosome number of the progeny formed from the unfertilised eggs of honey bee?

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.

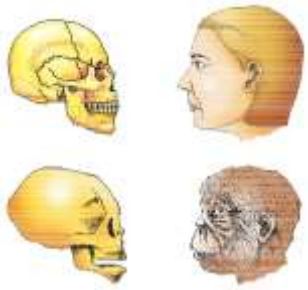
28. Fill in the blanks -

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 neanderthelesis

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

In 1981, the health workers of United States of America had become aware of the increased frequency of Kaposi's sarcoma, cancer of the skin and blood vessels and another disease pneumocystis pneumonia, a respiratory infection caused by a protozoan. Both these diseases were very rare in the general population, but occurred frequently in more severely

"immunosuppressed" individuals. This led to the recognition of the immune system disorder that was named Acquired Immune Deficiency Syndrome (AIDS).

In1983, virologists working in the USA and France had identified a causative agent for 'AIDS', now known as Human Immunodeficiency Virus (HIV). HIV follows a set path to attack the human body to cause the disease.

(a) Name the group of cells the HIV attacks after gaining entry into the human body and write the various events that occur within this cell.

(b) Write the expanded form of the diagnostic test used for detecting AIDS. Write the possible treatment available for the disease at present.

(c) Mention any two steps suggested by WHO for preventing the spread of this disease.

OR

(c) "A patient suffering from AIDS does not die of this disease but from some other infection." Justify the statement.

SECTION - E

31. (a) (i) Explain the monosporic development of embryo sac in the ovule of an angiosperm.

(ii) Draw a diagram of the mature embryo sac of an angiospermic ovule and label any four parts in it.

OR

(b) (i) Explain the formation of placenta after the implantation in a human female

(ii) Draw a diagram showing human foetus within the uterus and label any four parts in it.

32. (a) Name and describe the steps involved in the technique widely used in forensics that serves as the basis of paternity testing in case of disputes.

OR

(b) It is sometimes observed that the F_1 progeny has a phenotype that does not resemble either of the two parents and has intermediate phenotype. Explain by taking a suitable example and working out the cross upto F_2 progeny.

33. (a) 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 based on the given paragraph:

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

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

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

OR

(b) 'Bt cotton', the genetically modified crop, has greatly helped the cotton farmers to increase their crop yield.

(i) How was Bt cotton plant made resistant to bollworm ? Explain.

(ii) Describe the mechanism that leads to the death of bollworms feeding on Bt cotton plants.

ROUGH WORK