CBSE Class 12 Biology 2024 - Set 57/S/3 - Compartment

Question Paper

Conducted by the Central Board of Secondary Education (CBSE)

Time Allowed: 3 Hours **Maximum Marks: 70**

General Instructions

(i) This question paper contains 33 questions. All questions are compulsory.

(ii) Question paper is divided into five sections – 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) Kindly note that there is a separate question paper for Visually Impaired candidates.

(x) Wherever necessary, neat and properly labelled diagrams should be drawn.

Section A

1. The mosquito-borne disease in humans causing chronic inflammation of the lymphatic vessels is :

(A) Elephantiasis
(B) Ascariasis
(C) Ringworm
(D) Amoebiasis

2. In plants, which one of the following helps in the absorption of phosphorus from soil ?

(A) *Glomus*
(B) *Rhizobium*
(C) *Frankia*
(D) *Anabaena*

3. Long ribbon-like pollen grains are seen in some :

(A) Aquatic plants
(B) Wind-pollinated grasses
(C) Gymnosperms
(D) Bird-pollinated flowers

4. Estrogen is secreted by :

(A) Corpus luteum
(B) Membrane granulosa of Graafian follicle
(C) Pituitary gland
(D) Germinal epithelium

5. Crystals of Bt toxin produced by some bacteria, do not kill the bacteria producing them because :

(A) bacteria are resistant to the toxin
(B) toxin is immature
(C) toxin is inactive
(D) bacteria encloses 'toxin' in a special capsule

6. The population interaction where one species is harmed and the other is unaffected is :

(A) Amensalism
(B) Commensalism
(C) Parasitism
(D) Predation

7. The most primitive ancestor of humans is :

(A) *Homo habilis*
(B) *Australopithecus*
(C) *Ramapithecus*
(D) *Homo neanderthalensis*

8. The sequence that controls the copy number of linked DNA in the vector is termed :

(A) Selectable marker
(B) Ori site
(C) Palindromic sequence
(D) Recognition site

9. Which one of the following codons has dual function ?

(A) AUG
(B) AUC
(C) ACU
(D) ACA

10. Which one of the following options gives the correct temperature condition and the mixture of the gaseous components that were used by S.L. Miller in 1953 to prove abiogenesis of life ?

(A) CH_4, H_2, NO_2 and water vapour at 1800°C
(B) CH_4, H_2, NH_3 and water vapour at 1800°C
(C) CO_2, H_2, NH_3 and water vapour at 800°C
(D) CH_4, H_2, NH_3 and water vapour at 800°C

11. Amniocentesis is a technique that is used to :

(A) determine any disease of the heart
(B) determine any genetic disorder of the foetus
(C) determine any disorder of the brain
(D) detect any abnormality in the bone formation

12. In humans, non-disjunction of the 21st pair of chromosomes leads to :

(A) Acquired Immune Deficiency Syndrome
(B) Klinefelter's Syndrome
(C) Turner's Syndrome
(D) Down's Syndrome

13. Assertion (A) : *Streptococcus pneumoniae* and *Haemophilus influenzae* are responsible for causing infectious diseases in human beings.
Reason (R) : A healthy person acquires the infection by inhaling the droplets/aerosols released by an infected person.

(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(C) Assertion (A) is true, but Reason (R) is false.
(D) Assertion (A) is false, but Reason (R) is true.

14. Assertion (A) : Biotechnology produces transgenic micro-organisms that act as microfactories for proteins.
Reason (R) : To produce proteins for human use like insulin, transgenic microorganisms can be developed.

(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(C) Assertion (A) is true, but Reason (R) is false.
(D) Assertion (A) is false, but Reason (R) is true.

15. Assertion (A) : Gross primary productivity is always less than net primary productivity.
Reason (R) : Rate of synthesis of organic matter by consumers is known as secondary productivity.

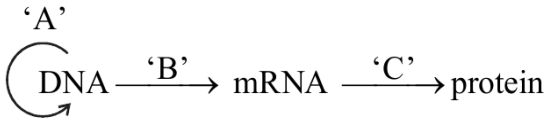
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(C) Assertion (A) is true, but Reason (R) is false.
(D) Assertion (A) is false, but Reason (R) is true.

16. Assertion (A) : Periodic abstinence is a method in which couples avoid coitus from day 10 to 17 of menstrual cycle.
Reason (R) : Periodic abstinence has limited effectiveness because menstrual cycles are not always regular.

(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(C) Assertion (A) is true, but Reason (R) is false.
(D) Assertion (A) is false, but Reason (R) is true.

Section B

17. (a) Given below is a representation of the "Central dogma" :



Identify 'A', 'B' and 'C' in the above representation.

(b) What does the Central dogma state in molecular biology ? Write an example where it is not applicable.

18. Why is making host cells 'competent' essential for rDNA technology ? Mention any two ways by which this can be achieved.

19(a). Comment on the interaction between a fig tree and wasp. Mention the phenomenon that operates in their relationship.

OR

19(b). Explain "brood parasitism" with the help of an example.

20. State the cellular nature and functions of myometrium and endometrium.

21. How do 'implants' act as an effective method of contraception in human females ? Mention their one advantage over contraceptive pills.

Section C

22. Differentiate between :

(a) Grazing food chain and Detritus food chain (Any three differences)

(b) Upright pyramid and Inverted pyramid (Any three differences)

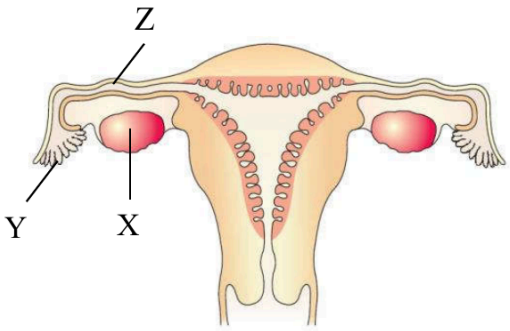
23(a). (i) What are "biodiversity hotspot" regions ? Mention any two criteria used for determining any region as a "hotspot".

(ii) Name any two hotspots of India.

OR

23(b). Explain giving three reasons, why tropics show greatest level of species diversity.

24. Given below is the diagram showing a part of the reproductive system of a human female.



(a) Identify 'Y' and write its function.

(b) Identify 'Z' and write the events that may occur here.

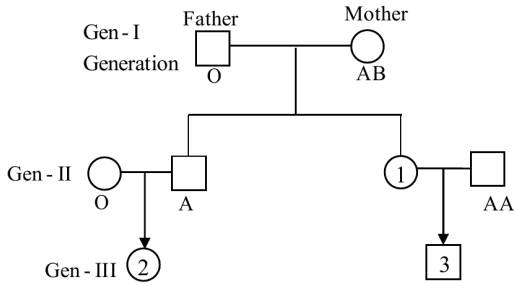
(c) Mention the stage at which the process of oogenesis temporarily gets arrested and name the cells thus formed in the 'X' of a baby girl at the time of her birth.

25. (a) What is gene therapy ?

(b) Describe the procedure of such a therapy that could be a permanent cure for a genetic disease. Name the genetic disease.

26. Differentiate between the explanations given by Darwin and de Vries respectively on the mechanism of evolution. Write any three differences.

27. Given below is the pedigree chart up to 3 generations (Generation I, Generation II, Generation III) of a family with respect to their blood groups.



(a) Mention the blood group along with the genotype of the offspring numbered '1' in Generation II.

(b) Write the possible blood groups along with their genotypes of the offsprings numbered '2' and '3' in Generation III.

28. (a) Name the enzyme responsible for the transcription of tRNA.

(b) Draw a labelled diagram of an initiator tRNA charged with its respective amino acid.

(c) Explain the role of the initiator tRNA in initiation of protein synthesis.

Section D

29(a). Restriction endonuclease was isolated for the first time by W. Arber in 1962, in bacteria. DNA, the genetic material can be manipulated by addition or substitution of the desired gene by using a specific restriction endonuclease resulting in rDNA. This is one of the major steps in biotechnology.

Name the first isolated restriction endonuclease. Why are restriction endonucleases so called ?

29(b). Write the palindrome recognised by EcoRI.

29(c)(i). How does restriction endonuclease function ? Explain.

OR

29(c)(ii). Write the convention for naming a restriction endonuclease with the help of an example.

30(a). A senior student, sneezing very badly, with watery eyes and having difficulty in breathing was brought to the school medical room by his fellow friends. The medical room nurse enquired as to what had happened. One of the students said "after the football match we all were sweating profusely, one of our friends sprayed deodorant on us. Soon after the deodorant was sprayed on the senior boy, the symptoms appeared."

What are the symptoms seen in the student indicative of ? Elaborate.

30(b). State how the cause of such responses can be confirmed.

30(c)(i). Name the cells in our body and the chemicals produced by them that are responsible for such reactions. Name any two drugs used to reduce these symptoms.

OR

30(c)(ii). 'In recent times there is a rise in such reactions amongst urban human population.' Do you agree ? Give three reasons in support of your answer.

Section E

31(a). Describe the process of wastewater (sewage) treatment under the following heads :

(i) Primary treatment

(ii) Secondary treatment

OR

31(b). (i) Explain the sequence of events occurring in a biogas plant.

(ii) Write the components of biogas.

(iii) Write any three advantages of using cow dung as the raw material.

32(a). (i) Draw a labelled diagram of a fertilised embryo sac of an angiosperm. (label any four parts)

(ii) Explain double fertilisation in angiospermic plant.

OR

32(b). (i) Draw a labelled diagram of a cross-section of human seminiferous tubule. (label any four parts)

(ii) Explain the hormonal regulation of spermatogenesis.

33(a). (i) Absence of lactose in the culture medium affects the expression of lac operon in *E. coli*. Why and how ? Explain.

(ii) Write any two ways in which the gene expression is regulated in eukaryotes.

OR

33(b). (i) By taking two suitable traits in a pea plant, work out a dihybrid cross up to F_2 generation.

(ii) State the Mendel's law derived from such a cross only.

- End of Question Paper -