

INDIAN SCHOOL AL WADI AL KABIR

SAMPLE PAPER -3

Biology (044) Theory

Class XII

Time: 3 Hours

Maximum Marks: 70

General Instructions:

- (i) All questions are compulsory.
- (ii) The question paper has four sections: Section A, Section B, Section C and Section D. There are 33 questions in the question paper.
- (iii) Section–A has 14 questions of 1 mark each and 02 case-based questions. Section–B has 9 questions of 2 marks each. Section–C has 5 questions of 3 marks each and Section–D has 3 questions of 5 marks each.
- (iv) 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.
- (v) Wherever necessary, neat and properly labeled diagrams should be drawn.

SECTION A

1. The pollen grains of the past are obtained as fossils; what characteristic of the pollen grains makes this happen.
2. How many meiotic divisions are required for the formation of 100 grains of wheat?
3. What changes are brought about in milk by LAB?
4. How does the initial milk of the mother protect the new born infant against disease?
5. What hereditary principle can be derived from a cross showing 9:3:3:1 ratio in the F₂ generation
6. Write the genotype of
 - i) An individual who is carrier of colour blindness
 - ii) An individual affected with the disorder.
7. Name any two non-sense codons
8. Mention the use of cloning vector in biotechnology
9. What is a palindrome sequence, give an example.
10. Which of the three forests- Temperate, Mangroves and Tropical Evergreen is more vulnerable to invasion by outside animals and plants?
11. **Assertion:** Restriction endonucleases are enzymes which makes cut at specific positions within the DNA molecule.

Reason: They restrict the action of the enzyme DNA polymerase.

- a. Both assertion and reason are true, and reason is the correct explanation of assertion.
- b. Both assertion and reason are true, but reason is not the correct explanation of assertion.
- c. Assertion is true but reason is false.
- d. Both assertion and reason are false.

OR

Assertion: An organism with lethal mutation may not even develop beyond the zygote

stage.

Reason: All types of gene mutations are lethal.

- a. Both assertion and reason are true, and the reason is the correct explanation of the assertion.
- b. Both assertion and reason are true, but the reason is not the correct explanation of the assertion.
- c. Assertion is true but reason is false.
- d. Both assertion and reason are false

12. **Assertion:** Microparticles of Gold or Tungsten are coated with DNA for transformation

Reason: This helps in transformation of plant cell using gene gun.

- a. Both assertion and reason are true, and the reason is the correct explanation of the assertion.
- b. Both assertion and reason are true, but the reason is not the correct explanation of the assertion.
- c. Assertion is true but reason is false.
- d. Both assertion and reason are false

13. **Assertion:** A community with more species is more stable than that with less species.

Reason: More the number of species, greater is the variation in the total biomass production year after year.

- a. Both assertion and reason are true, and the reason is the correct explanation of the assertion.
- b. Both assertion and reason are true, but the reason is not the correct explanation of the assertion.
- c. Assertion is true but reason is false.
- d. Both assertion and reason are false

14. **Assertion:** Dung can be used for generation of biogas.

Reason: Methanogens digest cellulosic materials present in the dung

- a. Both assertion and reason are true, and the reason is the correct explanation of the assertion.
- b. Both assertion and reason are true, but the reason is not the correct explanation of the assertion.
- c. Assertion is true but reason is false.
- d. Both assertion and reason are false

15. Read the following and answer any **four** questions from 15(i) to 15(v) given below:

Biodiversity losses:

Habitat loss and fragmentation is the most important cause driving animals and plants to extinction. The most dramatic examples of habitat loss come from tropical rain forests. Once covering more than 14 per cent of the earth's land surface, these rain forests now cover no more than 6 per cent. They are being destroyed fast. The Amazon rain forest (it is so huge that it is called the 'lungs of the planet') harbouring probably millions of species is being cut and cleared for cultivating soya beans or for conversion to grasslands for raising beef cattle. Besides total loss, the degradation of many habitats by pollution also threatens the survival of many species. When large habitats are broken up into small fragments due to various human activities,

mammals and birds requiring large territories and certain animals with migratory habits are badly affected, leading to population declines.

- i) Biodiversity is important for ecosystem functioning as
 - a. It provides stability to the ecosystem.
 - b. Contributes to higher productivity
 - c. Preservation of natural enemies (predators & parasitoids)
 - d. Drives unwanted animals and plants to extinction.

Choose from below the correct alternative.

- i) only (a) is true
 - ii) (a) and (b) are true
 - iii) (c) and (d) are true
 - iv) (a) and (d) are true
- ii) The Amazon forest is called the lungs of the planet
- a. As it harbours a million of species
 - b. It contributes to about 20 per cent of the total oxygen in the earth's atmosphere.
 - c. We derive from nature—the aesthetic pleasures of walking through thick woods
 - d. It contributes to about 40 per cent of the total oxygen in the earth's atmosphere
- iii) The main reason for habitat loss of tropical rain forests is due to
- a. Growing medicinal plants
 - b. Poaching
 - c. conversion to grasslands for raising beef cattle.
 - d. Pollution

iv) The most important cause driving animals and plants to extinction is

- a) Over-exploitation
 - b) Habitat loss and fragmentation
 - c) Alien species invasions:
 - d) Co-extinction
- v) When large habitats are broken up into small fragments due to various human activities
- a) Only mammals and birds requiring large territories are badly affected
 - b) Only certain animals with migratory habits are badly affected
 - c) Both mammals and birds requiring large territories and certain animals with migratory habits are badly affected
 - d) The degradation of many habitats by pollution also threatens the survival of many species.

16. Read the following and answer any **four** questions from 16(i) to 16(v) given below:

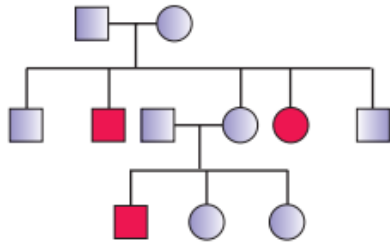
Pedigree Analysis

An analysis of traits in a several of generations of a family is called the pedigree analysis. In the pedigree analysis the inheritance of a particular trait is represented in the family tree over generations. In human genetics, pedigree study provides a strong tool, which is utilised to trace the inheritance of a specific trait, abnormality or disease. DNA is the carrier of genetic information. It is hence transmitted from one generation to the other without any change or alteration. A number of disorders in human beings have been found to be associated with the inheritance of changed or altered genes or chromosomes.

i) An alteration in the single base pair is called

- a) Mutation
- b) Frame shift mutation
- c) Point mutation

- d) Chromosomal disorders.
- ii) The pedigree chart given below shows
- Autosomal dominant trait
 - Autosomal Recessive trait
 - Sex recessive trait
 - Sex dominant trait



- iii) Pedigree study provides a strong tool, which is utilised to
- trace the inheritance of a specific trait
 - abnormality or disease
 - Sex of the foetus
 - Evolutionary history

Choose from below the correct alternative.

- only (a) is true
 - (a) and (b) are true
 - (c) and (d) are true
 - (a) and (d) are true
- iv) If one parent has phenylketonuria and the other is the carrier of the disorder, there is _____ that their children will have phenylketonuria and _____ will carry the trait
- 25 % risk, 75% risk
 - 50 % risk, 50% risk
 - 75% risk, 25% risk
 - No risk

v) **Assertion:** The pattern of inheritance of Mendelian disorders can be traced in a family by the pedigree analysis.

Reason: By pedigree analysis one can easily understand whether the trait in question is dominant or recessive

- Both assertion and reason are true, and the reason is the correct explanation of the assertion.
- Both assertion and reason are true, but the reason is not the correct explanation of the assertion.
- Assertion is true but reason is false.
- Both assertion and reason are false

SECTION – B

17. Birth control pills are called combined pills, taking the example of Saheli state why this oral pill is very popular in India.
18. Karyotype of a child shows monosomy of sex chromosome number. Identify the disorder and state the symptoms which are likely to be exhibited in this case.
19. Explain the advantages of Integrated pest management programme
20. Illustrate diagrammatically the steps in the formation of rDNA by action of EcoRI

OR

Draw a labelled diagram of the cloning vector pBR322 showing any two restriction sites for two antibiotic resistance genes.

21. Explain how the Biochemical characterization of Transforming Principle was established.
22. What is insertional inactivation explain its importance in rDNA technology.

OR

Explain all the materials required to carry out the procedure of the PCR.

23. Explain the Species Area relationships observed by Alexander Humboldt
24. Define interference competition. Give one example that supports competitive exclusion occurring in nature.
25. “Speciation is generally a function of time “explain this statement in relation to biological diversity.

SECTION – C

26. Diagrammatically show the hormonal action of spermatogenesis
27. Show with the help of a punette square how in pea plant more than one phenotype is influenced by the same gene.
28. Explain the state importance of the biological treatment of waste water.
29. A farmer noticed that nematode infection in tobacco plants has resulted in the reduction in the yield. Suggest a strategy which provides cellular defense for providing resistance to this pest. Explain the technique.
30. The figure given below shows the relationship between fig tree and wasp. Answer the questions in relation to their association.



- a) Identify the association and give reasons for the same.

b) If one of the species co evolves, what will be the impact of this on both the species.

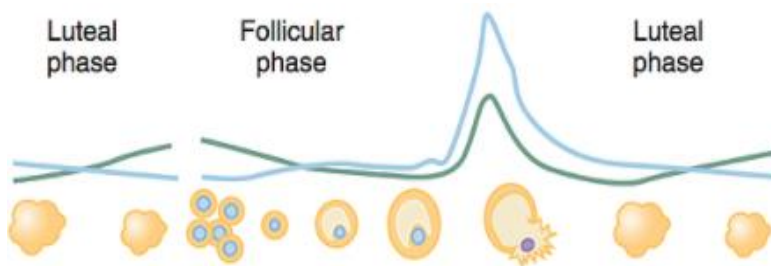
OR

Give reasons for the following:

- During the course of evolution brood parasitism has benefitted the cuckoo bird.
- The cattle egret is always seen in close association with the grazing cattle.
- Population ecology is an important area of ecology.

SECTION – D

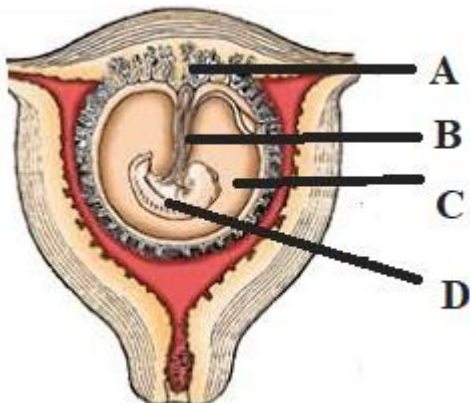
31. Study the graph given below related with menstrual cycle in females:



- Identify the Pituitary hormones marked in the graph and specify their functions.
- Correlate and describe the ovarian events that take place according to the Pituitary hormone levels mentioned in the graph on -
 - 6 – 15 days
 - 16 – 25 days
 - 26 – 28 days (when ovum is not fertilized)

OR

The following figure shows a fetus within the uterus. On the basis of the given figure, answer the questions that follow:



- From the above figure, identify the correct parts A, B, C & D
- Mention the role of A in the development of the embryo.
- Name the fluid surrounding the developing embryo. How is it misused for sex-determination?

32. Explain Hershey- Chase experiment to prove that DNA is the genetic material.

OR

Explain Meselson and Stahl's experiment to prove that DNA replicates semi conservatively.

33. a) Identify the disease in which the patient's cells attacks self-cells.
- b) State its possible cause and give one example of such disease.
- c) Name the cell type that helps in cell mediated immunity and is a type of which immunity response.
- d) Explain how this is related to organ transplant.
- e) Name the bioactive molecule and its source that is used during in organ transplant patients.

OR

A patient had tested positive to ELISA Test.

- a) Identify the disease and the pathogen responsible for this disease.
- b) Trace the path and the spread of this pathogen in the human body.
- c) Give reasons for the reduced/ weak immunity of the patient.
- d) State the effects of the weak immunity in the human body.

Prepared by : The Department of Science 2020 -21
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