

**CLASS XII (2019-20)****BIOLOGY (044)****SAMPLE PAPER-3****Time : 3 Hours****Maximum Marks : 70****General Instructions :**

- There are a total of 27 questions and five sections in the question paper. All questions are compulsory.
- Section A contains question numbers 1 to 5, multiple choice questions of one mark each.
- Section B contains question numbers 6 to 12, short answer type I questions of two marks each.
- Section C contains question numbers 13 to 21, short answer type II questions of three marks each.
- Section D contains question numbers 22 to 24, case-based short answer type questions of three marks each.
- Section E contains question numbers 25 to 27, long answer type questions of five marks each.
- There is no overall choice in the question paper. However, internal choices are provided in two questions of one mark, one question of two marks, two questions of three marks and all three questions of five marks. An examinee is to attempt any one of the questions out of the two given in the question paper with the same question number.

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**SECTION A**

- Q1. Agarose extracted from sea weeds finds use in [1]
- (a) spectrophotometry (b) tissue culture  
(b) PCR (d) gel electrophoresis

**OR**

There is a restriction endonuclease called Eco RI in which co part stands for

- (a) colon (b) coelom  
(c) coenzyme (d) coil
- Q2. According to Allen's rule, the mammals from colder climates have [1]
- (a) shorter ears and longer limbs (b) longer ears and shorter limbs  
(c) longer ears and longer limbs (d) shorter ears and shorter limbs

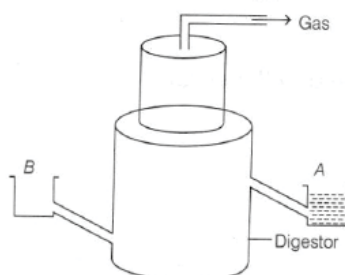
**OR**

Decomposers like fungi and bacteria are

- (i) autotrophs  
(ii) heterotrophs  
(iii) saprotrophs  
(iv) chemoautotrophs

Choose the correct option.

- (a) (i) and (iii) (b) (i) and (iv)  
(c) (ii) and (iii) (d) (i) and (ii)
- Q3. Name the parts labelled 'A' and 'B' shown in a typical biogas plant. [1]



- (a) A-Gas holder; B-Sludge tank
- (b) A-Sludge tank; B-Slurry container
- (c) A-Slurry container; B-Sludge tank
- (d) A-Sludge tank; B-Gas holder

Q4. Which of the following statements is correct? [1]

- (a) Surgical methods of contraception do not prevent gamete formation
- (b) In embryo transfer technique, embryos are always transferred into the uterus
- (c) Oral pills are very popular contraceptives among the rural women
- (d) All STDs are not completely curable

Q5. Which gene was introduced in the first transgenic cow? [1]

- (a) Human alpha lactalbumin
- (b) OC-1-antitrypsin
- (c) P-1-antitrypsin
- (d) cry-IAC

## SECTION B

Q6. List any two ways through which foreign DNA is inserted into the plant cell genome to change its phenotypic expression. [2]

Q7. How does pistil recognise the pollen grain of the right type? [2]

Q8. Radhika went on a school trip to the garden and started sneezing on reaching there. In the evening when she came back home, she was feeling all fine. Suggest a valid reason behind her unique condition and also mention the type of antibody produced by the body as a response against this condition. [2]

Q9. Write your observations on the variations seen in the Darwin's finches shown below. [2]



How did Darwin explain the existence of different varieties of finches on Galapagos islands?

Q10. A food web represents interlinking food chains of many consumers. Using this information, highlight the feeding relationship between the main groups of organisms of your choice in a food web. Also, mention an advantage of the food webs existing in an ecosystem. [2]

## OR

In a habitat with unlimited resources, which type of population growth can be observed? Support your answer with a graphical representation.

Q11. There is more species rich biodiversity in the tropical latitude when compared to the temperate ones. Justify the statement giving two reasons. [2]

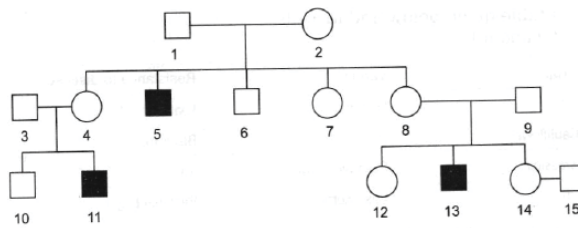
Q12. Consider the following facts.

- (i) Particulate air pollutants can be differentiated into settleable and suspended forms.
- (ii) According to CPCB, particulate matter of 2.5  $\mu\text{m}$  or less in size can cause harm to human health. Reconcile the above statements with respect to particulate pollutants and suggest the harmful effects they can cause on human health. Also, present a solution to remove these types of pollutants from the environment. [2]

## SECTION C

Q13. Explain the structure of a typical microsporangium with the help of a well-labelled diagram. Also, highlight the major roles performed by the innermost layer of the microsporangium. [3]

- Q14. Haemophilia is a sex-linked recessive disorder of humans. The pedigree chart given below shows the inheritance of haemophilia in a family. Study the pattern of inheritance and answer the questions that follows. [3]



- Give all the possible genotypes of the members 4, 5 and 6 in the pedigree chart.
- A blood test shows that the individual 14 is a carrier of haemophilia. The member numbered as 15 got recently married to number 14. What is the probability that their first child will be a haemophilic male?

**OR**

Name the type of genetic disorder and its two symptoms that will likely be observed in an individual, if

- the production of  $\alpha$ -globin gene on chromosome 16 is affected by mutation or deletion of one or more of its four alleles.
- the karyotype is 45 + XO.

- Q15. (i) Study the table given below and identify (a), (b), (c) and (d) [3]

Crop	Variety	Resistance to disease
(a)	Himgiri	Leaf rust
Cauliflower	(b)	Black rot
Brassica	Pusa Swarnim	(c)
(d)	Pusa Komal	Bacterial blight

- Plant breeding technique has helped sugar industry in North India.
  - Between sugarcane variety of North India and South India, which one has higher sugar content?
  - What attempt was made to increase yield of sugarcane in North India?

- Q16. Give reasons for the following. [3]

- Some animals like frog, show hibernation.
- Clownfish lives among the tentacles of sea anemone.
- Desert plants bear thick cuticle on their leaf surfaces.

- Q17. In a cross between red and white flowers of snapdragon, all pink flowers were produced. Explain, why it is a case of incomplete dominance and not of blending inheritance. [3]

- Q18. Biotechnologists identified the source and isolated different types of cry genes from the bacterium *Bacillus thuringiensis* and incorporated them into many crops. Briefly explain, how have these genes brought beneficial changes in the crops and the mankind. [3]

- Q19. Name the two different categories of microbes naturally occurring in sewage water. Explain their role in cleaning sewage water into usable water. [3]

**OR**

The valuable services bees provide to local ecosystems make it possible for farms and cattle operations to succeed. Acknowledging the above mentioned fact, how would you explain and convince the farmers that apiculture is both an easy and economically beneficial practice for them?

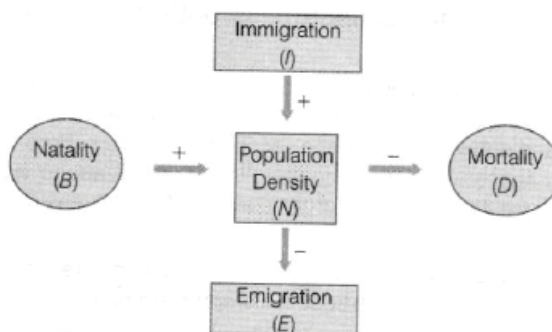
- Q20. Consider the following statements. [3]
- Origin of replication or on site is a specific sequence of DNA from where replication initiates.
  - Selectable markers are genes which impart unique features to a vector, e.g. antibiotic resistance.
  - Cloning or Recognition sites are short stretches of DNA which specific restriction enzymes can identify and bind to.

Reconcile the above statements and explain why these features are considered essential to facilitate cloning into a vector during RDT.

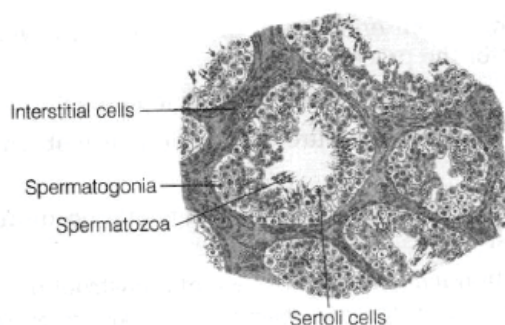
- Q21. A paternity dispute case for a child has reached the court for which there is no definitive evidence. Propose an alternative solution which can settle this dispute without any suspicion. [3]

### SECTION D

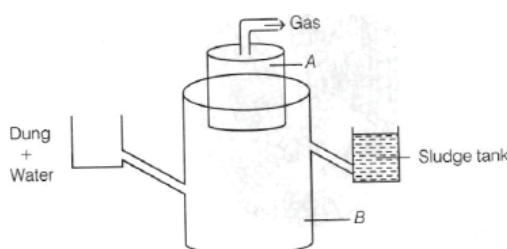
- Q22. Observe the diagram of the factors influencing population density and answer the questions that follows. [3]



- (i) Define immigration and emigration.  
 (ii) Name the factors on which the size of a population for any species depend?  
 (iii) Give the expression for the change in population size.
- Q23. With reference to the below diagrammatic sectional view of seminiferous tubule, answer the following questions. [3]



- (i) Name the cells that divide by mitosis to increase their number and the cells that undergo meiosis-II.  
 (ii) Discuss about the hormones influencing the process of gametogenesis in males.
- Q24. The biogas plant shown below is used in rural areas for the production of biogas. [3]
- (i) Observe the figure and label the different parts marked as A and B.  
 (ii) Explain the working of a biogas plant.



### SECTION E

- Q25. (i) What is triple fusion? Where and how does it take place? Give the name of nuclei involved in triple fusion. What is the product of this process? [5]

- (ii) Which of the following, an endosperm or an embryo, develops first in an angiospermic seed? Give reason for the precedence.
- (iii) State the role of endosperm in mature albuminous seed.
- (iv) Draw a labelled diagram of a mature dicotyledonous embryo.

**OR**

- (i) With the help of a flowchart, explain the events that occur during fertilisation in humans. Also, mention the site of its occurrence.
  - (ii) Successful fertilisation leads to the absence of menstruation in females. Give reason.
- Q26. During the course of evolution DNA was chosen over RNA as genetic material in most living organisms. Give reasons by first discussing the desired criteria in a molecule that can act as genetic material and in the light of biochemical differences between DNA and RNA. [5]

**OR**

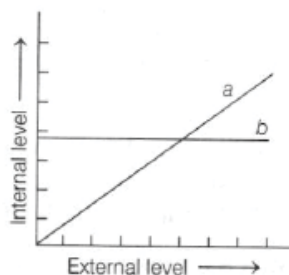
- (i) Mutation occurs when there is a change in the sequence of triplet codons which may alter the phenotype of an organism. One such mutation is substitution whereby one base gets substituted with another. Using an example, explain how this substitution of one base in DNA alters the phenotype of an organism.
  - (ii) According to you, why was the arrangement of the bases in the nucleic acids thought to be in the form of a triplet?
- Q27. (i) In an aquarium, two herbivorous species of fish are living together and feeding on phytoplanktons. As per the Gause's principle, one of the species is to be eliminated in due course of time, but both are surviving well in the aquarium. Analyse the above situation and provide valid reasons for the continued co-existence of the two species. Give possible reasons.
- (ii) Do you agree that the plants inhabiting a desert are not found in mangrove? Present your opinion with proper reasons. [5]

**OR**

The graph given below represents the response of different organisms to certain environmental fluctuations

(e.g. temperature).

- (i) Which are conformers out of a and b?
- (ii) What does the other line in graph depict?
- (iii) Suggest how these organisms differ from each other with reference to homeostasis.
- (iv) Suggest the category to which humans belong. Give an example to support your answer.



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