

D.A.V. PUBLIC SCHOOLS, ODISHA ZONE-I.
Half Yearly Examination, 2019-20

- Check that this question paper contains **8** printed pages only.
- Check that this question paper contains **27** questions.
- Write down the Serial Number of the question before attempting it.
- 15 minutes cooling time has been allotted to read this question paper only and do not write any answer on the answer book during this period.

CLASS – XII
BIOLOGY (Code No: 044)

Time: 3 hours

Maximum Marks: 70

General Instructions:

- (1) There are a total of 27 questions and five sections in the question paper. All questions are compulsory.
- (2) Section-A contains question numbers 1 to 5, multiple choice type 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.
- (3) 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.

SECTION-A

1. Which one of the following statements is not correct? (1)
- PDF Compressor Free Version. Amoebae are called zoospores.
 - Water hyacinth growing in standing water drains oxygen from water that leads to death of fishes.
 - In potato, banana and ginger the plantlets arise from the internodes present in the modified stem.
 - Gemmule formation in sponges and conidia in *Penicillium* are types of asexual reproduction.

OR

Find the mismatch-

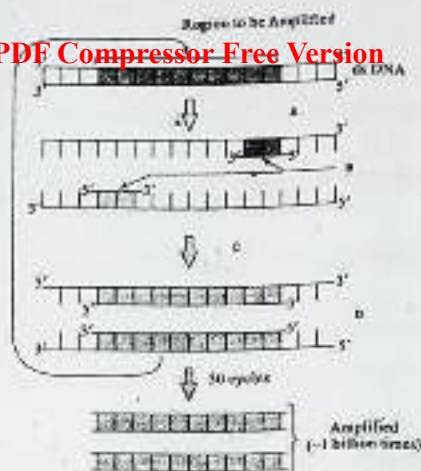
- Rhizome- Banana
 - Bulls- potato
 - Offset- water hyacinth
 - Adventitious leaf buds- *Bryophyllum*
2. 50 secondary oocytes in female and 50 secondary spermatocytes in male give rise to – (1)
- 100 ova and 200 sperms
 - 200 ova and 50 sperms
 - 100 ova and 100 sperms
 - 50 ova and 100 sperms

OR

240 viable seeds are produced by a flower of tomato plant. How many microspore mother cells and how many male gametes were involved in this case?

- 240, 480
 - 120, 480
 - 60, 480
 - 60, 240
3. Read the following statements and find the correct statement/statements- (1)
- Nitrogen base is linked to pentose sugar through N- glycosidic linkage.
 - Phosphate group is linked to 5' OH of a nucleoside.
 - Two nucleosides are linked by 3'-5' glycosidic linkage.
 - Negatively charged DNA is wrapped around positively charged histone to form histone octamer.
 - Chromatin that is most densely packed can synthesize more proteins and is called euchromatin.
- i, ii, iii
 - iv, v
 - i, ii
 - i, ii, and v

4.



(1)

Study the above diagram and choose the correct option from the following-

- A-Primer, B-Taq polymerase, C-Annealing, D- Elongation
 - A- High temperature, B- Taq polymerase , C- Annealing, D- Elongation
 - A- High temperature, B- Primer, C- dNTPs, D- Elongation
 - A- High temperature, B-Annealing,C- Taq polymerase, D- Denaturation
5. *cry I Ac* and *cry I Ab* produce toxin that controls..... (1)
- Cotton bollworms and corn borer respectively.
 - Corn borers and cotton bollworms respectively.
 - Tobacco budworms and nematodes respectively.
 - Nematodes and tobacco budworms respectively.

SECTION-B

6. Answer the following questions. (2)

- How does the Mycorrhizal association benefit the plants?
- How has the fungus *Trichoderma polysporum* proved to be very essential to organ transplant patient?

OR

- How can a healthy potato plant be obtained from a desired potato variety which is virus infected? Explain.
- List two vitamin C enriched vegetable crops developed by IARI.

7. (2)

- Why in cleistogamous flower cross pollination is not possible?
- How cleistogamous flower is advantageous to plants?
- How does the study of pollen grains and carpel of a flower help in identifying wind as its pollinating agent?

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8. Evolution is a stochastic process based on chance mutation. Justify it with an example. How does the theory of Hugo de Vries support this? (2)

OR

- a. Identify and define the factor affecting Hardy Weinberg law that leads to Founder effect.
- b. Draw the natural selection graph for melanised moth in urban area.
9. The coding sequence of β -galactosidase is considered to be a better marker? Justify. (2)
10. (2)
- a. Compare the role of RNA polymerase with Severo Ochoa enzyme.
- b. Although a prokaryotic cell has no defined nucleus, yet DNA is not scattered throughout the cell. Explain.

11. Identify A, B, C and D. (2)

Chemical/bioactive molecule	Name of the Microbe	Function
Statin	A	B
C	D	Clot buster

12. (2)

- a. Given below is a single stranded DNA molecule. Frame and label its sense and antisense RNA strand.
5'ATGGGGCTC3' sense
- b. How are the RNA molecules made from the above DNA strand help in silencing of the specific RNA molecule?

SECTION-C

13. Draw the schematic representation of the steps in the formation of recombinant DNA by the action of restriction endonuclease *EcoRI* with proper labeling. (3)
14. a. Growing *Spirulina* on large scale is beneficial both environmentally and nutritionally for humans. Justify. (3)
- b. Demand for mushroom as a food has led to its culturing on large scale. Similarly it is perceived that microbes too would become acceptable as food. Identify a microbe other than *Spirulina* which can be cultured as food source and give the applicability of its culture in the given context.

15. A garden Pea plant bearing axial violet flower when crossed with another Pea plant bearing axial white flower, produced axial violet flower and axial white flower in the ratio of 3:1. Work out the cross showing the genotypes of the parent pea plants and their progeny. (3)

Name and state the law that can be derived from this cross and not from a monohybrid cross.

16. a. The regulatory gene is essential for the functioning of *lac* operon. Comment. (3)
b. "A very low level of expression of *lac* operon has to be present in the cell all the time". Why?
c. Why is the regulation of *lac* operon called negative regulation?

17. Given below is a sequence of coding strand of DNA. Answer the following questions basing on the data. (3)

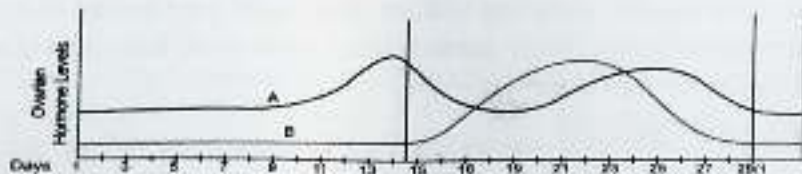
3'AAAATITTTAAGTTCATGGAGCTAGTAGCATGTAGGTTTT5'

- a. Derive the mRNA sequence from the above.
b. How many amino acids does it code for?
c. Draw the tRNA structure for the 2nd codon of the derived mRNA with its amino acid. (3)

18. a. Why Adenosine deaminase is required in human body?
b. How gene therapy helped those patients? Why is it not a permanent cure method?
c. Suggest a possible permanent cure method.

OR

- a. How can the mutated gene in cancer be diagnosed in early stage by using molecular diagnosis process?
b. How is the bacterial cell made competent to take up foreign DNA?
19. The graph given below shows the variation in the levels of ovarian hormones during various phases of menstrual cycle: (3)
- a. Identify the source of 'A' and 'B'.
b. Write one function of each hormone.
c. What are the changes that take place in ovary from 15th to 19th days and also mention the level of pituitary hormones during the above mentioned period?



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20. (3)
- Define the process by which Tasmanian tiger cat evolved from its ancestral stock.
 - Mention another animal evolved along with it. Which type of evolution both represent? Justify

OR

How do homologous organs represent divergent evolution? Explain with the help of a suitable example.

21. (3)
- How do LNG-20 and Multiload 375 differ in their mode of contraceptive action?
 - Why is 'Saheli' considered as an effective contraceptive for women to space child birth?

SECTION-D

22. A group of youth was raided by police. Pockets of smack and syringes and needles were found littered around. (3)
- Write the chemical name of smack and the name of the source plant.
 - How is it obtained?
 - Name another mode of its intake other than injection.
 - Write any two effect of smack on human body.

23. Study the figure given below and answer the questions that follow- (3)



- What is the role of Zona pellucida in the above process?
 - Analyse the changes occurring in the secondary oocyte in the above process.
 - What helps the sperms to enter into the egg and why?
24. Two blood samples A and B, picked up from the crime scene were handed over to the forensic department for genetic finger printing. Given below is the flow chart of the technique. Complete the flow chart. (3)
- Isolation of DNA from blood cell
- ↓
- Cutting of DNA by 'a'
- ↓
- Separation of DNA fragments by using 'b'

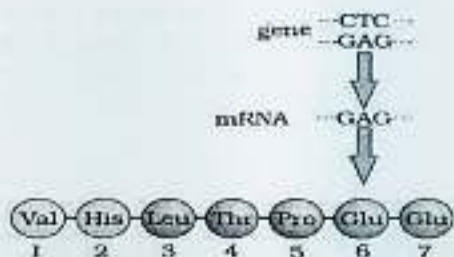
Transfer (blotting) of fragments to 'c'
↓
DNAs split into single strands
↓
Introduction of labeled 'd'
↓
'e' single strands with 'd'
↓
Detection of banding pattern by 'f'

SECTION-E

25. Study the pedigree analysis given below for haemophilia and answer the following questions. (5)
- Justify that the pedigree chart given below for the disease is sex linked and caused by recessive allele.
 - Write the possible genotype of the individual 2 and 12.
 - Write the types of genes and the location of the genes causing thalassaemia in human.



OR



Given above is the representation of amino acid composition of the relevant translated portion of beta chain of haemoglobin.

- Is this representation indicating a normal human or affected one? Give reason to your answer.

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- What difference could be noticed in the phenotype of normal and sufferer related to this gene?
- Write the genotype of both the parents whose son is affected from the defect related to the gene represented.
- Name the disease caused due to defect in the above gene and also mention its cause.
- Who are likely to suffer more from the defect- male/ female or both and why?

26. (5)

- Explain contact inhibition and metastasis with respect to cancer.
- All human beings have cellular oncogenes but only a few suffers from cancer. Give reason.
- Name any two techniques which are useful to detect cancer of internal organs.
- Why are cancer patients often given α interferon as a part of their treatment?

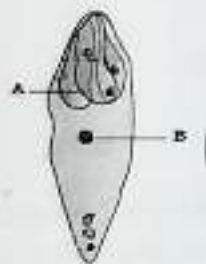
OR

- Differentiate between the immunity produced by Polio vaccine and Tetanus antitoxin.
- Give the schematic representation of replication and life cycle of HIV in human body with proper labeling.

27. (5)

- Differentiate between parthenocarpy and parthenogenesis.
- What is apomixis? Write two ways by which apomictic seeds can be produced.
- Write one advantage of apomictic seed over hybrid seed.
- Are the embryos found in citrus fruit are genetically similar or different? Comment.

OR



Answer the following questions.

- Name the structures which the parts A and B shown in the diagram above respectively develop into?
- Write the ploidy of A and B.
- Explain the process of development which B undergoes in coconut.
- Castor seeds are different from pea seeds with respect to post fertilization changes. Explain.