

Roll No. -----

Q.P.1 Subject Code-044

Please check that this question paper
Contains 33 questions and has
2 printed pages.

D.A.V. INSTITUTIONS CHHATTISGARH
EXAMINATION-2023-24
CLASS-XII
SUBJECT-BIOLOGY (044)

Time: 3 Hrs

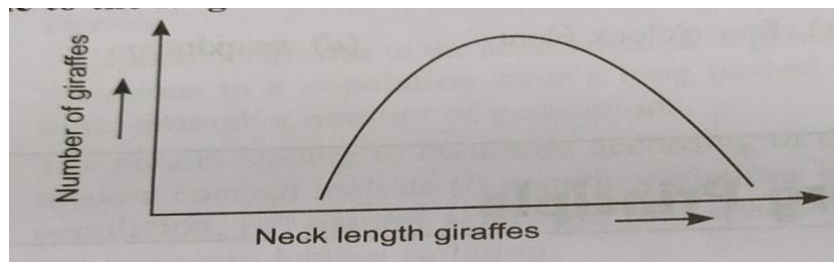
Maximum Mark-70

General Instructions:-

- (i). All questions are compulsory.
- (ii) The question paper has five sections and 33 questions. All questions are compulsory.
- (iii) 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.
- (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. Select the option that gives the correct description of the process of Natural Selection with respect to the length of the neck of giraffe.



- a) Stabilizing selection as giraffes with longer neck lengths are selected further.
 - b) Disruptive selection as giraffes with smaller and longer neck lengths are selected
 - c) Directional selection as giraffes with longer neck lengths are selected
 - d) Stabilizing selection as giraffes with medium neck lengths are selected.
2. The time of ovulation is of importance in cases of:-
 - (i) Couple having difficulty in conception.
 - (ii) To know the safe period for prevention of pregnancy.
 - (iii) To inhibit the process of ovulation.
 - (iv) To stimulate ovarian follicular development.

- (a) (i) and (iv)
- (b) (ii) and (iv)
- (c) (i) and (ii)
- (d) (iii) and (iv)

3. Given below are the list of the commercially important products and their source organisms, Select the option that given the correct matches.

	Bioactive product	Source organism(Microbes)
A	Cyclosporin-A	i) Streptococcus
B	Statins	ii) Tricoderma polysporum
C	Streptokinase	iii) Penicillium notatum
D	Penicillin	iv) Monascus purpureus

- (a) A-i , B-ii, C-iii, D-iv
- (b) A-iii, B-iv, C-ii, D-i
- (c) A-iv, B-iii, C-i, D-i
- (d) A-ii, B-iv, C-i, D-iii

4. Given below is a sequence of bases in mRNA of a bacterial cell. Identify the amino acid that would be incorporated at codon position 3 and codon position 5 during the process of its translation.

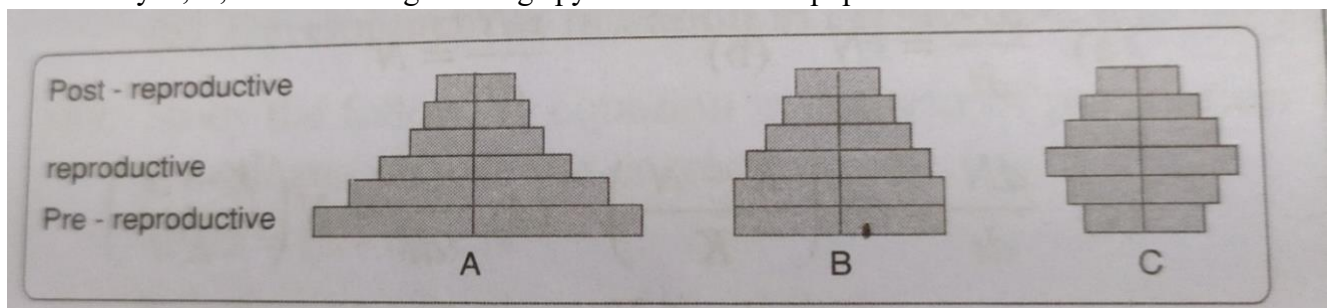
3' AUC AGG UUU GUG AUG GUA GGA 5'

- a) Phenylalanine, Methionine
- b) Cysteine ,Glycine
- c) Alanine,proline
- d) Serine,Valine

5. Which of the following food chain is the major conduit for energy flow in terrestrial and aquatic Ecosystem respectively?

	Terrestrial ecosystem	Aquatic ecosystem
a	Grazing	Grazing
b	Detritus	Detritus
c	Detritus	Grazing
d	Grazing	Detritus

6. Identify A, B, C in below figure of age pyramid for human population..



- (a) A: Declining B: Stable C: Expanding
 (b) A: Stable B: Expanding C: Declining
 (c) A: Expanding B: Stable C: Declining
 (d) A: Stable B: Declining C: Expanding

7. Select the option which is/are incorrect statement/s with respect to T-lymphocytes in the human body.

- I. They are a type of white blood cells
 II. They are produce in Bone marrow
 III. They remain active at all times in the body
 IV. They mature in the bone marrow.

- (a) I and IV only
 (b) III only
 (c) IV only
 (d) III and IV only

8. MALT constitutes about ----- present of the lymphoid tissue in human body.

- (a) 20%
 (b) 70%
 (c) 10%
 (d) 50%

9. Match items of column I with those of II and select the correct option.

Column-I	Column-II
A. Lactational amenorrhoea	1. Implant under the skin
B. LNG-20	2. Suppressing ovulation and implantation
C. Tubectomy	3. Suppression of gonadotropins
D. Oral contraceptive	4. Blocking the transport of gametes
	5. Making the cervix hostile to sperms

- (a) A-3 B-4, C-2, D-5
 (b) A-3, B-1, C-4, D-2
 (c) A-2, B-4, C-5, D-3
 (d) A-3, B-5, C-2, D-1

10. The historical convention on Biodiversity held in Rio de Janeiro in 1992 is known as:

- (a) The CITES convention
 (b) The Earth Summit
 (c) The G-16 summit
 (d) The MAB programme

11. From the statements given below, choose the options that are true for a typical female gametophyte of a flowering plant?

- i. It is 8-nucleate and 7-celled at maturity
- ii. It is free-nuclear during the development
- iii. It is situated inside the integument but outside the nucellus
- iv .It has an egg apparatus situated at the chalazal end.

Choose the correct answer from the options given below:-

- (a) i and v
- (b) ii and iii
- (c) i and ii
- (d) ii and iv

12. Select the wrongly matched option:-

- a) Gel electrophoresis- Separation of DNA fragments based on their molecular size..
- b) Vector- A molecule to carry a piece of foreign DNA into the target cell.
- c) PCR- Amplification of DNA fragments in vitro in the laboratory.
- d) Recombinant DNA- A gene sequence of a single origin.

Question. No. 13 to 16 consists of two statements- Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below.

A. Both Assertion and Reason are true and the Reason is a correct explanation of the Assertion.

B. Both Assertion and Reason are true but the Reason is not a correct explanation of the Assertion.

C. Assertion is true but Reason is false.

D. Assertion is False but Reason is true.

13. Assertion:-In Thalassemia an abnormal myoglobin chain is synthesized due to a gene defect.

Reason:- Thalassemia is controlled by genes HBA1 and HBA2 on chromosome 16.

14. Assertion:-Menstrual cycle are absent during pregnancy.

Reason:- High level of estrogen and progesterone during pregnancy suppress the gonadotropins.

15. Assertion:-Decomposition process is fast if detritus is rich in lignin and chitin.

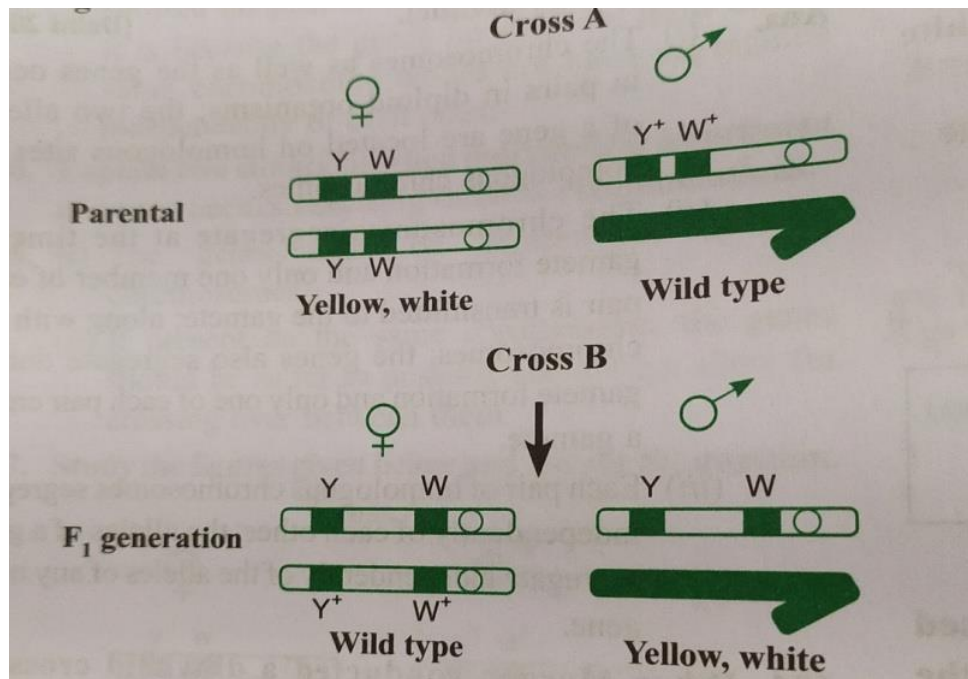
Reason:-Decomposition is largely an oxygen requiring process.

16. Assertion:-Retroviruses are used efficiently as vectors in rDNA technology experiments.

Reason:-Agrobacterium tumefaciens is the most commonly used vector for transformation of Plant cells

SECTION-B

17. T.H. Morgan carried out a cross on *Drosophila melanogaster*, involving genes for body colour (Y^+/Y) and genes for eye colour (W^+/W). Study the schematic representation of the cross up to F₁ generation and answer the questions that follow:

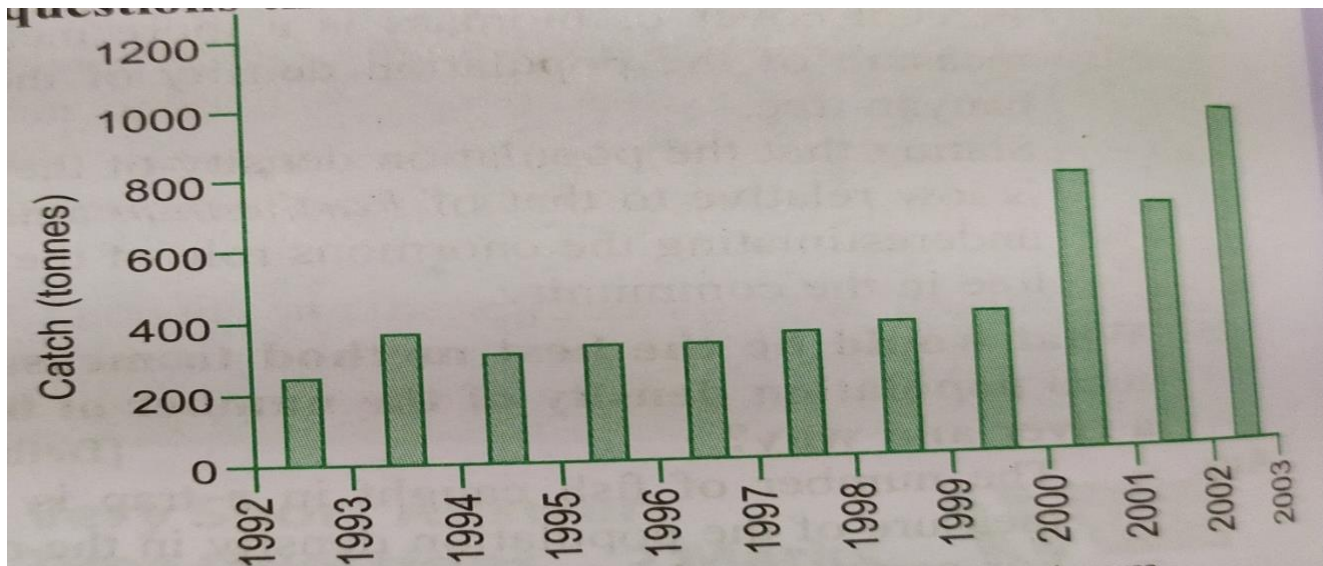


- (a) Name the kind of cross, it represent?
- (b) Identify and write the dominant phenotype with respect to eye colour.
- (c) What are these gene located on the chromosome shown, referred to as?
18. Justify "Bacillus thuringiensis act as a biocontrol agent for protection in Brassica and fruit trees.".
19. (a) Explain the process of the development of a male gametophyte in an angiosperm?
- (b) Why it is called a male gametophyte.
20. (a) 'Insertional Inactivation' is a method to detect recombinant DNA. Explain the method.

OR

(b) Explain how recombinant DNA technology is used to detect a disease even before any clinical symptom appears.

21. The histogram given below represents the data for annual shark harvest in the great barrier reef located on the east coast of Queensland, Australia. Study the histogram and answer the questions that follow.



- (i) Write your interpretation of the data given.
- (ii) Write the impact on the biodiversity of the area that you can interpret on the basis of given data.

SECTION-C

22. Expand and explain the following techniques used in the “test Tube Baby” programme:-

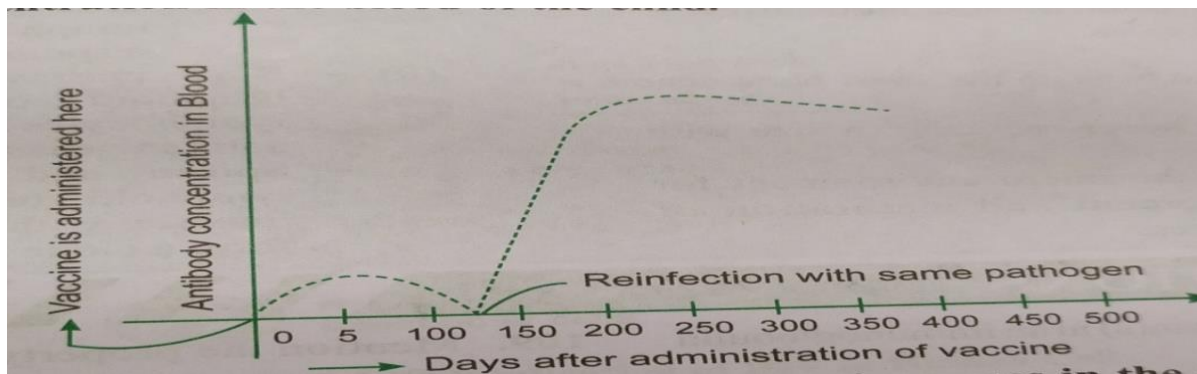
- (i) GIFT
- (ii) ZIFT
- (iii) IUT

23. Differentiate between Dominance, Incomplete dominance and co-dominance with the help of a suitable example of each.

24. How did industrialization play a role in Natural Selection of light and dark coloured moth in England?

25. One of the major approaches of crop improvement programme is Artificial Hybridization. Explain the steps involved in making sure that only the desired pollen grains pollinate the stigma of a bisexual flower by a plant breeder?

26. A time-bond vaccination programme is followed for the children in our country from their Birth up to ten years of age. A graph plotted below shows the effect of the vaccination followed by infection by the same pathogen and the antibody concentration in the blood of the child.



- (a) Explain why the administration of a vaccine causes an increase in the antibody concentration?
- (b) If the child is infected with the same pathogen almost four months later, the antibody Concentration in his/her blood increases very fast. Explain why?

27. Draw a pyramid of Biomass and a pyramid of energy in sea. Give your comments on the types of Pyramid drawn?

OR

- (a) What is Ramsar convention?
- (b) Name any two Ramsar sites in India?
- (c) What was it called previously?
28. (i) Mention the cause of ADA deficiency in humans.
- (ii) How is gene therapy carried out to treat the patients suffering from this disease?
- (iii) State the probability of a permanent cure of this disease?

SECTION-D

Question No. 29 and 30 are case-based questions. Each question has 3 subparts with internal choice in one subpart.

29. In our body, cell growth and differentiation are highly controlled and regulated process. In the cancerous or neoplastic cells, there is break down of these regulatory mechanism leading to uncontrolled proliferation of cells resulting in masses of cells, called tumours. Transformation of normal cells into neoplastic cells is often induced by physical, chemical or biological agents called carcinogen.

- (a) Name and define one regulatory mechanism that normal cells possess, but are lost in cancer cells? (1)
- (b) Why are tumours cells dangerous? (1)
- (c) Name two types of tumour and write the differences between them?

OR

- (d) What is metastasis? Why is it fatal? (2)

30. Nondisjunction is the failure of homologous chromosomes to disjoin correctly during meiosis. It leads to the formation of a new cell with an abnormal amount of genetic material. A number of clinical conditions are the result of this type of chromosomal mutation. This results in the production of gametes containing a greater or lesser chromosomal amount than normal ones. Consequently, the individual may develop a trisomy or monosomal syndrome. Nondisjunction can occur in both Meiosis I and Meiosis II of the cellular division. It is also the main cause of many genetic disorders; however, its origin and process remain vague. Although it results in the majority of cases from errors in maternal meiosis II, both paternal and maternal meiosis I do influence it. Maternal age is considered a risk factor for trisomy, as well as recombination alterations and many others that can affect chromosomal segregation

(a) State what is aneuploidy? (1)

(b) If during spermatogenesis, the chromatids of sex chromosomes fail to segregate during meiosis, Write only the different types of gametes with altered chromosome number that could possibly be produced? (1)

(c) A normal human sperm (22+Y) fertilizes an ovum with karyotype 22+XX. Name the disorder the offspring thus produced would suffer from and write any two symptoms of the disorder?

OR

(d) Name the best known and most common autosomal aneuploid abnormally in human and write any two symptoms? (2)

SECTION-E

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

(b) It is sometimes observed that the F1 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 up to F2 progeny??

OR

i) List any four goals of Human Genom Projects?

ii) Write any four ways, the knowledge from HGP is of Significance for human?

iii) Expand BAC and mention its importance?

32. (a) Explain the formation of placenta after the implantation in a human female.

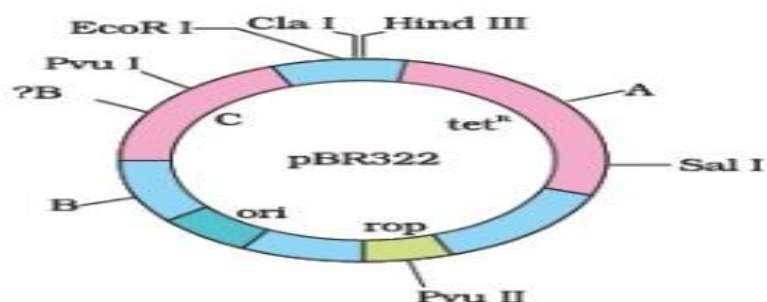
(b) Draw a diagram showing human foetus within the uterus and label any four parts in it?

OR

(i) How does microspore mother cell develop into mature pollen grain in angiosperms?

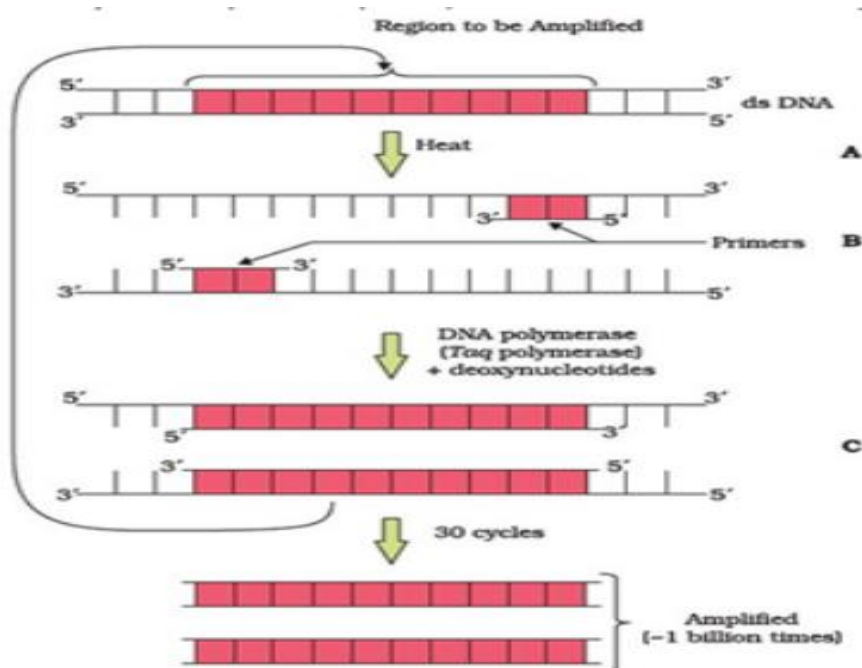
(ii) Describe the structure of a mature pollen grain and draw a labelled diagram of its two Celled stage.

33. (a) Name the regions A, B, and C.



(b) Enlist the steps of Recombinant DNA Technology?

(c) Identify the steps A, B, C in the following diagram.



OR

Answer the following questions with respect to recombinant DNA technology.

- (i) Why is plasmid considered to be an important tool in r DNA technology? From where can plasmids be isolated? (Any two sources)
- (ii) Explain the role of 'Ori' and selectable marker in a cloning vector?
- (iii) "r DNA technology cannot proceed without restriction endonuclease." Justify.