

Please check that this question paper contains 33 Questions and has 05 Printed pages.

Roll No. _____

D.A.V. INSTITUTIONS, CHHATTISGARH

SAMPLE QUESTION PAPER-2023-24

CLASS XII

SUBJECT-BIOLOGY

Time Allowed: 3 Hours

Maximum Marks: 70

GENERAL INSTRUCTIONS:

- (i) All questions are compulsory.
- (ii) The question paper has five sections and 33 questions.
- (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. Spiny or sticky pollen grains and large, attractively coloured flowers are associated with
 - (a) hydrophily
 - (b) entomophily
 - (c) ornithophily
 - (d) anemophily
2. In albuminous seeds, food is stored in ____ and in non albuminous seeds, it is stored in _____.
 - (a) endosperm, cotyledons
 - (b) cotyledons, endosperm
 - (c) nucellus, cotyledons
 - (d) endosperm, radicle
3. Emergency contraceptives are effective if used within
 - (a) 72 hrs of coitus.
 - (b) 72 hrs of ovulation.
 - (c) 72 hrs of menstruation.
 - (d) 72 hrs of implantation.
4. The most accepted line of descent in human evolution is
 - (a) Australopithecus → Ramapithecus → Homo sapiens → Homo habilis
 - (b) Homo erectus → Homo habilis → Homo sapiens
 - (c) Ramapithecus → Homo habilis → Homo erectus → Homo sapiens
 - (d) Australopithecus → Ramapithecus → Homo erectus → Homo habilis → Homo sapiens.
5. If the sequence of nitrogen bases of the coding strand of DNA in a transcription unit is: 5' – ATGAATG – 3', the sequence of bases in its RNA transcript would be
 - (a) 5' – AUG A AUG – 3'

- (b) 5' – UACUU AC – 3'
 (c) 5' – CAUUCAU – 3'
 (d) 5' – GUAAGUA – 3'.
6. Histone proteins are
 (a) basic, negatively charged
 (b) basic, positively charged
 (c) acidic, positively charged
 (d) acidic, negatively charged
7. Amino acids which are specified by single codons are
 (a) phenylalanine and arginine
 (b) tryptophan and methionine
 (c) valine and proline
 (d) methionine and aroinine.
8. Which of the following pairs correctly matches a disease and a pathogen causing it ?
 (a) Typhoid – Salmonella typhi
 (b) Pneumonia – Haemophilus pneumoniae
 (c) Malaria – Ascaris lumbricoides
 (d) Ringworm – Entamoeba histolytica
9. ___ is a CNS stimulant as it interferes with the transport of the neuro-transmitter ____ .
 (a) Cocaine, acetylcholine
 (b) Barbiturate, glutamate
 (c) Cocaine, dopamine
 (d) Barbiturate, glycine
10. In an experiment, recombinant DNA bearing ampicillin-resistance gene is transferred into E.coli cells. The host cells are then cultured on a medium containing ampicillin. The result will be
 (a) both transformants and non-transformants cannot survive.
 (b) both transformants and non-transformants can survive.
 (c) transformants only and not the non-transformants can survive.
 (d) transformants cannot survive, but non-transformants can not.
11. According to Allen's Rule, the mammals from colder climates have:
 (A) Shorter ears and longer limbs
 (B) Longer ears and shorter limbs
 (C) Longer ears and longer limbs
 (D) Shorter ears and shorter limbs
12. The relationship between the alga Cladophora and the snail shell on which it grows corresponds to:
 (A) Neutralism
 (B) Predation
 (C) Commensalism
 (D) Mutualism

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

- A. Both A and R are true and R is the correct explanation of A.
 B. Both A and R are true and R is not the correct explanation of A.
 C. A is true but R is false.
 D. A is False but R is true
13. Assertion: Saheli, the new oral contraceptive for the females, contains a steroidal preparation.
 Reason: It is "once in a day" pill with very few side effects.
14. Assertion : Darwin's finches show a variety of beaks suited for eating large seeds, flying insects and cactus seeds.

Reason : Ancestral seed-eating stock of Darwin’s finches radiated out from South America main land to different geographical areas of the Galapagos Islands, where they found competitor-free new habitats.

15. Assertion: ‘Cry’ proteins are named so because they are crystal proteins.

Reason: In acidic environment of insect midgut ‘Cry’ proteins are solubilized and then release toxic core fragments after proteolytic action.

16. Assertion: The prickly pear cactus introduced into Australia in early 1920s caused havoc by spreading rapidly into millions of hectares of land range.

Reason: When certain exotic species are introduced into a geographical area, they become invasive and start spreading fast because the invaded land does not have the natural predators.

SECTION-B

17. During polyembryony, if one embryo is formed from synergids and the other from nucellus, state the one that is haploid and the one that is diploid.

18. In a dihybrid cross, when would the proportion of parental gene combinations be much higher than non-parental types, as experimentally shown by Morgan and his group?

19. Bottled fruit juices are clearer as compared to those made at home. Explain.

20. Suggest any two possible treatments that can be given to patient exhibiting adenosine deaminase deficiency.

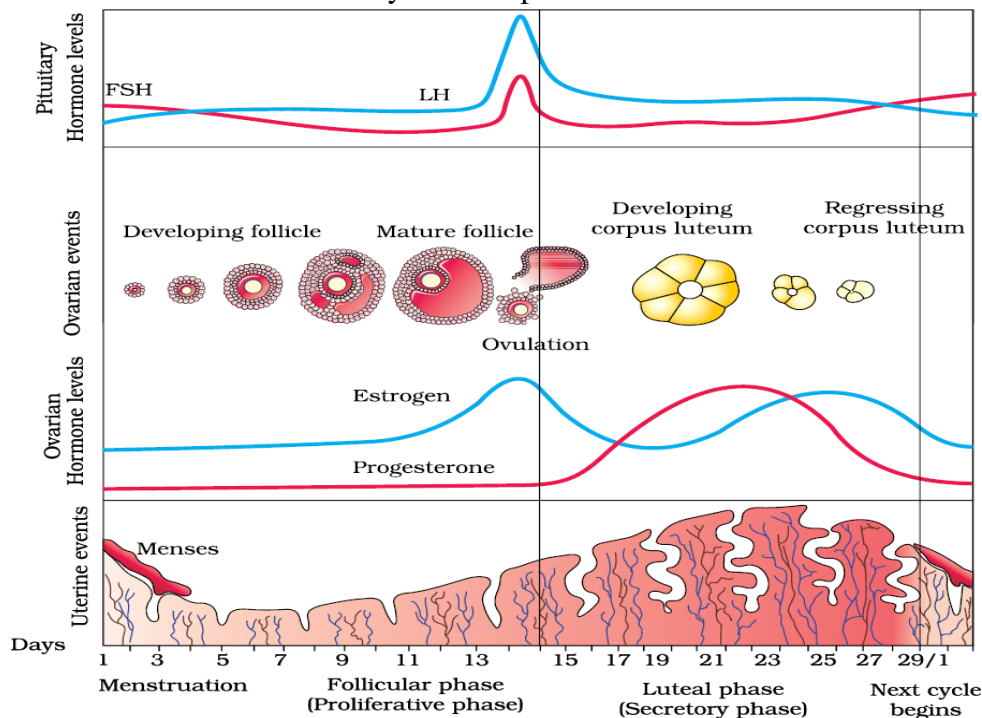
21. Give an example of an organism that enters ‘diapause’ and why?

OR

Why are some organisms called as eurythermal and some others as stenohaline?

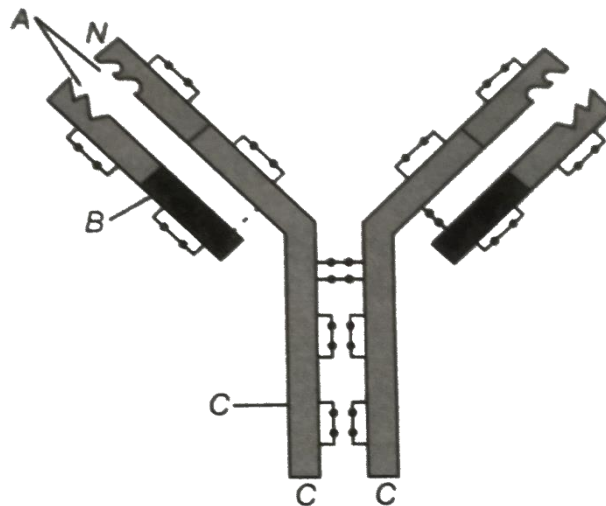
SECTION-C

22. The events of the menstrual cycle are represented below.



Answer the following questions.

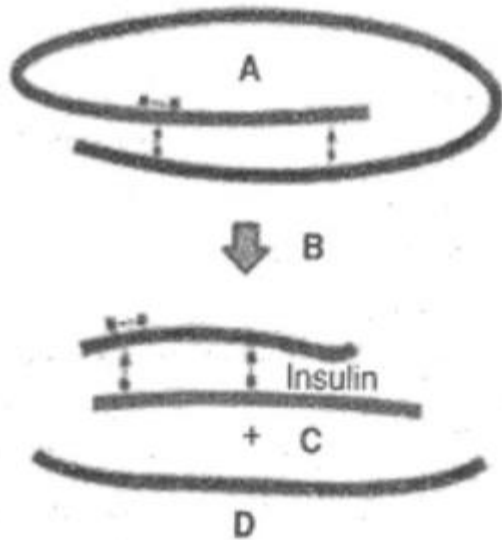
- (i) State the levels of FSH, LH, and Progesterone simply by mentioning high or low around the 13th and 14th day and 21st to 23rd day.
- (ii) In which of the above-mentioned phases does the egg travel to the fallopian tube?
- (iii) Why is there no menstruation after fertilization?
23. Continued self-pollination leads to inbreeding depression. List three devices, which flowering plants have developed to discourage self-pollination?
24. In a cross made between a hybrid tall and red plant (TtRr) with dwarf & white flower (ttrr). What will be the genotype of plants in the F1 generation?
25. Explain the process of splicing, capping, and tailing which occur during transcription in Eukaryotes.
26. Classify the following as examples of homology and analogy.
- Hearts of fish and crocodile
 - Wings of butterflies and birds
 - Eyes of Octopus and Mammals
 - Tubers of potato and Sweet potato
 - Thorns of Bougainvillea and spines of Opuntia
 - Thorn of Bougainvillea and tendrils of cucurbits.
27. In the figure, the structure of an antibody molecule is shown. Observe it and answer the following questions.



- Label parts A, B, and C.
 - Which cells produce these chemicals?
 - State the function of these molecules.
28. Since DNA is a hydrophilic molecule, it cannot pass through cell membranes. Name and explain the technique with which the DNA is forced into
- a bacterial cell
 - a plant cell
 - an animal cell.

OR

In the picture shown below, shape (A) and shape (B) indicate other forms of the peptide hormone secreted by the mammalian pancreas.



What type of bond is present between hormonal chains?

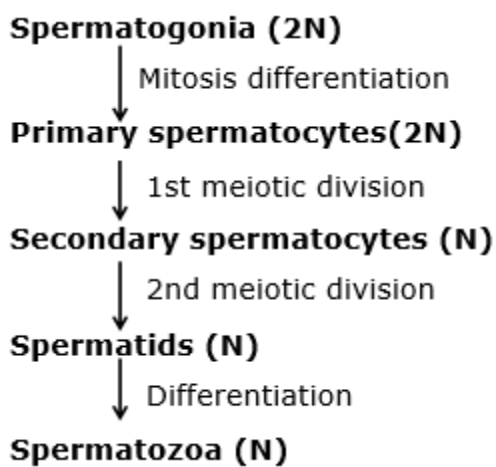
What are the shape (A) and shape (B)? How are these shapes are different from each other?

Explain how rDNA technology was used to produce this hormone by the US company Eli Lilly.

SECTION-D

Q.no 29 and 30 are case based questions. Each question has subparts with internal choice in one.

29. Spermatogenesis is the production of sperms from male germ cells (spermatogonia) inside the testes (seminiferous tubule). This process begin at puberty. Observe the following flow diagram and answer the questions that follows



A. Which type of cell division takes place during spermatogenesis ?

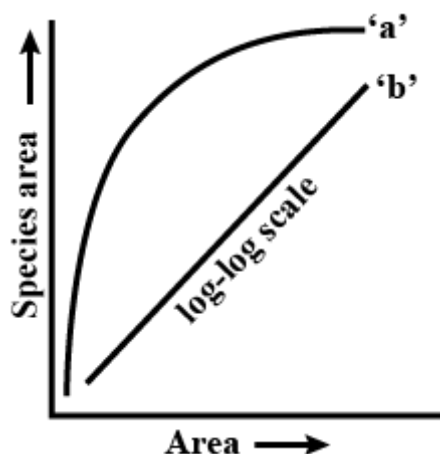
B. Name the hormone induced by spermatogenesis.

C. How many spermatozoa are produced from a single primary spermatocyte? What is spermiogenesis?

Or

C. Write the function of Sertoli cell and leydig cell.

30. The following graph shows the species---area relationship. Answer the following questions as directed.



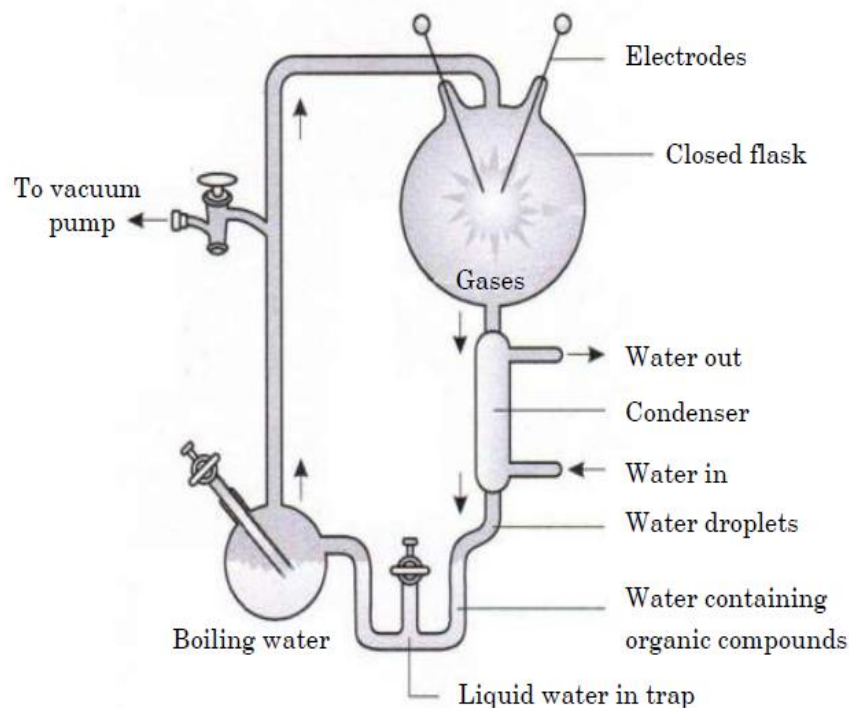
- A) Name the naturalist who studied the kind of relationship shown in the graph. Write the observation made by him.
- B) Write the situations as discovered by the ecologists when the value of Z (slope of the line) lies between (a) 0.1 and 0.2 (b) 0.6 and 1.2. What does Z stand for?
- C) When would the slope of the line b' become steeper?

OR

- C) Write the equation for rectangular hyperbola.

SECTION-E

31. Given below is a diagrammatic representation of the experimental setup used by SL Miller for his experiment.



- (i) Write the names of different gases contained and the conditions set for the reaction in the flask A.
- (ii) State the type of organic molecule he collected in the water at B.
- (iii) Write the conclusion he arrived at.

OR

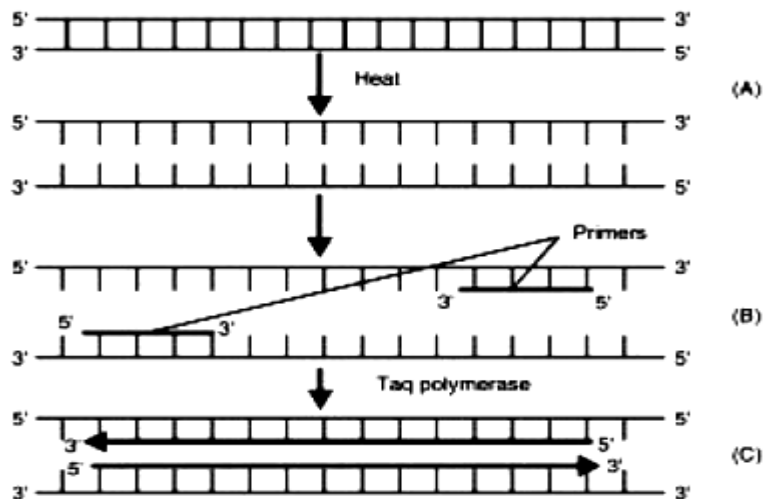
Give an example of a gene responsible for multiple phenotypic expressions. What are such genes called? State the cause that is responsible for such an effect.

32. The development of bioreactors is required to produce large quantities of products.

- Give optimum growth conditions used in bioreactors.
- Draw a well-labeled diagram of a simply stirred tank bioreactor.
- How does a simply stirred tank bioreactor differ from sparged stirred – tank’ bioreactor?

OR

In the given figure, one cycle of polymerase chain reaction (PCR)



Is shown.

- Name the steps A, B, and C.
 - Give the purpose of each of these steps.
 - State the contribution of the bacterium *Thermus Aquaticus* in this process.
33. The immune system of a person is suppressed. He was found positive for a pathogen in the diagnostic test ELISA.
- Name the disease, the patient is suffering from.
 - Which pathogen is identified by the ELISA test?
 - Which cells of the body are attacked by the pathogen? Suggest preventive measures of the infection.

OR

Given below is the Flow chart of Sewage treatment.(A) Fill in the blank spaces marked a to f.(B) Name the bacteria present in the anaerobic sludge digester. Why is the pond water contain more

BOD than river water ?

