

Please check that this question paper contains 33 Questions and has 07 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. Which of the following statements regarding the structure of microsporangium are correct?

- [i] It is generally surrounded by four wall layers- epidermis, endothecium, middle layers and tapetum.
 [ii] The outer three layers help in dehiscence of anther to release the pollen.
 [iii] The cells of tapetum undergo meiosis to produce microspore tetrad.

[a] [i] & [ii] [b] [i] & [iii] [c] [ii] & [iii] [d] all of these

2. Which one of the following is not a human male accessory gland?

[a] Acinar glands [b] Prostate gland [c] Bulbourethral gland [d] Seminal vesicle

3. All statements related to the adaptor molecule are correct except

- [i] Anticodon loop that has bases complementary to the codon.
 [ii] It has amino acid acceptor end to which it binds to amino acid
 [iii] There are three t-RNAs for three Stop codons.

[iv] In actual structure the t-RNA is a compact molecule which looks like a clover leaf.

[a] [i] & [ii] [b] [i] & [iii] [c] [ii] & [iii] [d] iii & iv

4. The wall of the uterus has three layers of tissue namely perimetrium [A] myometrium[B] and the endometrium [C]. Which layer is glandular & undergoes cyclical changes during menstrual cycle and which layer exhibits strong contraction during delivery of the baby respectively?

[a] B & C

[b] C & A

[c] A & C

[d] C & B 1

5. Nostoc, Oscillatoria are the examples for:

[i] Bacteria that can fix atmospheric nitrogen

[ii] cyano-bacteria that can fix atmospheric nitrogen

[iii] Protozoa that can fix atmospheric nitrogen

[iv] Fungi that can fix atmospheric nitrogen

6. Match the column I and II with correct options

Column I

Column II

A. Oral Pills

[i] prevent contraception by blocking the entry of sperms through the cervix.

B. Diaphragm

[ii] they inhibit ovulation and implantation as well as alter the quality of cervical mucus to prevent/retard entry of sperms

C. Vasectomy

[iii] make the uterus unsuitable for implantation and the cervix hostile to the sperms

D. LNG-20

[iv] Surgical method done in females

[v] Surgical method done in males

[a] A-ii [b] B-i [c] C-v [d] D-iii

[b] A-ii [b] B-i [c] C-iv [d] D-iii

[c] A-iii [b] B-ii [c] C-v [d] D-i

[d] A-ii [b] B-iii [c] C-iv [d] D-I

7. Read the given figure and answer the questions.



[i] A is Sporozoites and B is the salivary gland cell of Human being

[ii] A is Sporozoites and B is salivary glands of female Anopheles

[iii] A is filarial worms and B is the cells of thigh muscles

[iv] A is the filarial worm and B is salivary glands of female Anopheles 1

8. You are a biotechnologist, wanted to create a colony of E.coli possessing the plasmid pBR322, sensitive to ampicillin. Which one of the following restriction sites would he use to ligate a foreign DNA?

[a] Sal I

[b] Hind III

[c] Pvu I

[d] Cla I

9. Silencing of a gene could be achieved through the use of :
- [a] RNAi only [b] RNA only [c] both RNAi and RNA [d] both RNAi and antisense RNA
10. In the gene-gun method of gene transfer the cells are bombarded with high velocity micro-particles of _____ or _____ used (coated with DNA).
- [a] Gold or Silver [b] Gold or Tungsten [c] Gold or Platinum [d] Silver or Platinum
11. Assigning a '+' sign for beneficial interaction, '-' sign for detrimental and 0 for neutral interaction, then the population interaction represented by '+' sign and '-' sign refers to
- [a] Predation [b] Parasitism [c] Both predation and parasitism [d] Amensalism
12. How do you name 'the rate of formation of new organic matter by a Consumer such as goat?
- [a] Primary Productivity [b] Gross Primary productivity
- [c] Net Primary Productivity [d] Secondary Productivity

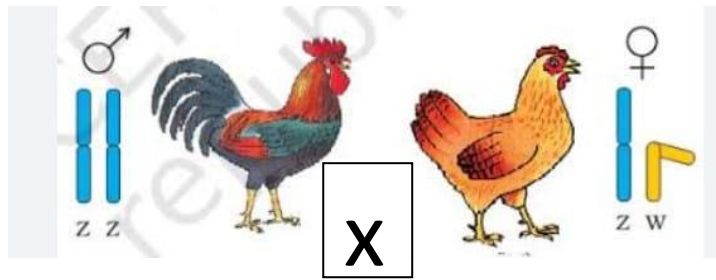
Question No. 13 to 16 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

- 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-The detritus food chain (DFC) begins with dead organic matter.
 Reason-- It is made up of saprotrophs which are heterotrophic organisms, mainly fungi and bacteria. They meet their energy and nutrient requirements by degrading dead organic matter
14. Assertion-DNA is chemically less reactive and structurally more stable when compared to RNA
 Reason-- DNA, however, is dependent on RNA for synthesis of proteins.
15. Assertion-When a host is exposed to antigens, which may be in the form of living or dead microbes or other proteins, antibodies are produced in the host body. This type of immunity is called active immunity
 Reason-Active immunity is faster and takes less time to give its full effective response.
16. Assertion- 'biodiversity hotspots' regions show low levels of species richness and low degree of endemism
 Reason-Endemic species are confined to particular region and not found anywhere else.

SECTION: B

17. Read the given sentences and write the correct technical terms for [a] [b] [c] & [d]
- “The gynoecium may consist of a single pistil [a] or may have more than one pistil[b].When there are more than one, the pistils may be fused together[c] or may be free [d].”

18. Explain the type of sex determination in given example.



19. Give the reason for the following:

- [a] biogas plants are more often built in rural areas.
- [b] the excreta (dung) of cattle is commonly used to produce biogas.

20. Why are transgenic animals being produced? Give any four reasons.

21. Pyramid of energy is always upright. Can never be inverted. Why? Draw the diagram.

OR

“There are certain limitations of ecological pyramids” Write any two of them.

SECTION: C

22. Answer the following:

- [a] What is triple fusion?
- [b] Draw the diagram to show fertilised embryo sac.

23. [a] What is placenta? How it is connected to the embryo?

- [b] Write the role of Placenta as an endocrine structure.

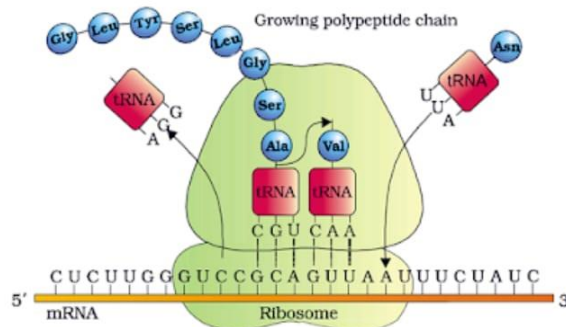
24. [a] Differentiate between α - thalassemia and β thalassemia

- [b] Differentiate between thalassemia and sickle cell anaemia

OR

[c] What is aneuploidy? Write the symptoms of Down’s syndrome

25. Read the given diagram and answer the following:



[a] What does the given diagram represent? Define it.

[b] Where does this process occur in an eukaryotic cell?

26. Answer the following:

[a] Name the two key concepts of Darwinian theory of Evolution.

[b] What do you mean by convergent evolution?

[c] Both Ramapithecus and Dryopithecus were hairy existed about 15mya walked like gorillas. Yet they differ each other in one aspect. Name it.

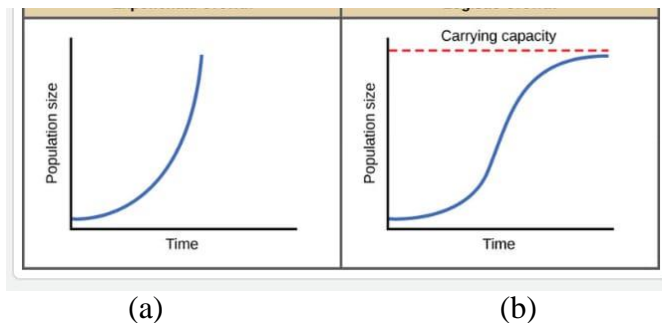
27. Write the role of:

[i] Primary Lymphoid organs such as Bone marrow and Thymus.

[ii] The Spleen

[iii] Lymph nodes.

28. In the given set of graphs which one (a) or (b) is the Logistic growth curve.



Write its equation. Why is it called so as 'realistic' growth curve.

SECTION: D

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

29. Domestic sewage primarily contains biodegradable organic matter, which readily decomposes –thanks to bacteria and other micro-organisms, which can multiply using these organic substances as substrates and hence utilise some of the components of sewage. It is possible to estimate the amount of biodegradable organic matter in sewage water by measuring Biochemical Oxygen Demand (BOD).

Based on this, an experiment was done. Three water samples namely river water, untreated sewage water and secondary effluent discharged from a sewage treatment plant were subjected to BOD test. The samples were labeled A, B and C; but the student did not note which was which. The BOD values of the three samples A, B and C were recorded as 20mg/L, 8mg/L and 400mg/L, respectively.

Answer the following:

[a] Treatment of waste water is done by the heterotrophic microbes naturally present in the sewage. This treatment is carried out in two stages: Name them.

[b] What is 'BOD' (biochemical oxygen demand)

[c] Based on this experiment which water water sample- A or B or C is the most polluted? How is BOD and pollution level of aquatic bodies related?

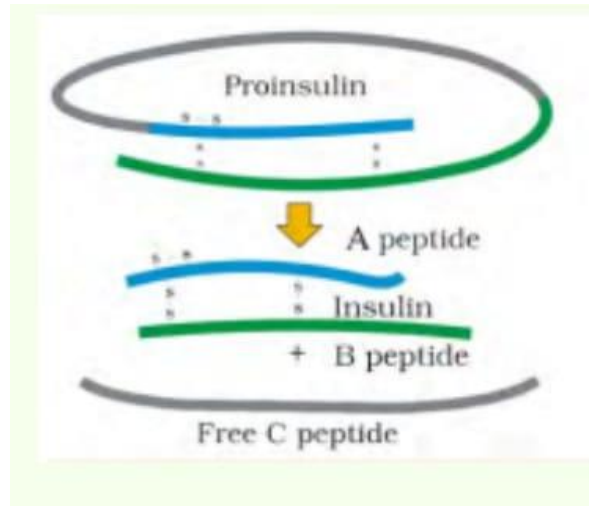
OR

[c] In anaerobic sludge digesters the anaerobic bacteria digest the other bacteria and fungi and produce bio gas. What is the composition of Biogas?

30. In mammals, including humans, insulin is synthesized as a pro-insulin. Insulin used for diabetes was earlier extracted from pancreas of slaughtered cattle and pigs. Insulin from an animal source, though caused some patients to develop allergy or other types of reactions to the foreign protein.

Now the American Company called Eli Lilly produces the human insulin using r-DNA technology.

Observe the given diagram showing Maturation of pro-insulin into insulin and answer the questions that follow.



[a] Differentiate 'Pro-insulin' and mature insulin?

[b] State the chemical changes that proinsulin under goes to become the mature functional insulin.

[c] What is the challenge in the production of insulin using r-DNA techniques?

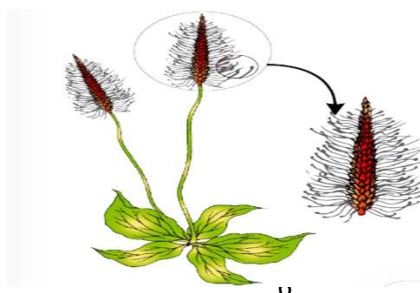
OR

[c] The two main types of cells in the Islet of Langerhans are called α -cells and β -cells. Which types of cell α -cells or β -cells secrete the insulin?

SECTION: E

31. [a] What is pollination? Mention its three types and state which type of pollination brings genetically different type of pollen grains to the stigma?

[b] Read the given flower and state the type of pollination occurs in it. Also write any three adaptive features it possesses to get pollinated.



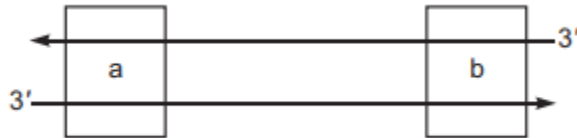
OR

[c] Continued self-pollination result in inbreeding depression. If so, how do flowering plants discourage self-pollination. Explain. 5

32. [a] “The unequivocal proof that DNA is the genetic material came from the experiments of Alfred Hershey and Martha Chase” Explain how did Hershey and Chase differentiate between DNA and protein in their experiment while proving that DNA is the genetic material.

OR

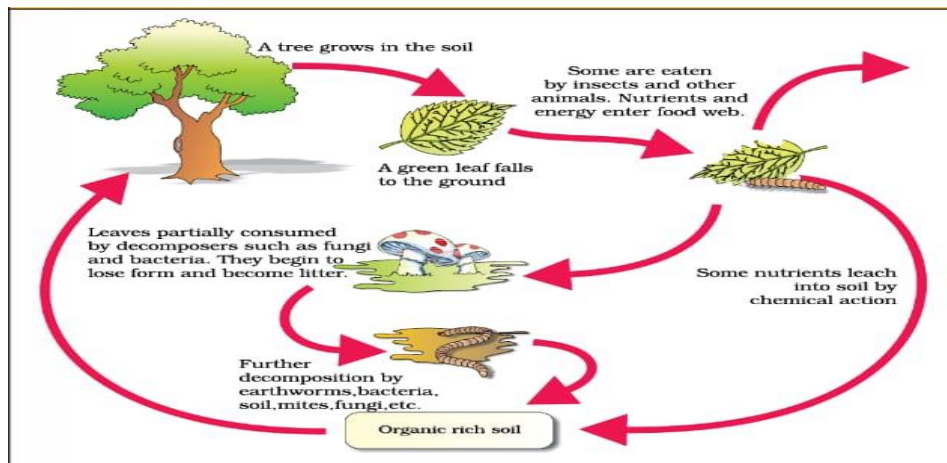
Read the given diagram and answer the given questions:



[b] Write the role of [a] and [b] in the given diagram

[c] What is cistron? [d] Why both the strands are not copied during transcription .

33. Given here is the schematic representation of decomposition cycle in a terrestrial ecosystem. What is ‘decomposition’? Why it is important for an ecosystem? Explain its steps.



OR

Reference to the ‘Biodiversity ’answer the given questions.

[i] Name the socio biologist who have popularized the term ‘Biodiversity’

[ii] Explain ‘latitudinal gradient in diversity’ with suitable example.

[iii] Explain ‘Rivet-popper hypothesis.

