No. of printed pages:5

INDIAN SCHOOL SOHAR

TERM – I EXAMINATION 2024-2025

BIOLOGY (044)

Date: 01/10/2024 **Time:3 Hours.**

Class: XII **Max.Marks:70**

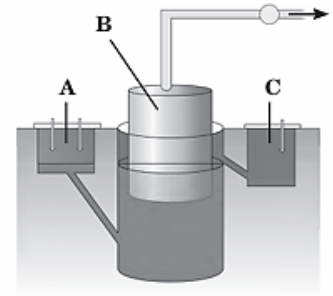
General Instructions:

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

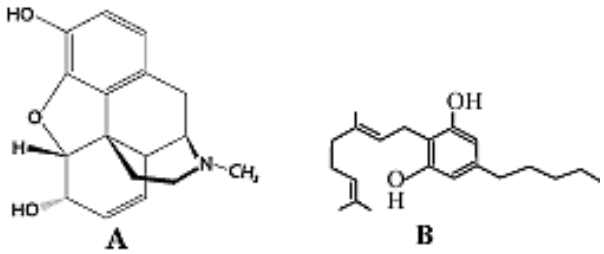
1. Passive immunity is defined as immunity, **1**
   a) inherited from the parents.
   b) achieved through vaccination.
   c) acquired through first exposure to the diseases.
   d) achieved through the sera of other animals enriched in antibodies.
2. A dioecious flowering plant prevents both, **1**
   a) autogamy and xenogamy.
   b) autogamy and geitonogamy.
   c) geitonogamy and xenogamy.
   d) cleistogamy an xenogamy.
3. A person with trisomy of 21st chromosome shows, **1**
   i) Furrowed tongue.
   ii) Characteristic palm crease.
   iii) Rudimentary ovaries.
   iv) Gynecomastia.
   Select the correct option, from the choices given below:
   a) (ii) and (iv)
   b) (i), (ii) and (iv)
   c) (ii) and (iii)
   d) (i) and (ii)
4. Identify the mismatched pair with regard to transcription in eukaryotic cells. **1**
   a) RNA polymerase I – 28S rRNA and 18S rRNA.
   b) RNA polymerase II – sn RNA and hn RNA.
   c) RNA polymerase II – hn RNA.
   d) RNA polymerase III – sn RNA and 5S rRNA.
5. Which of the following hormone acts on uterine muscle and causes its stronger contraction? **1**
   a) Relaxin
   b) Estrogen
   c) Oxytocin
   d) Progesterone

6. The given figure represents a typical biogas plant. Select the correct option given below. **1**



a) A is the inlet for cattle dung.
b) C is the outlet for the release of biogas.
c) B is the chamber which contains leftover slurry.
d) All of these.

7. Identify the molecules **A** and **B** shown below and select the right option, giving their source and use. **1**



	Molecule	**Source**	**Use**
a)	A-Cocaine	*Erythroxylum coca*	Accelerates the transport of dopamine.
b)	B - Heroin	*Cannabis sativa*	Depressant and slows down body functions.
c)	B-Cannabinoid	*Atropa belladonna*	Produces hallucinations.
d)	A - Morphine	*Papaver somniferum*	Sedative and pain killer.

8. Which of the following is incorrect regarding vasectomy? **1**
a) no sperm occurs in seminal fluid.
b) no sperm occurs in epididymis.
c) vasa deferens is cut and tied.
d) irreversible sterility.

9. The function of copper ions in copper releasing IUDs is, **1**
a) they inhibit gametogenesis.
b) they make uterus unsuitable for implantation.
c) they inhibit ovulation.
d) they suppress sperm motility and fertilizing capacity of sperms.

10. Okazaki fragments are seen during,
a) transcription.
b) translation.
c) replication.
d) transduction.

11. The common nitrogen fixer in paddy fields is, **1**
a) *Rhizobium*
b) *Azospirillum*
c) *Oscillatoria*
d) *Frankia*

12. Given below is a list of steps Meselson and Stahl carried out in their experiment to prove that DNA replication is semi-conservative. Select the option that gives the correct sequence of steps followed by them. **1**

i) Bacteria transferred to a N^{14} medium and sampled every 20 minutes.
ii) All bacteria contain hybrid DNA (N^{14} DNA and N^{15} DNA).
iii) Bacteria grown in N^{15} medium for many generations.
iv) All bacteria contain N^{15} DNA.
v) Bacteria contain either all N^{14} DNA or all hybrid DNA.

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

Each of these questions contains an Assertion following by Reason. Read them carefully and answer the question on the basis of following options. You have to select the one that best describes the two statements.

a) Assertion and reason both are true and reason is correct explanation for assertion.
b) Assertion and reason both are true but reason is not correct explanation for assertion.
c) Assertion is true statement but reason is wrong statement.
d) Assertion is wrong statement but reason is true statement.

13. Assertion: DNA is considered to be a better genetic material than RNA for most organisms. **1**
Reason: 2'–OH group present in DNA makes it less reactive.

14. Assertion: In case of incomplete linkage, linked gene show new combination along with parental combination. **1**
Reason: In case of incomplete linkage, linked genes are separated by crossing over.

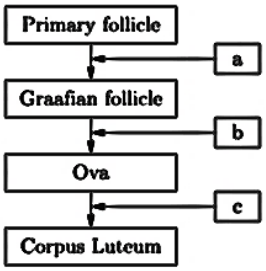
15. Assertion: Organ transplantation patients are given immunosuppressive drugs. **1**
Reason: Transplanted tissue has antigens which stimulate the specific immune response of the recipient.

16. Assertion: Integrated Pest Management (IPM) uses different pest control methods which are ecofriendly. **1**
Reason: *Bacillus thuringiensis* kill larvae of certain insects.

Section - B

17. Explain, giving two reasons, how the immune response by 'vaccine' is different from that by 'antitoxin' in humans. **2**

18. a) In humans, how is polyspermy prevented? **2**
b) Given below is a flow chart showing ovarian changes during the menstrual cycle. Fill in the space, giving the name of the hormones responsible for the event shown.



19. a) Construct a complete transcription unit with promotor and terminator on the basis of the hypothetical coding strand given below; **2**



b) Write the RNA strand transcribed from the above transcription unit along with its polarity.
c) Give the sequence of bases AUG is transcribed from and its anticodon.

20. a) Explain how plants benefitted from their association with "Glomus species." **2**

b) What will happen if the flocs are absent in biological treatment in sewage treatment plants?

21 In a dihybrid cross of white eyed, yellow bodied female Drosophila crossed with red eyed, brown bodied male Drosophila produced in the F2 generation, 1.3 percent recombinants and 98.7 percent progeny with parental type combinations. This observation of Morgan deviated from the Mendelian F2 phenotypic dihybrid ratio. Explain, giving reasons, Morgan's observations. **2**

Section - C

22. a) A patient had suffered myocardial infarction, and clots were found in his blood vessels. Name a 'clot buster' that can be used to dissolve the clots and the microorganism from which it is obtained. **3**

b) A woman had just undergone a kidney transplant. A bioactive molecular drug is administered to oppose kidney rejection by the body. What is the bioactive molecule? Name the microbe from which this is extracted.

c) What do doctors prescribe to lower the blood cholesterol level in patients with high blood cholesterol? Name the source organism from which this drug can be obtained.

23. a) When the relative frequency of the different phenotypes of a cross is plotted graphically, a bell-shaped curve results. Mention any four characteristics of such a pattern of inheritance. **3**

b) Why do the males suffer more from haemophilia than females?

24. a) Why does DNA replication occur within a replication fork and not in its entire length simultaneously? b) "DNA replication is continuous and discontinuous on the two strands within the replication fork." **3**

Explain with the help of a schematic representation.

25. Draw and explain the mechanism of sex determination in birds. **3**

26. a) Why is ZIFT a boon to childless couples? Explain the procedure. **3**

b) Removal of gonads cannot be considered a contraceptive option. Why?

27. a) Why is *Gambusia* introduced into drains and ponds? **3**

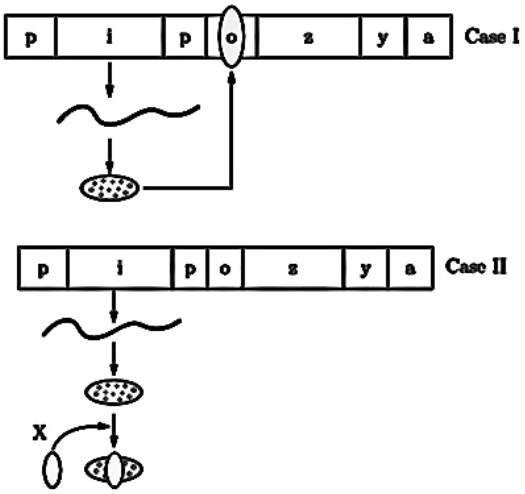
b) Doctors generally advise not to undergo surgery for tonsils. Why?

c) Give the scientific name of one bacterium and one parasite, which mainly attack a person suffering from AIDS.

28 Why are colorblindness and thalassemia categorized as Mendelian disorders? Write the symptoms of these diseases seen in people suffering from them. **3**

Section – D case – based questions

29. From a number of studies on the metabolism of the bacterium *Escherichia coli*, two French scientists, Jacob and Monod in 1961, found that the genetic material possesses regulated gene units called operons. Study the given below operon system operating in *E.coli* and answer the questions that follow: **4**



a) On the basis of the given operon system, what conclusion can you draw about case I and case II? What would happen in the presence of X in case II?

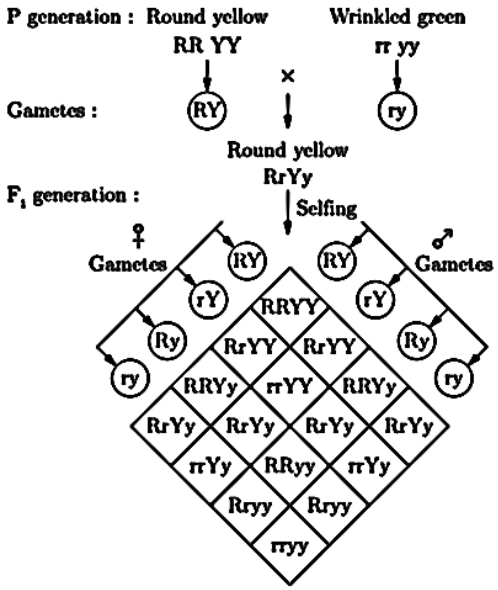
b) It is said that the lac operon has to be operational at a very low level in the bacterial cell all the time. Justify.

c) What type of regulation can be seen in the given operon system by the repressor? Which structural gene codes for permease in both the cases, and what is its function?

OR

c) Why is lac operon said to be a transcriptionally regulated system?

30. A geneticist crosses round yellow seeded pea plant to wrinkled green seeded pea plant and observed the inheritance of both traits as per the following pattern. He collected total 1600 seeds in F2 generation. **4**



a) What would be the total number of seeds that are homogenous for yellow colour and heterogenous for round seed shape? How many seeds would be homogenous for wrinkled yellow and wrinkled green?

b) Schematically represent what phenotypic ratio would be obtained if the plants of F1 generation would be crossed with homogenous wrinkled green seeded plant?

c) With the help of a Punnett Square, find the percentage of heterozygous individuals in a F2 population of a cross involving a true-breeding pea plant with green pods and a true-breeding pea plant with yellow pods, respectively.

OR

c) Write the conclusions Mendel arrived at on dominance of traits on the basis of monohybrid crosses that he carried out in pea plants.

Section - E

31. a) How are seeds advantageous to flowering plants? **5**

OR

Explain the role of stigma in pollen - pistil interactions. Describe the post - pollination events leading to double fertilization in angiosperms, starting with a two - celled pollen grain.

32. What is innate immunity? How is it accomplished in a human body? **5**

OR

Trace the stage of Plasmodium in the body of female Anopheles after its entry.
How do macrophages in the human body act as 'HIV Factory'?

33. Draw and explain post transcriptional modifications of a eukaryotic mRNA. **5**

OR

Provide the requirements a molecule must meet in order to act as genetic material. Which criteria does DNA or RNA better satisfy, establishing one as superior genetic material over the other? Please provide clarification.