B.K. BIRLA CENTRE FOR EDUCATION

SARALA BIRLA GROUP OF SCHOOLS
A CBSE DAY-CUM-BOYS' RESIDENTIAL SCHOOL

PRE-BOARD-II EXAMINATION 2025-26
BIOLOGY (044)
SET-II

Class: XII | Duration: 3 Hours
Date: 09/12/2025 | Max. Marks:70
Admission no: | Roll no:

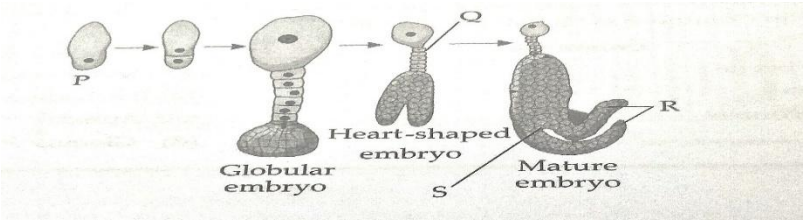
General Instructions:

(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. Answer all 33 questions. 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

Q. No. 1 to 12 are multiple choice questions. Only one of the choices is correct. Select and write the correct choice as well as the answer to these questions.

Q.n	Question	
1.	In humans, non-disjunction of the 21st pair of chromosome leads to: A. Acquired immune deficiency syndrome B. Klinefelter's syndrome C. Turner's syndrome D. Down's syndrome	1
2.	In a pea plant (Pisum sativum), green pod colour is dominant over yellow pod colour. The expected ratio of the phenotypes of the offsprings (F1) in a cross between parents with heterozygous green pod colour and homozygous yellow pod will be : A. 1 : 1 B. 2 : 1 C. 3 : 1 D. 4 : 1	1
3.	Crystals of Bt toxin produced by some bacteria, do not kill the bacteria producing them because: A. Bacteria are resistant to the toxin B. Toxin is inactive C. Bacteria encloses 'toxin' in a special capsule. D. None of these	1
4.	In eukaryotes, the removal of introns and joining of exons during mRNA processing is called: A. Splicing B. Transcription C. Translation D. Capping	1
5.	In *E.coli*, the lac operon gets switched on when lactose is A. present in the medium and it binds to the repressor. B. not present in the medium and the repressor binds to the operator. C. not present in the medium and RNA polymerase binds to the operator. D. active lactose present in the medium binds to RNA polymerase.	1
6.	The diagram given below shows labelling of four parts of a dicot embryo during its development as P, Q, R and S.	1



Choose the option that indicates correct labelling of 'P', 'Q', 'R' and 'S' of embryo in different stages of its development:

	P	Q	R	S
A.	Egg	Suspensor	Radicle	Cotyledon
B.	Zygote	Suspensor	Cotyledon	Plumule
C.	Egg	Radicle	Suspensor	Cotyledon
D.	Zygote	Suspensor	Cotyledon	Radicle

7. Given below are few statements with reference to the major events in the menstrual cycle of a human female : 1
(i) During the follicular phase, the primary follicles grow to become a Graafian follicle.
(ii) Gonadotropins FSH and progesterone stimulate follicular development during the follicular phase.
(iii) LH surge induces rupture of Graafian follicle thereby releasing the corpus luteum.
(iv) Progesterone released by corpus luteum is essential for maintenance of endometrium.
(v) Both LH and progesterone attain a peak level in the middle of the cycle.
Choose the option with all true statements from the given options :
A. (i), (ii) and (iv) B. (ii), (iii) and (v)
C. (ii), (iv) and (v) D. (i), (iii) and (iv)

8. How many pollen grains and ovules are likely to be formed in the anther and the ovary of an angiosperm bearing 70 microspore mother cells and 40 megaspore mother cells respectively? 1
A. 100, 25 B. 280, 40 C. 70, 40 D. 200, 100

9. In a double helical structure of DNA molecule, the strands are: 1
A. identical and complementary B. identical and non-complementary
C. anti-parallel and complementary D. anti-parallel and non-complementary

10. Which one of the following codons has dual function? 1
A. AUG B. AUC C. ACU D. ACA

11. The large bean-shaped organ acting as a filter of the blood in humans is : 1
A. Liver B. Thymus C. Spleen D. Heart

12. Industrial production of which of these products can be negatively affected by the presence of *Saccharomyces cerevisiae*? 1
A. Beer B. Wine C. Fruit juice D. Wheat bread

Question No. 13 to 16 consist of two statements-Assertion (A) and Reason (R). Answer these questions by 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 (A): Cells of tapetum have more than one nucleus. 1
Reason (R): They undergo meiosis without cytokinesis.

14. Assertion (A): Elimination of a competitively inferior species in a closely related or otherwise similar group is known as competitive exclusion principle. 1
Reason (R): If two species compete for the same resource, they could avoid competition by choosing different times for feeding or different foraging patterns.

15. Assertion (A): Antihistamines are effective in treating allergy symptoms. 1
Reason (R): Allergies occur due to excessive secretion of histamines in response to allergens.

16. Assertion (A): Golden rice is a genetically modified crop that contains high iron content. 1
Reason (R): Golden rice is enriched with beta-carotene to address vitamin A deficiency.

SECTION-B

17. Attempt either option A or B. 2

A. Explain how the interaction between a fig tree and its tight one-to-one relationship with the pollinator species of wasp is one of the best examples of mutualism.

OR

B. Correctly depict (also indicate the trophic level) and describe the ecological pyramid of number with 32 birds dependent on 20 insects feeding on one banyan tree.

18. List four points (criteria) that a molecule must fulfill to act as a genetic material. 2

19. Give an account of the generalised structure of an antibody molecule produced by B-lymphocytes in response to the pathogen. 2

20. Attempt either option A or B. 2

A. 'Curd is easier to digest by humans than milk'. Justify giving suitable reasons.

OR

B. A culture plate of Lactobacillus shows blue-colored colonies and colorless colonies. Explain the principle involved in the formation of such variance in the color of colonies.

21. Attempt either option A or B. 2

A. From which end of the ovule, and how does the pollen tube gain its entry into the embryo sac of a hibiscus flower?

OR

B. State the fate of the male nuclei present in the pollen tube.

SECTION-C

22. Explain the neuroendocrine mechanism involved in the process of parturition in a human female leading to the expulsion of the baby out of the uterus through the birth canal. 3

23. (i)Why is "in vitro fertilization" (IVF) so named? State its importance. 3
(ii)Distinguish between GIFT and ZIFT.

24. Name one commonly occurring genetic disorder in humans which is caused due to monosomy (one chromosome less than the normal number of chromosomes) of sex chromosome. Give its two symptoms. 3

25. (i) State Oparin and Haldane hypothesis. 3
(ii) How did S.L. Miller prove their hypothesis experimentally? Explain.

26. What are transgenic animals? Mention any two uses of such animals in biotechnology. 3

27. A cancer patient is prescribed cyclosporin A after a kidney transplant. 3
(i) Name the microbe that produces cyclosporin A.
(ii) What is its biological role in transplant patients?
(iii) Why is *Aspergillus niger* widely used in industries?

28. Explain how the loss of habitat and fragmentation drives plants and animals to extinction with the help of an example of habitat loss in the tropical rain forest. Also write the effect of fragmentation of a habitat on the population decline. 3

SECTION-D

29. Given below is a set of information about some fruits and seeds. 4

Fruit	Fruit and seed information
P	Nucellar cells surrounding the embryo sac develop into embryos.
Q	Ovary develops into the fruit by the application of growth hormones.
R	Thalamus contributes to fruit formation.
S	Ovary matures into a fruit after fertilisation.

On the basis of the information provided above, answer the following questions with justification for each answer.

A. How many embryo sacs will be present in each ovule of S before maturation and how many egg(s) will be present in each embryo sac when the embryo sac is developed from a single megaspore?

B. (i) Which of these fruits exhibits polyembryony? Will there embryos exhibit genetic variation? Justify.

(ii) What will be the ploidy of the embryonic cells in the above case ?

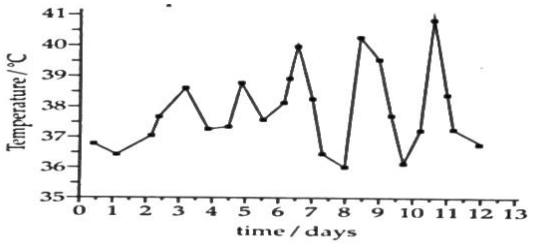
Attempt either subpart C or D.

C. Which of these fruits can be considered as parthenocarpic? Give a reason.

OR

D. Which of the fruits P, Q, R and S is a true fruit with seeds? Give reason.

30. Given below is the pattern of temperature in a person suffering from a non-viral disease transmitted by mosquitoes. Study the graph and answer the questions that follow: 4



A. Explain the factor(s) responsible for this pattern of temperature.

B. How does this pathogen multiply in the human body?

C. How is this infection transmitted to humans?

D. Which stages of the life cycle of this pathogen are completed in the mosquito's gut?

SECTION-E

31. A. (i) Describe the population growth curve applicable in a population of any species in nature that has unlimited resources at its disposal. 5

(ii) Explain the equation of this growth curve.

(iii) Name the growth curve and depict a graphical plot for this type of population growth.

OR

B. (i) Explain the conclusion drawn by Alexander von Humboldt during his extensive explorations in the wilderness of South American jungles.

(ii) Give the equation of the Species-Area relationship.

(iii) Draw a graphical representation of the relation between species richness and area for a wide variety of taxa such as birds, bats, etc.

32. A. Illustrated below is a DNA segment, which constitute a gene. 5

(i) Will the whole gene be transcribed into RNA primarily? State 'Yes' or 'No'.

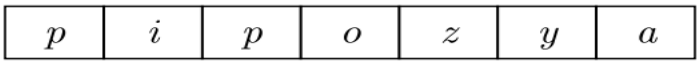
(ii) Name the shaded and unshaded parts of ~~the~~ gene.

(iii) Explain how these genes are expressed.

(iv) How is this gene different from prokaryotic gene in its expression?

OR

B. Study the schematic representation of the genes involved in the lac operon given below and answer the questions that follow:



(i) Identify and name the regulatory gene in this operon. Explain its role in 'switching off ' the operon.

(ii) Why is the lac operon's regulation referred to as negative regulation?

(iii) Name the inducer molecule and the products of the genes 'z' and 'y' of the operon.Write the functions of these gene products.

33. A. (i) Explain the principle of polymerase chain reaction (PCR) and its applications in the field of biotechnology. 5

(ii) Describe the structure of mature human insulin. State one advantage of using recombinant insulin over animal insulin.

OR

B. (i) Define gene therapy and mention one disease where it has been successfully attempted.

(ii) Suggest two ways to protect indigenous knowledge and biological resources.

**********ALL THE BEST**********