COMMON PRE-BOARD EXAMINATION

BIOLOGY-Code No. 044

Class-XII-(2025-26)

SET: 1

Time allowed: 3 Hrs. **Maximum Marks: 80**

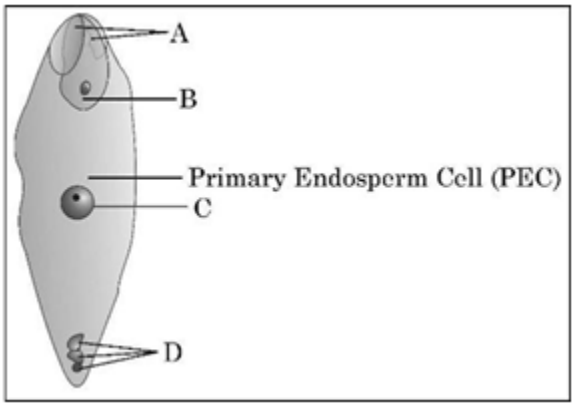
General Instructions:

Read the following instructions very carefully and follow them:

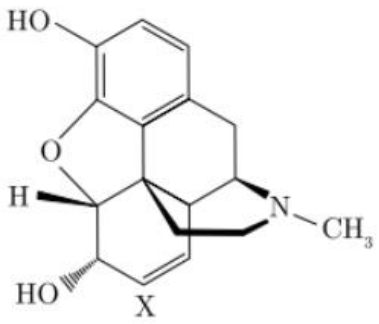
(i) All questions are compulsory.
(ii) The question paper has five sections and 33 questions.
(iii) Section–A has 16 questions of 1 mark each; Section–B has 5 questions of 2 marks each; Section– C has 7 questions of 3 marks each; Section– D has 2 case-based questions of 4 marks each; and Section–E has 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 labelled diagrams should be drawn.

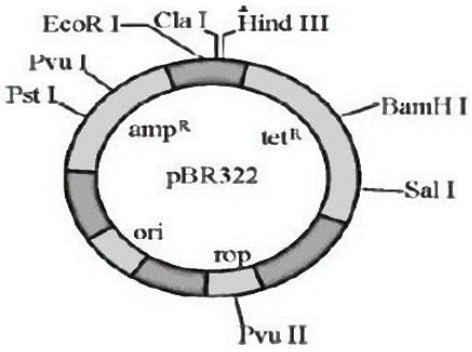
Section – A

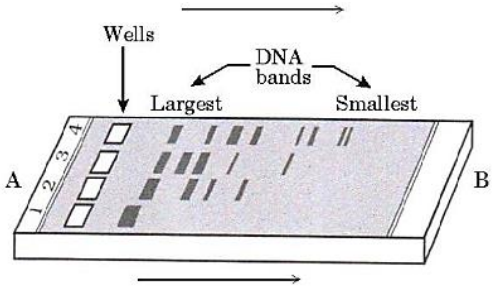
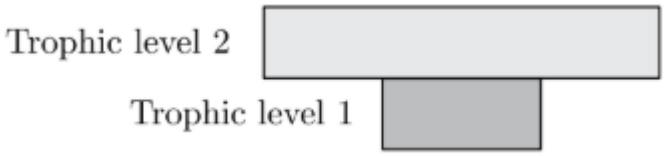
Q. Nos. 1 to 12 are multiple-choice questions. Only one of the choices is correct. Select and write the correct choice as well as the answer to these questions.

Q. No.	Questions	Marks
1	Identify the correct labelling in the figure of a fertilised embryo sac of an angiosperm given below.  A. A–zygote, B–degenerating synergids, C–degenerating antipodals, D–PEN. B. A–degenerating synergids, B–zygote, C–PEN, D–degenerating antipodals. C. A–degenerating antipodals, B–PEN, C–degenerating synergids, D–zygote D. A–degenerating synergids, B–zygote, C–degenerating antipodals, D–PEN	1
2	From among the situations given below, choose the one that prevents both autogamy and geitonogamy. A. Monoecious plant bearing unisexual flowers	1

	B. Dioecious plant bearing only male or female flowers C. Monoecious plant with bisexual flowers D. Dioecious plant with bisexual flowers	
3	The primary endosperm nucleus (PEN) is formed by the fusion of A. 2 polar nuclei + 1 synergid cell nucleus B. 1 polar nucleus + 1 antipodal cell nucleus + 1 synergid cell nucleus C. 2 polar nuclei + 1 male gamete nucleus D. 2 antipodal cell nuclei + 1 male gamete nucleus.	1
4	The second meiotic division in the secondary oocyte results in the formation of A. first polar body and a diploid ovum. B. first polar body and a haploid ovum. C. second polar body and a diploid ovum D. second polar body and a haploid ovum.	1
5	In human beings, where genotype AABBCC represents dark skin colour, aabbcc represents light skin colour and AaBbCc represents intermediate skin colour; the pattern of genetic inheritance can be termed as: A. Pleiotropy and co-dominance B. Polygenic and qualitative inheritance C. Pleiotropy and incomplete dominance D. Polygenic and quantitative inheritance	1
6	Match column I with column II and select the correct option from the given codes. **Column I** / **Column II** A. Turner's Syndrome — (i) XX-XO B. Linkage — (ii) AA+XO C. Birds — (iii) Morgan D. Grass hopper — (iv) ZZ-ZW A. A- (ii), B- (iii), C- (i), D- (iv) B. A- (ii), B- (iii), C- (iv), D- (i) C. A- (iii), B- (iv), C- (i), D- (i) D. A- (iv), B- (iii), C- (ii), D- (i)	1
7	In sea urchin DNA, which is double-stranded, 17% of the bases were shown to be cytosine. The percentages of the other three bases expected to be present in this DNA are: A. G 17%, A 16.5%, T 32.5% B. G 17%, A 33%, T 33% C. G 8.5%, A 50%, T 24.5% D. G 34%, A 24.5%, T 24.5%	1
8	The promoter site and the terminator site for transcription are located at: A. 3′ (downstream) end and 5′ (upstream) end, respectively of the transcription unit B. 5′ (upstream) end and 3′ (downstream) end, respectively of the transcription unit C. 5′ (upstream) end D. 3′ (downstream) end	1

9	Hugo de Vries gave his mutation theory on organic evolution while working on A. Pisum sativum B. Drosophila melanogaster C. Oenothera lamarckiana D. Althea rosea	1
10	The eyes of an Octopus and the eyes of a cat show different patterns of structure, yet they perform similar functions. This is an example of A. homologous organs that have evolved due to convergent evolution B. homologous organs that have evolved due to divergent evolution C. analogous organs that have evolved due to convergent evolution D. analogous organs that have evolved due to divergent evolution	1
11	The foetus gets immunised after receiving antibodies from the mother through the placenta. This type of immunisation is called: A. active immunity B. innate immunity C. passive immunity D. humoral immunity	1
12	 Identify the drug from the chemical structure. A. Morphine B. Cannabinoid C. Coca alkaloid D. Cocaine	1
	Questions No.13 to 16 consist of two statements- Assertion (A) and reason (R). Answer these questions selecting the appropriate options 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):** E. coli having pBR322 with DNA insert at the BamHI site cannot grow in medium containing tetracycline. **Reason (R):** Recognition site for Bam HI is present in tetR region of pBR322.	1

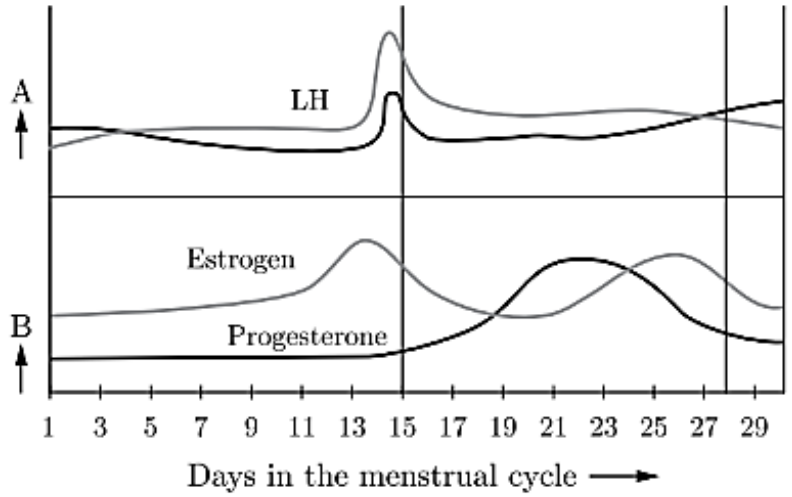
14	**Assertion (A):** Rosie was the first transgenic cow to make more nutritionally balanced milk for consumption by human babies. **Reason (R):** The milk of Rosie cow contained α-1-antitrypsin, which made the milk rich in protein.	1
15	**Assertion (A):** GEAC will decide the safety of introducing GM organism for public use. **Reason (R):** Genetic modifications of organisms may have opposite results when introduced into the ecosystem.	1
16	**Assertion (A):** Wings of birds and bats are different in origin but have similar function. **Reason (R):** Wings of birds and bats are examples of homologous structure.	1
	Section – B	
17	**Attempt either option A or B.** A. Trace the development of an endosperm after fertilisation with reference to the coconut. Mention the importance of endosperm development. **OR** B. Where are the following structures present in a male gametophyte of an angiosperm? Mention the function of each one of them. (i) Germ pore (ii) Generative cells	2
18	Study the schematic representation of the genes involved in the lac operon given below and answer the questions that follow: p i p o z y a Name the products of the genes 'z' and 'y' of the operon. Write the functions of these gene products.	2
19	A young boy when brought a pet dog home started to complain of watery eyes and a running nose. The symptoms disappeared when the boy was kept away from the pet. (i) Name the type of antibody and the chemicals responsible for such a response in the boy. (ii) Mention the name of any one drug that could be given to the boy for immediate relief from such a response.	2
20	**Attempt either option A or B.** A. Observe the diagram shown below of pBR 322. Answer the questions that follow: 	2

	(i) What is pBR322? (ii) Write the role of 'rop'. (iii) State the significance of 'ampR' and 'tetR'. **OR** B. Given below is the diagram representing the observations made for separating DNA fragments by the Gel electrophoresis technique. Observe the illustration and answer the questions that follow:  (i) Why are the DNA fragments seen to be moving in the direction A to B? (ii) How can the separated DNA fragments be visualised for further technical use?	
21	**<u>Attempt either option A or B.</u>** A. Given below is a pyramid of biomass in an ecosystem where each bar represents the standing crop available in the trophic level.  (i) With the help of an example, explain the conditions where this kind of pyramid is possible in nature. (ii) Will the pyramid of energy also be of the same shape in this situation? Give a reason for your response. **OR** B. During a class tour to a botanical garden, Mamta saw that many plant species were present there, which are no more found in the wild. She asked her teacher about how these rare species are cultivated and protected in such areas. (i) Which mode of biodiversity conservation is represented by Botanical gardens and zoos? (ii) How is the 'Sixth extinction, presently in progress, different from the previous episodes?	2

Section – C

22 (3)

In the figure given below, parts A and B show the levels of hormones which influence the menstrual cycle. Study the figure and answer the questions that follow:



(i) Name the organs which secrete the hormones represented in parts A and B.

(ii) State the impact of the hormones in part B on the uterus of the human female during 6 to 15 days of the menstrual cycle.

(iii) What happens to the corpus luteum in human female if the ovum is (a) fertilised, (b) not fertilised?

23 (3)

A large no. of married couples the world over are childless. It is shocking to know that in India, the females are blamed for the couple being childless.

(i) State any 2 reasons responsible for infertility.

(ii) Suggest any two techniques that can help the couple to have a child where the problem is with the male partner.

24 (3)

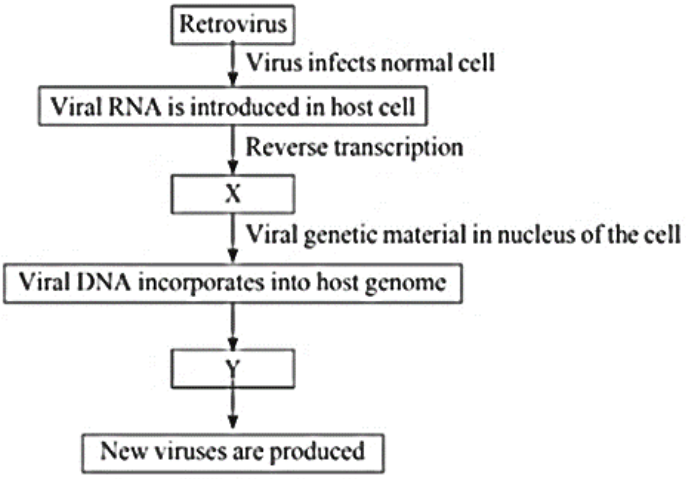
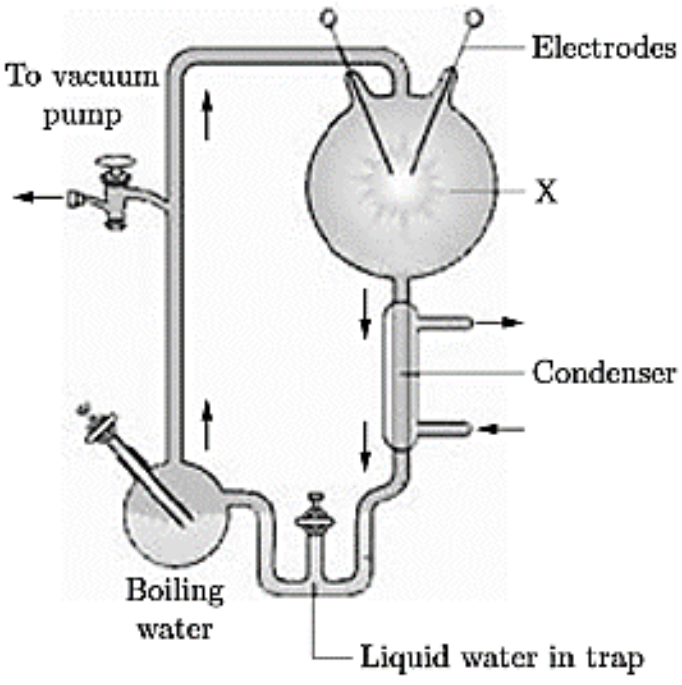
Study the two cases carefully regarding the pattern of inheritance of the disease.

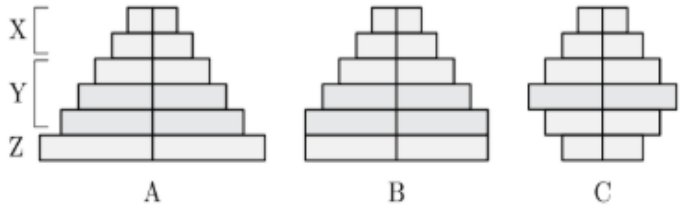
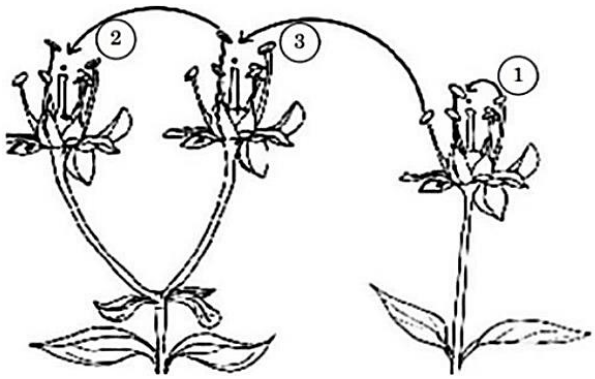
Case	Mother	Father	Children
Case I	With disease	Normal	Son is always with a disease
Case II	With disease	Normal	Sons and daughters could show the disease

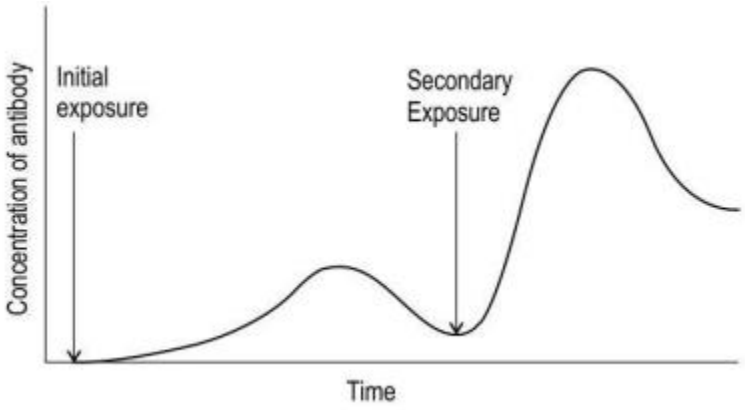
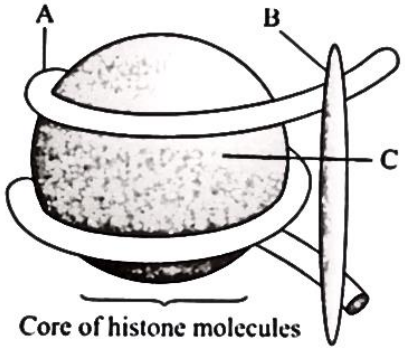
(i) Give one example each for case I and case II type diseases.

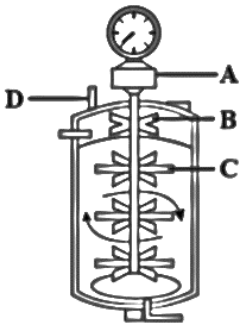
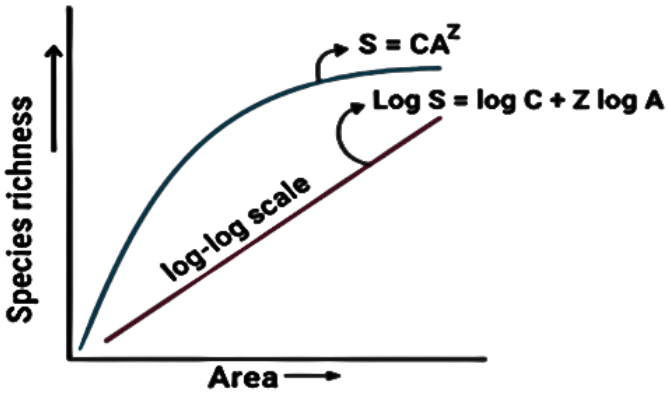
(ii) The possibility of a human female suffering from haemophilia is rare. Why is it so?

(iii) A normal visioned woman, whose father is colourblind, marries a normal visioned man. What would be the probability of her sons to be colourblind. Explain with the help of a pedigree chart.

25	What is hnRNA? Explain the changes hnRNA undergoes during its processing to form mRNA.	3
26	In the given flow chart, the replication of retrovirus in a host cell is shown. Study the flow chart and answer the following questions.  (i) Identify X and Y. (ii) Which specific type of cell in the human immune system is the very first to be targeted and infected when a person is exposed to HIV infection? (iii) Give any two modes by which HIV can be transmitted from an infected person to a healthy person. (iv) Explain the role of Reverse transcriptase.	3
27	Consider the following diagram  	3

	(i) State the hypothesis which S.L. Miller tried to prove in the laboratory with the help of the set-up given above. (ii) Name the organic compound x observed by him in the liquid water at the end of this experiment. (iii) List any two factors that can disturb the Hardey- Weinberg equilibrium.	
28	The given figure shows the different types of age pyramids for the human population.  (i) What do the parts 'X' and 'Z' represent? (ii) Which type of population is represented by pyramids A and B? (iii) Differentiate between A and C.	3
	Section – D	
29	Study the diagram given below showing the modes of pollination. Answer the questions that follow.  A. Identify the technical terms used for each of the pollen transfer methods labelled as 1 and 2. (1) B. Explain how the following plants accomplish successful pollination: (i) Water lily (ii) Vallisneria (2) **Attempt either subpart C or D.** C. Flowering plants have evolved various mechanisms to prevent inbreeding depression. Describe one physiological mechanism that helps the plants to achieve this goal. (1) **OR** D. Write any two characteristic features of insect pollinated flowers? (1)	4

30	The graph given below shows the levels of antibodies against a pathogen over a period of 30 years in a person's body.  A. What do the two peaks mean? (1) B. Explain the reason behind the difference in the size of the two peaks. (2) **<u>Attempt either subpart C or D.</u>** C. Name the lymphocytes that help in immune response in the human body. (1) **OR** D. Name the type of antibody produced in response to allergens. (1)	4
	Section – E	
31	(i) Explain the mechanism of DNA replication with the help of a replication fork. (ii) Why is tRNA called an adaptor molecule? (iii) Write any two features of a genetic codon. **OR** (i) The given figure shows the structure of a nucleosome, Label A, B & C.  (ii) Draw a neatly labelled structure of a transcription unit. (iii) Explain the dual function of the AUG codon.	5
32	(i) How is Agrobacterium tumefaciens able to transform a normal plant cell into a tumour.	5

	(ii) What is a DNA probe? Give its application in Biotechnology. (iii) How does EcoRI specifically act on a DNA molecule? Explain. **OR** (i) Observe the sketch of the stirred-tank bioreactor and label the parts A, B, C and D.  (ii) β-Galactosidase enzyme is considered a better selectable marker. Justify the statement. (iii) Name the source of the DNA polymerase in PCR. Mention why it is used?	
33	(i) Name the two growth models that represent population growth and draw the respective growth curves they represent. (ii) Mention any two special adaptations evolved in parasites. (iii) State Gause's competitive exclusion principle. **OR** The following graph shows the species area relationship. Answers the Questions as directed.  (i) Name the naturalist who studied the kind of relationship shown in the graph. Write the observations made by him. (ii) Write the situations as discovered by the ecologists when the value of 'Z' lies between (i) 0.1 and 0.2, (ii) 0.6 and 1.2 (iii) What does 'Z' stand for? (iv) What did David Tilman's experiments show about the relationship between biodiversity and ecosystem productivity? (Give 2 points).	5

****