KENDRIYA VIDYALAYA SANGATHAN, BHOPAL REGION
Pre-board question paper, 2025-26
BIOLOGY- class XII

Maximum Marks: 70 **Time: 3 hours**

General Instructions:

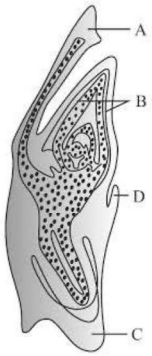
(i) All questions are compulsory.
(ii) The question paper has five sections and 33 questions.
(iii) Section–A has 16 questions of 1 mark each; Section–B has 5 questions of 2 marks each; Section– C has 7 questions of 3 marks each; Section– D has 2 case-based questions of 4 marks each; and Section–E has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

1. Select the option which correctly identify the plant with both cleistogamous and chasmogamous flowers:

(a) Helianthus
(b) Comelina
(c) Rosa
(d) Gossypium

2. Identify the parts labelled as A, B and C in the given figure and select the correct option.



	A	B	C	D
(a)	Scutellum.	Coleorhiza	Epiblast	Coleoptile
(b)	Scutellum	Coleoptile	Coleorhiza.	Epiblast.
(c)	Coleoptile	Epiblast	Scutellum	Coleorhiza
(d)	Coleorhiza	Scutellum	Epiblast	Coleoptile

3. During the menstrual cycle of a human female, formation of graafian follicle is stimulated by secretion of which of the following gonadotropin hormones?

(a) Estrogen and progesterone
(b) FSH and Estrogen
(c) FSH and LH
(d) Progesterone and LH

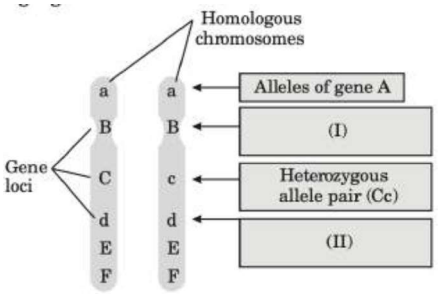
4. If both parents are carriers for thalassemia, which is an autosomal recessive disorder , what are the chances of pregnancy resulting in an affected child?

(a) 25%
(b) 100 %
(c) No chance
(d) 50 %

5. In order to isolate genetic material of a bacterium, the cell must be treated with

(a) Lysozyme, ribonuclease, protease, chilled ethanol
(b) Cellulase, ribonuclease, protease, chilled ethanol
(c) Chitinase, ribonuclease, chilled ethanol, water
(d) Ribonuclease, protease, chilled ethanol, water

6. Study the following figure and Identify (I) and (II)



	(I)	(II)
(a)	Homozygous recessive	Homozygous dominant
(b)	Homozygous dominant	Homozygous recessive
(c)	Heterozygous dominant	Heterozygous recessive
(d)	Heterozygous recessive	Heterozygous dominant

7. In a mRNA molecule, untranslated regions (UTRs) are present at

(a) 5' end (before start codon)
(b) 3' end (after stop codon)
(c) Both (a) and (b)
(d) 3' end only

8. At a particular locus ,frequency of allele A is 0.6 and that of allele a is 0.4. What would be the frequency of heterozygotes in a random mating population at equilibrium?

(a) 0.36
(b) 0.16
(c) 0.24
(d) 0.48

9. A gene contains a total of 1200 nucleotides that code for a polypeptide. Calculate the maximum number of amino acids in the polypeptide, assuming each amino acid is quoted by a single codon and a stop codon at the end.

(a) 399
(b) 400
(c) 1200
(d) 600

10. Humoral Immunity is associated with

(a) T - Cells
(b) B - Cells
(c) Both a and b
(d) Macrophages

11. Which of the following microorganisms form symbiotic association with plants and helps them in their nutrition?

(a) Glomus
(b) Azotobacter
(c) Klebsiella
(d) Azospirillum

12. In Meselson and Stahl's experiment he continued for four generations in bacteria, the ratio of $^{15}N/^{15}N$: $^{15}N/^{14}N$: $^{14}N/^{14}N$ containing DNA in the fourth generation would be-

(a) 1:1:0
(b) 1:4:0
(c) 0:1:3
(d) 0:1:7

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 (A)**:** The ability of the pistil to recognise the pollen is the result of a continuous dialogue between pollen and pistil.

Reason (R)**:** This electrical dialogue allows only compatible pollen to germinate.

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 human alpha- lactalbumin which made the milk rich in protein.

15. Assertion (A)**:** Directional selection changes the population towards one particular direction.
Reason (R): This type of selection favours average sized individuals.

16. Assertion (A)**:** Mucosa - associated lymphoid tissues are specialised immune barrier located on skin.
Reason (R): MALT constitutes about 50 percent of the lymphoid tissue in human body.

SECTION B

17. An individual who is sterile and has rudimentary ovaries is suffering from a chromosomal disorder. Write the karyotype and identify the disorder.

18. <u>Attempt either option A or B.</u>

A. (a) C-section is a surgical procedure .The baby is safely delivered through an incision in the abdominal wall and uterus. Which two parts of the female reproductive tract does the baby NOT pass through?
(b) To delay menstruation, a synthetic form of progesterone called progestin is commonly prescribed. What could be the possible role of progesterone here?

OR

B. (a) Indu gave birth to a pair of identical twins. How many egg/s were released at the start of her pregnancy?
(b) Infants suffer from the risk of infection if they are not breastfed within few hours of birth. What could be the reason?

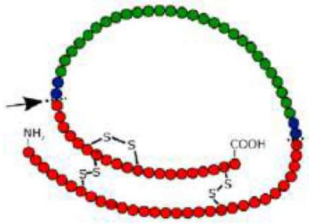
19. <u>Attempt either option A or B.</u>

A. Pectinases are used in the textile industry as well as in wastewater treatment. Identify how pectinase can help in each of these industries.

OR

B. A water treatment plant primarily receives wastewater from an industry that discharges fungicides as a waste byproduct. Mention any TWO ways the above situation might influence the water treatment procedure.

20. Given below is an image of a hormone which is required for the treatment of a disease.



(a) Identify the hormone and the disease that is caused due to its insufficient secretion.
(b) State whether the following statement about this hormone is true or false. Justify if true, correct if false.
'The structure in the image is a protein and is the precursor form of the hormone.

21. **Attempt either option A or B.**

A. The Tundra desert's gross primary productivity (GPP) is 800 kilocalories/m2 and respiration losses are about 200 kilocalories.

(a) What is the net primary productivity of the desert? Show calculations.

(b) Why do deserts have the least NPP across most ecosystems?

OR

B. State **TWO** points of difference between a natural terrestrial ecosystem and a man-made ecosystem such as zoo.

SECTION C

22. In guinea pigs, black coat colour (G) dominates over white (g) and brown eyes (B) dominate over blue (b). The alleles for coat colour and eye colour are not linked. What will be the probability of the offspring having blue eyes and a white coat if both parents are heterozygous for eye and coat colour? Find the probability using a Punnett square.

23. "PLAN YOUR FAMILY. GET OVER FINANCIAL WORRIES. KNOW THE SEX OF THE CHILD BEFORE IT IS BORN. AT A NOMINAL COST". In a city, this mysterious phrase, first emerged years ago, on the posters, taped to building, in pamphlets and painted on the side of the buses.

(a) What process is being represented in the above phrase?

(b) State any one reason for statutory ban on the process mentioned above?

(c) Suggest any one method for family planning which also helps in preventing STDs.

24. State THREE ADVANTAGES of in-situ conservation over ex-situ conservation of organisms.

25. In a population of birds, individuals with intermediate beak sizes can effectively feed on a range of available seeds while birds with either small or large beak sizes find it difficult to access certain seeds.

(a) Which birds are more likely to be naturally selected?

(b) Based on (a), which type of natural selection does this phenomenon exemplify?

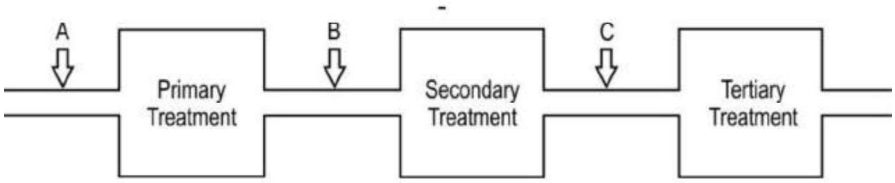
(c) Name the biologist who discovered this type of natural selection in Galapagos Island.

26. Explain how RNA interference functions as a natural cellular defence mechanism.

OR

Why is BT cotton not resistant to all pests, and what is the practical application implication of this for Indian farmers? Give one major advantage of cultivating BT cotton compare to normal cotton.

27. In a wastewater treatment plant, sampling was done thrice at various stages in the treatment process indicated by A, B and C in the following diagram. Each time the sample was taken, its BOD was measured, resulting in the following recorded values: 30 mg/L, 300 mg/L, 250 mg/L



(a) Define BOD and determine which of these BOD values correspond to stages A, B, and C in the treatment process.
(b) Which treatment is also called Biological treatment. Explain the role of activated sludge.

28. (a) Highlight one aspect by which meiosis during oogenesis differs from regular meiosis.
(b) Name two hormones that are common to spermatogenesis and oogenesis.
(c) State the function of hormone identified in (b) in human male .

SECTION D

29. Given below is a set of information about some fruits and seeds.
On the basis of the information provided above, answer the following questions with justification for each answer.

Fruit	Fruit and seed formation
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.

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.Which of these fruits exhibits polyembryony? What will be ploidy of the embryonic cells in the above case?

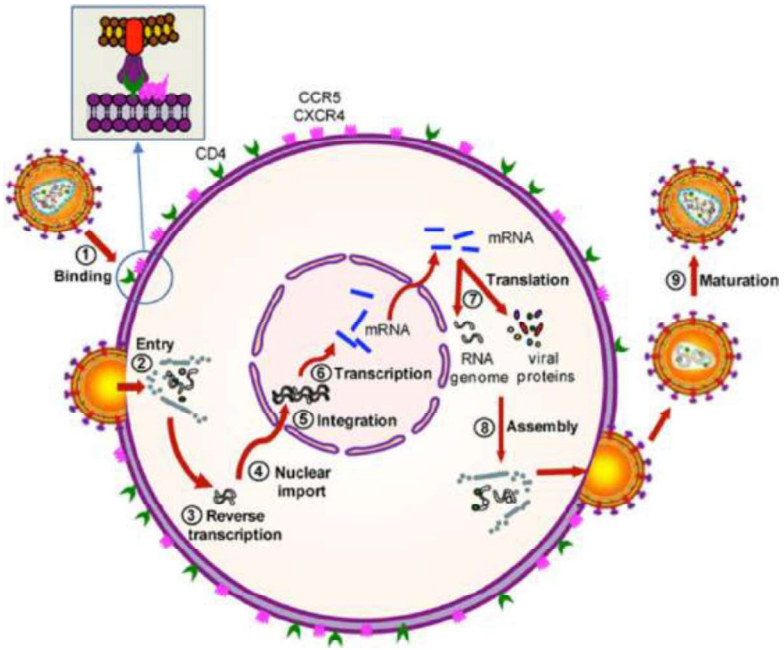
Attempt either subpart C or D.

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

OR

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

30. Observe the given diagram and answer the following questions.



(a) Which enzyme is responsible for converting the viral RNA into DNA after it enters the host cell?
(b) HIV-infected cells continue to remain alive while the viruses are being replicated inside them and released. Describe a way in which this strategy helps the viral infection process.
(c) What type of immune cell does HIV primarily infect, and how does this lead to weekend immune system?
(d) Why is the HIV virus considered a retrovirus?

SECTION E

31. Early experiments on the molecular basis of inheritance include Griffith's transforming principle (1928), which showed a "transforming principle" could transfer genetic material; the Avery-MacLeod-McCarty experiment (1944), which identified DNA as that principle; and the Hershey-Chase experiment (1952), which provided definitive proof that DNA, not protein, is the genetic material.

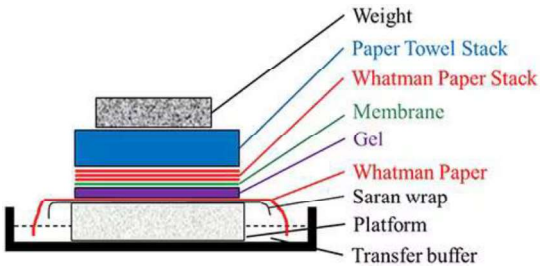
Chargaff's rules (late 1940s) showed the base pairing ratios (A=T, G=C), which were crucial for understanding the structure of DNA.

On the basis of above information, answer the following questions:

(a) How did Harshey and Chase use radioactive isotopes of phosphorus and sulphur to prove that DNA ,not protein is the genetic material?
(b) Based on the properties of DNA and RNA, why was DNA favoured over RNA genetic material ?Give two points.
(c) What was the key outcome of Griffith experiment that led him to propose the existence of a transforming principle?

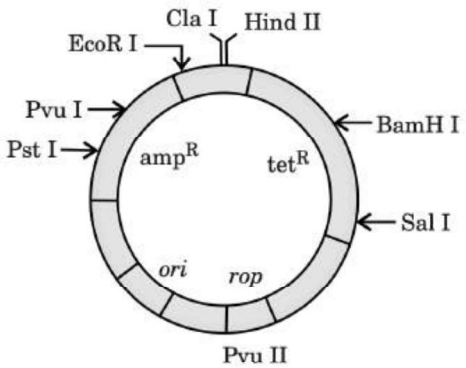
OR

The process of DNA fingerprinting involves the use of the Southern blotting technique. In this technique, DNA that has run on an agarose gel and then transferred to a nitrocellulose or nylon membrane. Finally, the DNA bands are visualised through autoradiography.



(a) Share your understanding of why the DNA needs to be transferred to the nitrocellulose membrane.
(b) What would be the charge on the nitrocellulose membrane? Give a reason to support your answer.
(c) Identify the type of label present on the VNTR probe. Justify your answer.
(d) What is the role of buffer in the above technique.

32. (a) Identify the cloning vector shown .Why it is called so ?



(b) Which restriction enzyme action leads to the inactivation of the amp^R gene?
(c) Why does the 'insertional inactivation' method to detect recombinant DNA is preferred to 'antibiotic resistance' procedure?
(d) What is the role of rop?

OR

(a) Give TWO reasons why it is important to introduce the gene/s of interest in a vector and then into the host cell or insert it directly into the host chromosomal genome.
(b) Bacterial cells offer certain advantages over plant or animal cells that make them an easy choice for the production of many recombinant molecules. State TWO such advantages.
(c) Name the first restriction endonuclease enzyme discovered.

33. Justify the following statements with suitable proof/examples: -
A. 'Competition is not limited to closely related species'
B. 'Competition is not always dependent on resources being limiting'
C. 'Competitive exclusion occurs in nature'

Attempt D or E
D. 'Competing species may evolve mechanisms for co-existence'

OR

E. 'Competition in nature comes from what is called 'competitive release''

OR

Plot a population growth curve,
(a) When resources are not limiting the growth .
(b) When resources are limiting the growth
(c) Write the equation for both the curves.
(d) Which one is more realistic and why?