

**KENDRIYA VIDYALAYA SANGATHAN, RANCHI REGION  
PRE-BOARD -1 QUESTION PAPER- 2024-25**

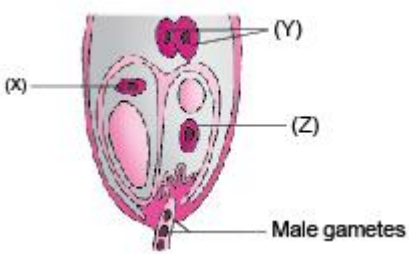
**BIOLOGY (044) Theory  
CLASS XII**

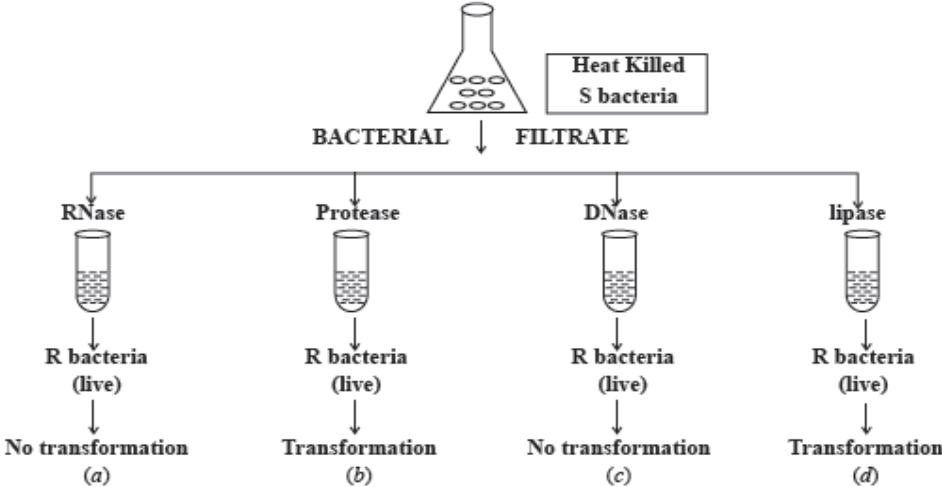
**Max.Marks70**

**Time allowed 3 hours**

**General Instruction:**

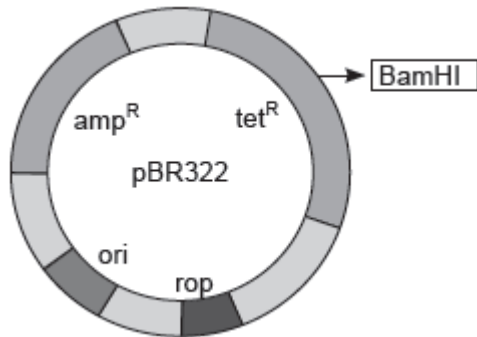
- (i) All questions are compulsory.
- (ii) The question paper has five sections and 33 questions. All questions are compulsory.
- (iii) Section–A has 16 questions of 1 mark each; Section–B has 5 questions of 2 marks each; Section– C has 7 questions of 3 marks each; Section– D has 2 case-based questions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

Sl. No	SECTION-A 16X1=16 MARKS
1	<p>The given figure of an egg apparatus of an angiosperm shows the entry of pollen tube for releasing the two male gametes. Which of the two from 'X', 'Y' and 'Z', the two male gametes fuse with:</p>  <p>(a) X and Z (b) X and Y (c) Y and Z (d) Z and Z</p>
2	<p>Which of the following statements about cleavage of a human zygote is incorrect?</p> <p>(a) Cleavage starts as the zygote moves through the isthmus towards the uterus. (b) As the cleavage divisions continue, the blastomeres become smaller and smaller. (c) The first cleavage division is meiotic. (d) The cleavage divisions occur in quick succession.</p>
3	<p>Mother and father of a person with 'O' blood group have 'A' and 'B' blood group respectively. What would be the genotype of both mother and father?</p> <p>(a) Mother is homozygous for 'A' blood group and father is heterozygous for 'B'. (b) Mother is heterozygous for 'A' blood group and father is homozygous for 'B'. (c) Both mother and father are heterozygous for 'A' and 'B' blood group, respectively. (d) Both mother and father are homozygous for 'A' and 'B' blood group, respectively.</p>

4	<p>A scientist while performing an experiment on a certain plant found that red fruit (R) is dominant over yellow fruit (r) and tallness (T) is dominant over shortness (t). Now, if he crosses a plant with RRTt genotype with a plant, with rrtt genotype, what percentage of tall plant with red fruits he find in progeny?</p> <p>(a) 50% (b) 100% (c) 75% (d) 25%</p>
5	<p>Given below are the illustration of the different steps of experiments conducted by Macleod, Mccarty and Avery to find the chemical nature of the ‘transforming principle’ as DNA. Select the option that incorrectly depicts the step of the experiment.</p> 
6	<p>Oswald Avery, Colin MacLeod and Maclyn McCarty used enzymes to purify biochemicals such as proteins, DNA and RNA from the heat-killed S cells to see which ones could transform live R cells into S cells in Griffith’s experiment. They observed that</p> <p>(a) P roteases and RNases affected transformation.  (b) DNase inhibited transformation.  (c) P roteases and Lipases affected transformation.  (d) R Nases inhibited transformation.</p>
7	<p>The experiment to prove semiconservative replication of DNA was conducted on</p> <p>(a) Streptococcus pneumoniae  (b) Escherichia coli  (c) bacteriophages  (d) Vicia faba</p>
8	<p>A DNA molecule is 160 base pairs long. It has 30% Guanine. How many adenine bases are present in this DNA molecule?</p> <p>(a) 48  (b) 64  (c) 96  (d) 192</p>
9	<p>In the case of peppered moth (<i>Biston betularia</i>) the black-coloured form became dominant over the light-coloured form in England during industrial revolution. This is an example of</p> <p>(a) appearance of the darker coloured individuals due to very poor sunlight  (b) protective mimicry  (c) inheritance of darker colour character acquired due to the darker environment  (d) natural selection whereby the darker forms were selected.</p>
10	<p>Which among the following biofertilisers does not fix atmospheric nitrogen?</p> <p>(a) Oscillatoria  (b) Rhizobium  (c) Azospirillum  (d) Glomus</p>

11 Secondary treatment of sewage  
 (a) removes the grit and large particles of organic matter.  
 (b) does not require aeration as it is an anaerobic process.  
 (c) involves physical processes like filtration and sedimentation.  
 (d) involves digestion of organic matter by the heterotrophic microbes naturally present in the sewage.

12 The figure below shows the structure of a plasmid.



A foreign DNA was ligated at BamHI. The transformants were then grown in a medium containing antibiotics tetracycline and ampicillin. Choose the correct observation for the growth of bacterial colonies from the given table.

	Medium with Tetracycline	Medium with Ampicillin
(a)	Growth	No growth
(b)	No growth	Growth
(c)	No growth	No Growth
(d)	Growth	Growth

**Question No 13 to 16 consists of two statement – Assertion(A) and Reason (R.) Answer these questions selecting the appropriate option below:**  
 (A) Both assertion and reason are true and reason is correct explanation of assertion.  
 (B) assertion and reason both are true but reason is not the correct explanation.  
 (C) Assertion is true, reason is false  
 (D) Assertion is false, reason is true

13 **Assertion:** If the tapetum is malfunctioning in an anther, the male gametophytes often become sterile.  
**Reason:** Tapetum nourishes the developing pollen grains.

14 **Assertion:** In prokaryotic/bacterial cells, transcription and translation can be coupled.  
**Reason:** In eukaryotic cells, transcription occurs in the nucleus and translation occurs in the cytoplasm.

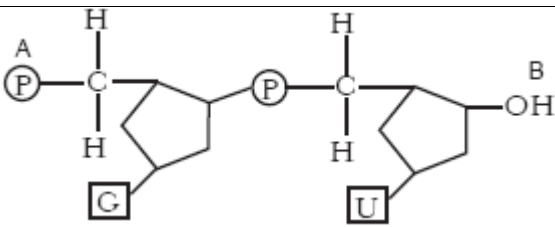
15 **Assertion:** Nucleopolyhedrovirus is an excellent genus for species-specific, narrow-spectrum insecticidal application.  
**Reason:** Nucleopolyhedrovirus has been shown to have no negative impact on other non-target organisms.

16 **Assertion:** When DNA from two different sources are cut by the same restriction enzyme, the resultant fragments have different kinds of 'sticky ends'.  
**Reason:** These can be joined end-to-end using DNA ligases.

**SECTION-B (5X2=10 MARKS)**

17 1. (a) Where do the signals for parturition originate from, in humans?  
 (b) Why is it important to feed the new born babies on colostrum?  
**Or**  
 2. Name the pituitary hormones influencing Leydig cells and Sertoli cells present in human testes. Explain the functions of these cells.

18 1. Answer the questions based on the dinucleotide shown below:



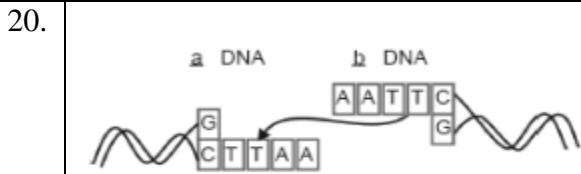
- (i) Name the type of sugar, the guanine base is attached to.
- (ii) Name the linkage connecting the two nucleotides.
- (iii) Identify the 3' end of the dinucleotide. Give a reason for your answer.

Or

2. ATGGAGTACTTCGTGTGA is the coding strand of DNA in a transcription unit.

- (i) Write the mRNA transcribed from this DNA segment.
- (ii) How many amino acids does it code for? Why?

- 19 A young boy when brought a pet dog home, started to complain of watery eyes and running nose. The symptoms disappeared when the boy was kept away from the pet.
- (a) Name the type of antibody and the chemicals responsible for such a response in the boy.
  - (b) Mention the name of any one drug that could be given to the boy for immediate relief from such a response.



Study the linking of DNA fragments shown above.

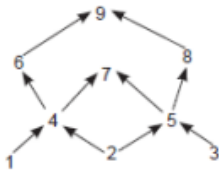
- (i) Name 'a' DNA and 'b' DNA.
- (ii) Name the restriction enzyme that recognises this palindrome.
- (iii) Name the enzyme that can link these two DNA fragments.

- 21 1. In the pyramid of biomass drawn below, name the two standing crops:
- (i) one which is supported, and
  - (ii) the one which supports. In which ecosystem is such a pyramid found?



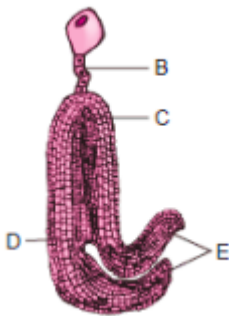
Or

2. Given below is a food web that involves nine organisms.



- (a) Identify two producers and two carnivores shown in the food web.
- (b) Is it possible to make an ecological pyramid depicting this food web? Give reason in support of your answer.

22 (a) Identify the figure given below and also identify.



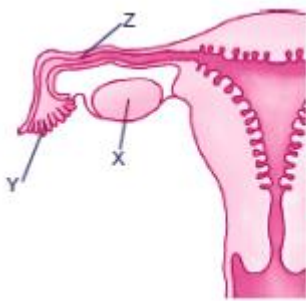
(b) State the function of E.

23 1. The diagram shows a part of the human female reproductive system.

(a) Name the gamete cells that would be present in 'X', if taken from a newborn baby.

(b) Name 'Y' and write its function.

(c) Name 'Z' and write the events that take place here.



Or

2. Medically, it is advised to all young mothers that breast feeding is the best for their newborn babies. Do you agree? Give reasons in support of your answer ( minimum 2 points)

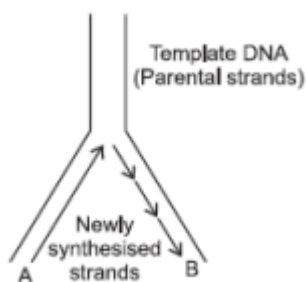
24 With respect to Messelson and Stahl's Experiment, answer the following questions:

(a) Identify the method used to distinguish between heavy and light isotopes of nitrogen.

(b) With the help of diagrams, compare the results for the DNA isolated after 20 minutes of experiments with the DNA which was isolated after 40 minutes.

25 (a) Identify the polarity at A and B respectively in the figure given below:

(b) Explain the mechanism the figure represents.

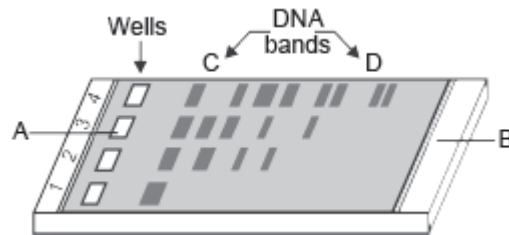


26 (a) A patient had suffered myocardial infarction and clots were found in his blood vessels. Name a 'clot buster' that can be used to dissolve the clots and the microorganism from which it is obtained.

(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.

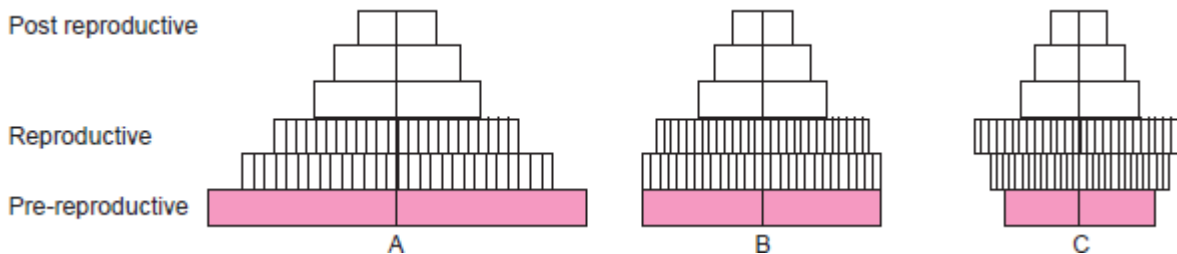
(c) What do doctors prescribe to lower the blood cholesterol level in patients with high blood cholesterol? Name the source organism from which this drug can be obtained.

27 Study the diagram given below and answer the following questions:



- Why have DNA fragments in band 'D' moved farther away in comparison to those in band 'C'?
- Identify the anode end in the diagram.
- How are these DNA fragments visualised?

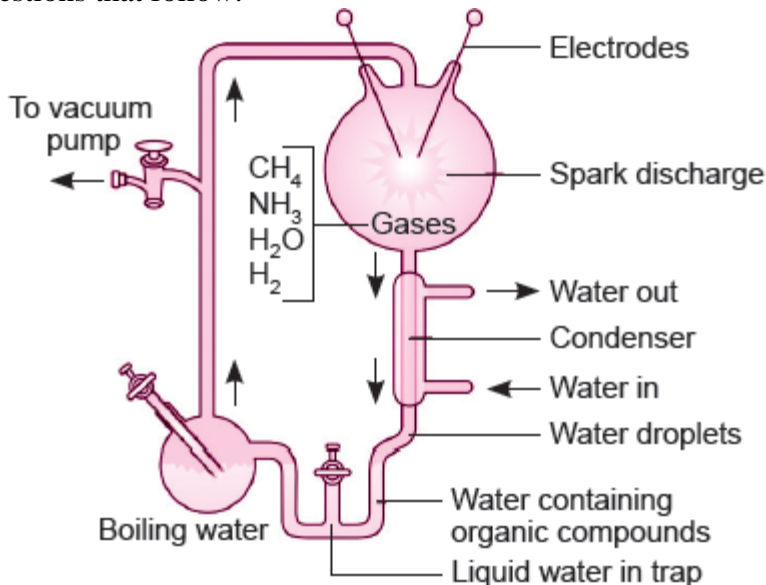
28 Study the age pyramids 'A', 'B', 'C' of human population given below and answer the questions that follow:



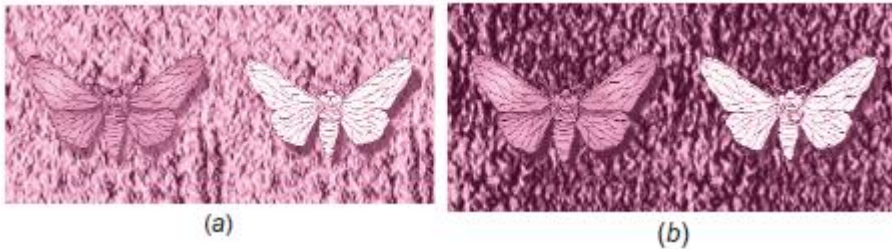
- Identify the pyramids 'B' and 'C'.
- Write the basis on which the above pyramids are plotted.
- Mention the one which is ideal for human population and why?

**SECTION-D (2X 4 MARKS EACH= 8 MARKS)**

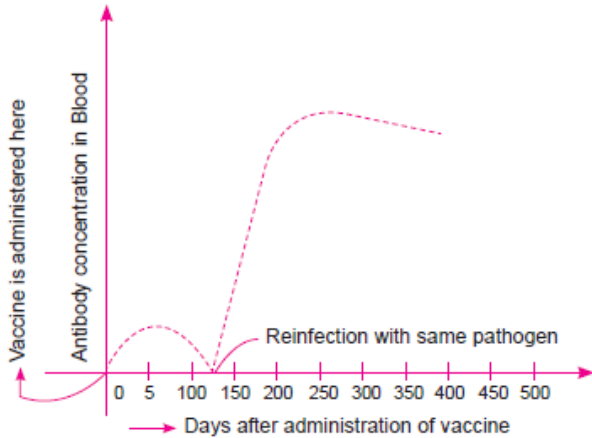
29 Study the diagrammatic representation of S.L. Miller's experiment given below and answer the questions that follow:



- How did S.L. Miller create the conditions, which existed before the origin of any life on earth?
  - Name the organic compound formed and collected at the end of the experiment.
  - Mention the kind of evolution his experiment supported.
- Or
- What do these pictures (a) and (b) illustrate with reference to evolution? Explain.



30 A time-bond vaccination programme is followed for the children in our country from their birth up to ten years of age. A graph plotted below shows the effect of the vaccination followed by infection by the same pathogen, and the antibody concentration in the blood of the child.



- (a) Explain why the administration of a vaccine causes an increases in the antibody concentration.
- (b) If the child is infected with the same pathogen almost four months later, the antibody concentration in his/ her blood \_\_\_\_\_ very fast.
- (c) A table given below gives information about different types of immunity and how they are attained. Identify ‘P’, and ‘Q’ in the table.

	Type of immunity	Production of antibodies	Presence of memory cells	Mode attained
(1)	Natural, active	Yes	‘P’	‘Q’
(2)	Natural, passive	No	‘R’	Across the placenta during pregnancy/ breast feeding
(3)	Acquired, active	‘S’	Yes	Getting a vaccine during breast feeding
(4)	Acquired, passive	‘T’	No	Getting an injection of antibodies

**Or**

- (d) Which immune response is faster , Primary or secondary ?

**SECTION-E (3X5 MARKS EACH=15 MARKS)**

- 31 1.A flower of tomato plant following the process of sexual reproduction produces 240 viable seeds. Answer the following questions giving reasons.
  - (a) What is the minimum number of pollen grains that must have been involved in the pollination of its pistil?
  - (b) What would have been the minimum number of ovules present in the ovary?



- (c) How many megaspore mother cells are involved?  
 (d) What is the minimum number of microspore mother cells involved in the above case?

**OR**

2. A village health worker was taking a session with women. She tells the women that one has to be very careful while using oral pills as method of birth control. Wrong usage can actually promote conception.

- (a) Analyze the statement and compare the merits and demerits of using oral pills and surgical methods of birth control.  
 (b) Village women confused as to how a thin metallic Copper loop can provide protection against pregnancy. Justify the use explaining the mode of action of IUDs.

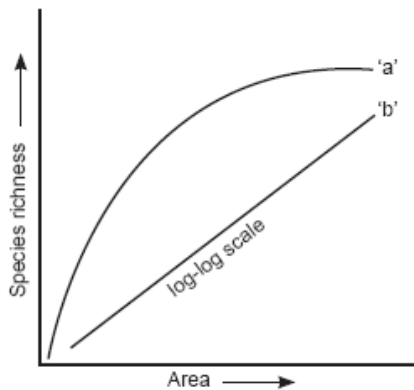
- 32 1(a) Name the source from which insulin was extracted earlier. Why is this insulin no more in use by diabetic people?  
 (b) Explain the process of synthesis of insulin by Eli Lilly company. Name the technique used by the company.  
 (c) How is the insulin produced by human body different from the insulin produced by the above mentioned company?

Or

2. Answer the following questions based on Bt crops.

- (a) Why do farmers prefer to grow Bt cotton crop than genetically unmodified cotton crop?  
 (b) Name any two insects that are killed by Bt toxin.  
 (c) Explain the mechanism by which Bt toxin kills the insects, but not the bacterium, which possesses the toxin.

- 33 The graph shows species–area relationship:  
 (a) If b denotes the relationship on log scale—  
 (i) Describe a and b  
 (ii) How is slope represented? Give the normal range of slope.  
 (iii) What kind of slope will be observed for frugivorous birds and mammals in a tropical forest?  
 (b) Species diversity of plants (22%) is much less than that of animals (72%). Analyze the reasons for greater diversity of animals as compared to plants.



2. (a) What are the two types of desirable approaches to conserve biodiversity? Explain with examples bringing out the difference between the two types.  
 (b) What is the association between the bumble bee and its favourite orchid, Ophrys? How would extinction or change of one would affect the other?