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Candidates must write the Set No on the title page of the answer book.

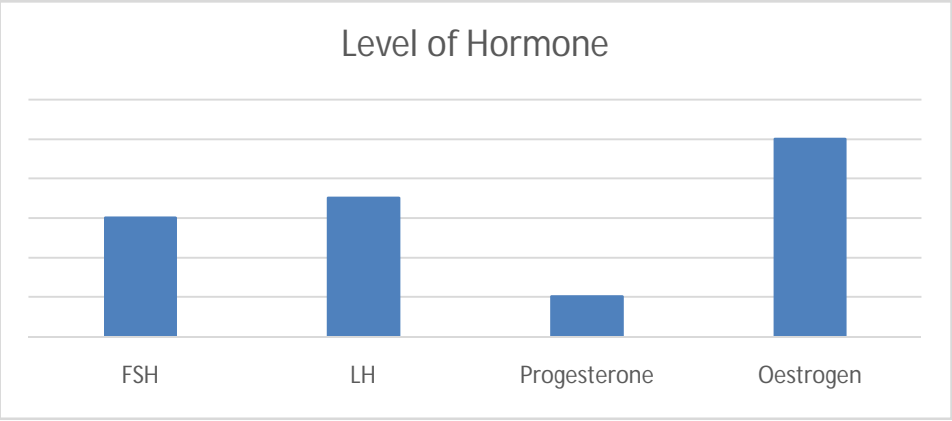
SAHODAYA PRE BOARD EXAMINATION – 2023-24

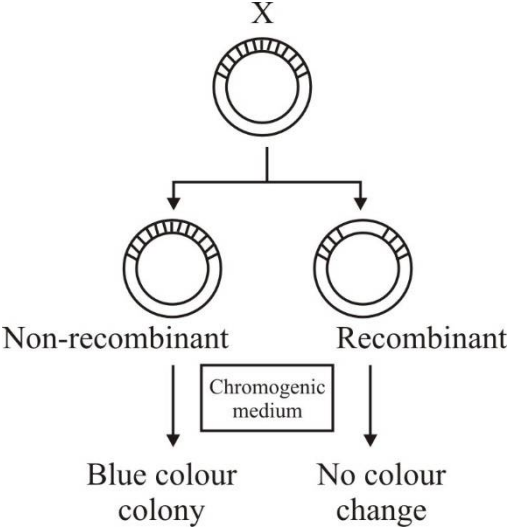
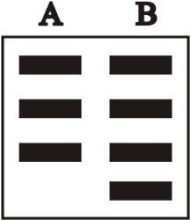
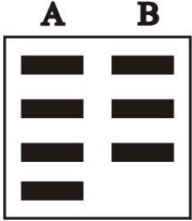
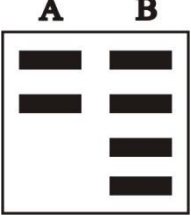

- ◆ Please check that this question paper contains 12 printed pages.
- ◆ Set number given on the right-hand side of the question paper should be written on the title page of the answer book by the candidate.
- ◆ Check that this question paper contains 33 questions.
- ◆ Write down the Serial Number of the question in the left side of the margin before attempting it.
- ◆ 15 minutes time has been allotted to read this question paper. The question paper will be distributed 15 minutes prior to the commencement of the examination. The students will read the question paper only and will not write any answer on the answer script during the period. Students should not write anything in the question paper.

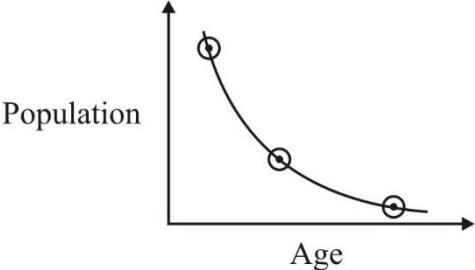
CLASS – XII**Sub.: BIOLOGY (044)****Time Allowed: 3 hours****Maximum Marks: 70****General Instructions:**

- All questions are compulsory.
- The question paper has five sections and 33 questions. All questions are compulsory.
- 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.
- 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.
- Wherever necessary, neat and properly labeled diagrams should be drawn.

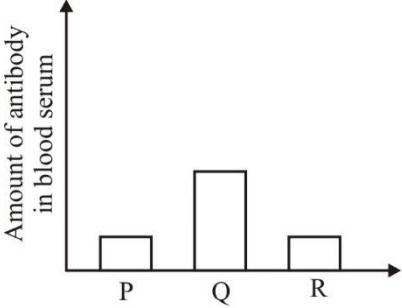
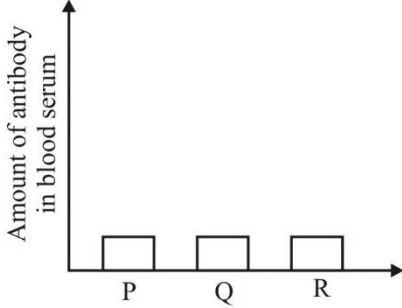
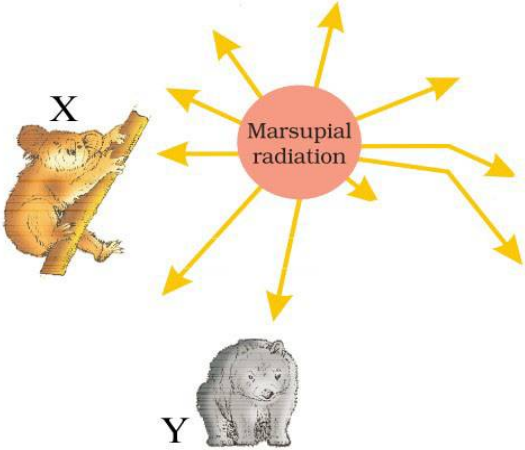
SECTION – A		
1.	Find the correct match. <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p style="text-align: center;">List-1</p> <p>(1) Diaphragm</p> <p>(2) Contraceptive pills</p> <p>(3) Intra uterine devices ovulation</p> <p>(4) Lactational Amenorrhoea</p> <p>(a) (1)-(ii), (2)-(iv), (3)-(i), (4)-(iii)</p> <p>(c) (1)-(iv), (2)-(i), (3)-(iii), (4)-(ii)</p> </div> <div style="width: 45%;"> <p style="text-align: center;">List-2</p> <p>(i) Inhibit ovulation and implantation.</p> <p>(ii) Increase phagocytosis of sperms within uterus.</p> <p>(iii) Absence of menstrual cycle and following parturition</p> <p>(iv) They cover the cervix blocking the entry of sperms</p> <p>(b) (1)-(iii), (2)-(ii), (3)-(i), (4)-(iv)</p> <p>(d) (1)-(iv), (2)-(i), (3)-(ii), (4)-(iii)</p> </div> </div>	[1]

2.	<p>The given graph indicates which phase of menstrual cycle?</p>  <p>(a) Menstrual phase (b) Ovulatory phase (c) Secretory phase (d) Follicular phase</p>	[1]																									
3.	<p>In the embryo of a typical dicot and a grass, true homologous structures are :-</p> <p>(a) Coleoptile and coleorhiza (b) Embryo and endosperm (c) Cotyledon and Scutellum (d) Endosperm and perisperm</p>	[1]																									
4.	<p>Taylor and colleagues performed experiment on _____ using radioactive _____ to prove that the DNA is replicated semi-conservatively. (Select the correct option for the blanks).</p> <p>(a) Thymidine, <i>Vicia faba</i> (b) <i>E.coli</i>, Uridine (c) <i>Vicia faba</i>, Thymidine (d) <i>E.coli</i>, Thymidine</p>	[1]																									
5.	<p>This is a punnet square of F₂ generation of dihybrid cross (TtRr × TtRr) given below:</p> <table border="1"> <tbody> <tr> <td>♀ → ♂ ↓</td> <td>TR</td> <td>Tr</td> <td>tR</td> <td>tr</td> </tr> <tr> <td>TR</td> <td>A</td> <td>B</td> <td>C</td> <td>D</td> </tr> <tr> <td>Tr</td> <td>E</td> <td>F</td> <td>G</td> <td>H</td> </tr> <tr> <td>tR</td> <td>I</td> <td>J</td> <td>K</td> <td>L</td> </tr> <tr> <td>tr</td> <td>M</td> <td>N</td> <td>O</td> <td>P</td> </tr> </tbody> </table> <p>Find the incorrect option.</p> <p>(a) The genotype of C is same with genotype of I (b) The phenotype of F is same with phenotype of N (c) M and D have same genotype (d) F and K have same phenotype</p>	♀ → ♂ ↓	TR	Tr	tR	tr	TR	A	B	C	D	Tr	E	F	G	H	tR	I	J	K	L	tr	M	N	O	P	[1]
♀ → ♂ ↓	TR	Tr	tR	tr																							
TR	A	B	C	D																							
Tr	E	F	G	H																							
tR	I	J	K	L																							
tr	M	N	O	P																							
6.	<p>An autosomal linked recessive trait can be transmitted from parents to the offsprings when</p> <p>(i) One of the parent is homozygous recessive and other is heterozygous (ii) Both the parents are heterozygous (iii) Both the parents are homozygous recessive (iv) Both are either homozygous recessive or heterozygous</p> <p>(a) only (i) and (ii) (b) only (iii) and (iv) (c) (i), (ii) and (iii) only (d) (i), (ii), (iii) and (iv)</p>	[1]																									

7.	<p>Out of five gametes, one gamete carries a recessive allele. What must be the frequency of homozygous recessive genotype in a population at Hardy-Weinberg's equilibrium?</p> <p>(a) 4% (b) 8% (c) 20% (d) 16%</p>	[1]
8.	<p>Match the items in Column-A and Column-B and choose the correct answer.</p> <p>Column-A (1) Lady bird (2) Mycorrhiza (3) Biological control (4) Biogas (a) (1)-(ii), (2)-(iv), (3)-(iii), (4)-(i) (c) (1)-(iv), (2)-(i), (3)-(ii), (4)-(iii)</p> <p>Column-B (i) Methanobacterium (ii) Trichoderma (iii) Aphids (iv) Glomus (b) (1)-(iii), (2)-(iv), (3)-(ii), (4)-(i) (d) (1)-(iii), (2)-(ii), (3)-(i), (4)-(iv)</p>	[1]
9.	<div style="text-align: center;">  <p style="text-align: center;">X</p> <p style="text-align: center;">Non-recombinant Recombinant</p> <p style="text-align: center;">↓ Chromogenic medium ↓</p> <p style="text-align: center;">Blue colour colony No colour change</p> </div> <p>In the above diagram X is a marker gene related to:</p> <p>(a) Antibiotic resistance (b) Enzyme production (c) Humulin production (d) Antibiotic synthesis</p>	[1]
10.	<p>pBR322 (A) is an artificial plasmid having two restriction sites for EcoRI, while T₂ bacteriophage (B) has three restriction sites for EcoRI. After restriction digestion the DNA fragments are allowed to run on agarose gel.</p> <p>Which of the following correctly depict the gel electrophoresis pattern?</p> <div style="display: flex; flex-wrap: wrap;"> <div style="width: 50%;"> <p>(a) </p> </div> <div style="width: 50%;"> <p>(b) </p> </div> <div style="width: 50%;"> <p>(c) </p> </div> <div style="width: 50%;"> <p>(d) </p> </div> </div>	[1]

11.	<p>Alexander Flemming while working on <i>Staphylococci</i> bacteria once observed that a mould growing in one of his unwashed culture plates, around which <i>Staphylococci</i> could not grow.</p> <p>What is the relationship between the two species if</p> <p>Species A – <i>Staphylococci</i></p> <p>Species B – Mould</p> <table style="margin-left: 40px;"> <tr> <td style="padding-right: 40px;">Species A</td> <td>Species B</td> </tr> <tr> <td>(a) +–</td> <td></td> </tr> <tr> <td>(b)–+</td> <td></td> </tr> <tr> <td>(c) +</td> <td>O</td> </tr> <tr> <td>(d)–</td> <td>O</td> </tr> </table>	Species A	Species B	(a) +–		(b)–+		(c) +	O	(d)–	O	[1]
Species A	Species B											
(a) +–												
(b)–+												
(c) +	O											
(d)–	O											
12.	<p>An age pyramid is given in graphical pattern for a population.</p> <div style="text-align: center;">  </div> <p>The above pattern reflects that the population is</p> <table style="margin-left: 40px;"> <tr> <td>(a) Expanding</td> <td>(b) Stable</td> </tr> <tr> <td>(c) Declining</td> <td>(d) Cannot be predicted</td> </tr> </table>	(a) Expanding	(b) Stable	(c) Declining	(d) Cannot be predicted	[1]						
(a) Expanding	(b) Stable											
(c) Declining	(d) Cannot be predicted											
13.	<p>Assertion : DNA replication in bacteria is bidirectional.</p> <p>Reason : A chromosome with primary constriction is called SAT-chromosome.</p> <p>(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.</p> <p>(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.</p> <p>(c) If Assertion is true but Reason is false</p> <p>(d) If Assertion is false but Reason is true</p>	[1]										
14.	<p>Assertion : Endomycorrhiza of forest trees contribute to the efficient nutrient cycling in tropical forest ecosystem.</p> <p>Reason : The fungi that formed mycorrhizal association with plant make nutrient ions available to them.</p> <p>(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.</p> <p>(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.</p> <p>(c) If Assertion is true but Reason is false</p> <p>(d) If Assertion is false but Reason is true</p>	[1]										

15.	<p>Assertion : Basmati variety contain specific gene that code for unique aroma & flavor.</p> <p>Reason : American semi-dwarf variety of rice produce this unique aroma and flavor is a transgenic rice.</p> <p>(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.</p> <p>(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.</p> <p>(c) If Assertion is true but Reason is false</p> <p>(d) If Assertion is false but Reason is true</p>	[1]
16.	<p>Assertion : Biodiversity is worth preserving for ethical reasons and broad utilitarians.</p> <p>Reason : 32% of Amphibia are facing the threat of extinction as their breeding ground is reducing by human activity.</p> <p>(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.</p> <p>(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.</p> <p>(c) If Assertion is true but Reason is false</p> <p>(d) If Assertion is false but Reason is true</p>	[1]
SECTION – B		
17.	<p>(a) How is it ensured that only one sperm fertilise the ovum?</p> <p>(b) What induces the completion of meiotic division in secondary oocyte?</p> <p>(c) Arrange the hormones in sequence of the production in a pregnant woman – hCG, Relaxin, LH, Progesterone.</p>	[2]
18.	<p>A small stretch of DNA template strand that codes for a polypeptide as shown here</p> <p>3'- CAT CAT AGA TGA AAC 5'</p> <p>(a) Which type of mutation could have occurred in each type resulting in the following mistakes during replication of the above original sequence;</p> <p>(i) 3'- CAT CAT AGA TGA ATC - 5'</p> <p>(ii) 3'- CAT ATA GAT GAA AC - 5'</p> <p>(b) How many amino acids will be translated from each of the strands (i) and (ii) respectively?</p> <p style="text-align: center;">OR</p> <p>(a) Why does replication occurs within replication fork not in the entire length simultaneously?</p> <p>(b) What enables histones to acquire a positive charge?</p>	[2]

19.	How is the variation differently explained by mutation theory of Hugo de vries and Darwin's theory of natural selection? Mention any four points.	[2]
20.	<p>The graphs below show the result of blood tests of a person X during illness (Graph I) and after recovering (Graph II)</p> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;">  <p>Amount of antibody in blood serum</p> <p>Antibody Type (Graph - I)</p> </div> <div style="text-align: center;">  <p>Amount of antibody in blood serum</p> <p>Antibody Type (Graph - II)</p> </div> </div> <p>(a) If person X has exposed to pollen grains of <i>Parthenium</i>, which type of antibody will be produced in his body? (b) With reference to the above graph, what will you infer about the disease in a person X? (c) Name the chemicals secreted by stimulatory cells due to the presence of allergens in the body.</p>	[2]
21.	<p>(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 micro-organism from which it is obtained. (b) Write one use of activated sludge in: (i) aeration tank (ii) anaerobic sludge digester</p>	[2]
SECTION – C		
22.	<div style="text-align: center;">  </div> <p>(a) Identify X and Y in the above figure and mention the type of evolutionary relationship they exhibit. (b) An evolutionary stage of human lived near east and central Asia. Mention the type of behavioural characteristics they had adapted.</p>	[3]

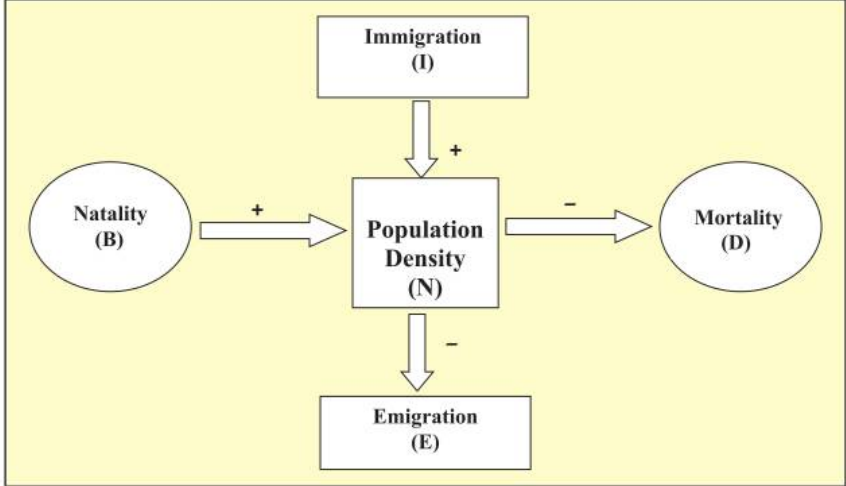
23.	<p>(a) Mention two factors on which pollen viability depends.</p> <p>(b) Draw a transverse section of a young anther and label:</p> <p>(i) innermost layer of microsporangial wall having dense cytoplasm and more than one nucleus.</p> <p>(ii) The cells which undergo microsporogenesis.</p>	[3]
24.	<div style="text-align: center;"> <pre> graph TD A[Hypothalamus (Female)] --> B[X] B --> C[Pituitary] C --> D[Y] C --> E[Z] </pre> </div> <p>(a) Name the hormone X, Y and Z.</p> <p>(b) What is the role of Y and Z?</p> <p>(c) Name a hormone of posterior pituitary that helps in parturition.</p> <p style="text-align: center;">OR</p> <p>(a) Enlist two reasons causing infertility inspite of unprotected sexual cohabitation.</p> <p>(b) Suggest ART for the following situation:</p> <p>(i) Low sperm count in male</p> <p>(ii) Female is unable to produce gamete but can provide environment for fertilization</p> <p>(c) How is IUT different from IUI?</p>	[3]
25.	<p>(a) What are the improvements in scientific knowledge that helped Sutton & Boveri to propose chromosomal theory of inheritance? (any two)</p> <p>(b) A normal couple has their first child who is haemophilic. Workout a cross to show how it is possible. State the possibility of normal and haemophilic children along with sex that can be born to them.</p>	[3]
26.	<p>(a) Abhishek suffers from constipation, sustained high fever, loss of appetite and intestinal perforation. Name the disease and the diagnostic test.</p> <p>(b) A drug has a potent stimulating action on CNS producing a sense of euphoria and increased energy.</p> <p>(i) Identify this drug.</p> <p>(ii) How does it stimulate the CNS?</p> <p>(c) How does bone marrow and thymus function as lymphoid organ?</p>	[3]

27. (a) Bottled fruit juices are clearer as compared to those made at home. Give the reason.
 (b) How does 'Swiss cheese' develop with large holes?
 (c) Curd is easier to digest by human than milk. Justify.

[3]

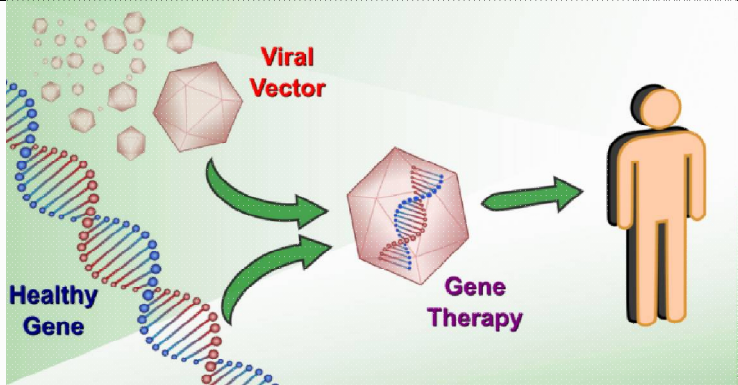
28. Based on the following diagram answer the following questions:

[3]



- (a) If N is the population density at time t , then what is the population density at time $t + 1$?
- (b) Under normal condition which two parameters influence population density.
- (c) If a new habitat is just colonized which parameter contribute significantly to population growth?
- (d) Which parameter decreases the population density of a migrating bird in Keolado National Park (Bharatpur) in Rajasthan?

SECTION – D

29. 

[4]

This method is applied in a person with a hereditary disease. In this method, genes are inserted into a person’s cells and tissues to treat a disease.

- The first clinical gene therapy was done in 1990 to a 4 year old girl with adenosine deaminase (ADA) deficiency. This disorder is caused due to the deletion of the gene for adenosine deaminase that is essential for immune system to function.

	<p>(a) What is gene therapy? [1]</p> <p>(b) How does enzyme replacement therapy treat ADA deficiency? [1]</p> <p>OR</p> <p>State the possibility of permanent cure of this disease.</p> <p>(c) How had gene therapy been carried by using rDNA technology? [2]</p>	
30.	<p>Observe the graph given below:</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>Species - A</p> </div> <div style="text-align: center;"> <p>Species - B</p> </div> </div> <p>The graphs represent interspecific interaction between two species of Barnacle in the coasts of Scotland. Species A (<i>Balanus</i>) and species B (<i>Chathamalus</i>) were grown in separate culture as well as mixed culture. It was found that each species follows logistic growth pattern when they grow separately but when they grow together the pattern is little changed for species B (<i>Chathamalus</i>).</p> <p>(a) Which species is comparatively superior? Support it with data provided in the graph.</p> <p style="text-align: center;">OR</p> <p>Under which condition species B can spread in whole geographic area?</p> <p>(b) State the underlying principle for the above result and name the scientist associated with this principle.</p> <p>(c) With an example, explain the mechanism in which two or more species competing for the same resources can co-exist.</p>	[4]
SECTION – E		
31.	<p>(a) Who and how revealed the biochemical nature of transforming principle?</p> <p>(b) If a bacterium divides in every 25 minutes what would be the proportion of hybrid and light densities of DNA molecule after 100 minutes.</p> <p>(c) Replication was allowed to take place in the presence of radioactive deoxyribonucleotides in E.coli mutant for DNA ligase. Newly synthesized radioactive DNA was purified and centrifuged using density gradient centrifugation. What type of differences will be observed in daughter DNA strands?</p> <p style="text-align: center;">OR</p> <p>(a) (i) 5'AUCAUAAUGAACGUAAGGUAACGAUC3'. Identify the UTR sequence and write its role.</p> <p>(ii) Mention the role of 23S rRNA in bacteria during protein synthesis.</p>	[5]

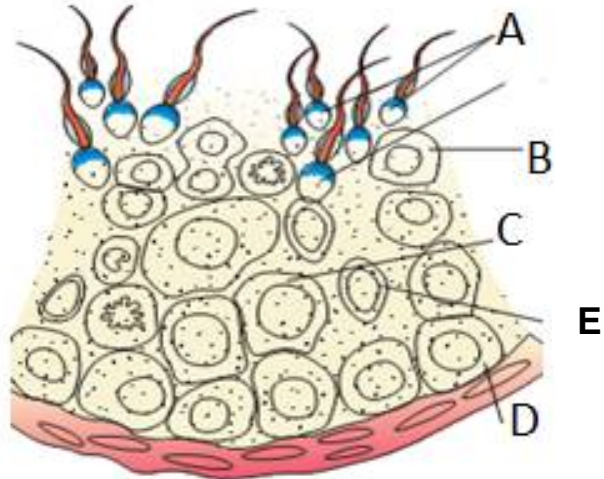
(iii) Name the free living non-pathogenic nematode whose genome has been sequenced.

(b) Explain the significance of SNPs in human genome.

(c) Why does the lac-operen shut down some time after the addition of lactose in the medium where E.coli is growing?

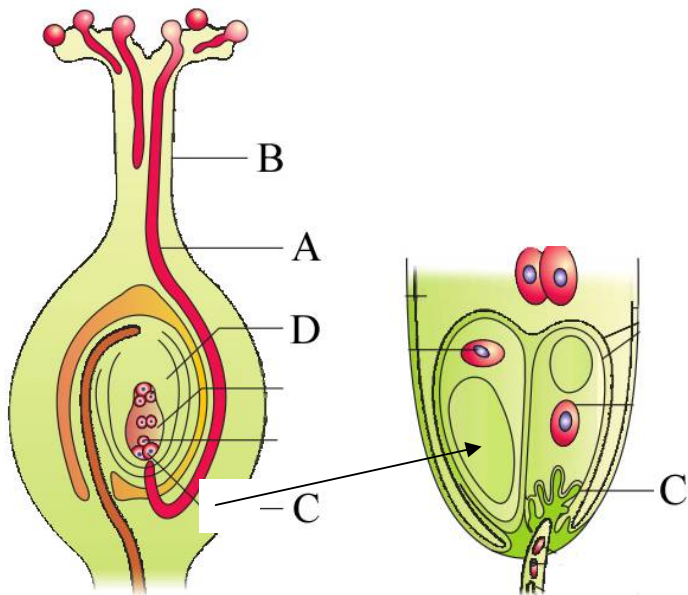
32.

[5]



- (a) (i) Mention the ploidy level of B and C.
(ii) Name the process by which A is produced from spermatid.
(iii) Write two roles of E in the given figure.
(iv) Name the cells produced from D by mitotic differentiation.
- (b) Nothing goes waste in the living system. Prove this statement considering developmental stages of Graafian follicle in the ovary.
- (c) (i) State the fate of trophoblast in human blastocyst at the time of implantation.
(ii) Which organ of female reproductive system is homologous to penis of male.

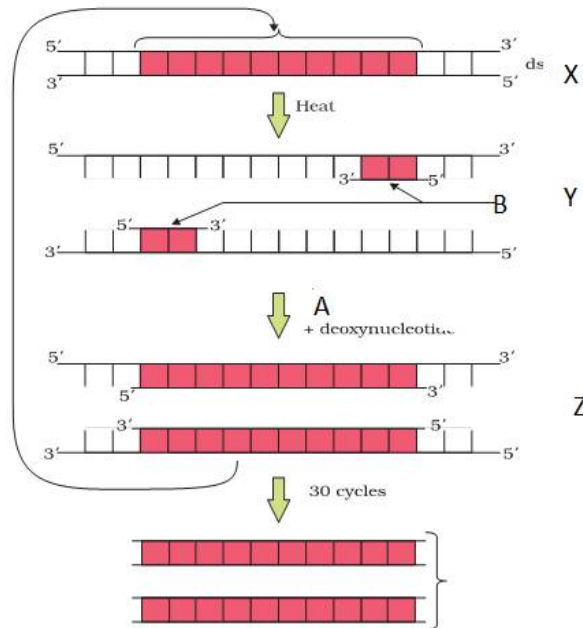
OR



- (a) (i) Mention the ploidy level of A and B.
(ii) Write the function of C.
(iii) Mention the role of D in development of some seeds of orange.
- (b) State how apomixis is commercially beneficial.
- (c) (i) Name two parasitic species that contain thousands of tiny seeds in their fruits.
(ii) Ajanta was given castor and bean seeds, which one will you select to observe endosperm?

33.

[5]

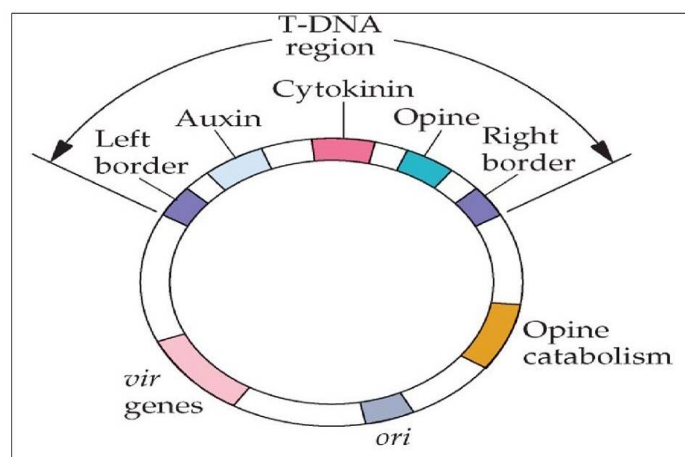


Answer the following questions based on the above diagram.

[1 × 5]

- (a) Which biotechnological process is described in the given diagram.
(b) Identify the steps X, Y and Z.
(c) Identify B and its chemical nature.
(d) Identify the enzyme A and its source.
(e) Mention two uses of this process.

OR



	<p>(a) Give the biological name of the organism from which the given figure is isolated. [1]</p> <p>(b) Why is the organism bearing above structure called as natural genetic engineer? [2]</p> <p>(c) Write any two usefulness of GM plants. [1]</p> <p>(d) Name two human diseases where transgenic models are used for their studies. [1]</p>	
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