

CBSE Class 12 Biology Question Paper 2020 Set 2 Solution

CLASS XII BIOLOGY SET – II 57/1/2

S.N O	SOLUTION	MARK
	SECTION A	
1	(B) Corn borer	1
2	(C) The normal DNA from ^{15}N - DNA	1
3	(C) The flower is cleistogamous	1
	(OR) (A) Chlamydomonas	1
4	(C) Tissue culture	1
	(OR) (A) Lactobacillus and Yeast	1
5	(D) Skin	1
	SECTION B	
6	Baculoviruses belongs to the genus Nucleopolyhedro viruses.(0.5m) They can be used as bio control agent due to the following reasons: (a) Baculovirus are species specific(0.5m) (b) They have no negative impact on plants, mammals, birds, fish and non-target insects(0.5m) (c) Baculovirus have narrow spectrum-insecticidal application.(0.5m)	2
	(OR) Bacteria & filamentous fungi forms flocs in the secondary treatment (Biological treatment) of sewage. The flocs are essential to digest the organic matter present in the sewage. Thus this results in decrease of BOD, making the sewage water safe for disposal into the water bodies.	2
7	When the person suffers from measles in their early childhood, their body prepares antibodies against the measles virus. Thus when the body comes in contact with the virus for the second time, those antibodies act against the measles virus. Therefore the body becomes immune to measles virus for the second time. This type of immunity is known as active immunity .	2
8	Wings of birds and wings of butterflies are example of analogous organs and they exhibit convergent evolution. Organisms developing different structures but have the same function is called convergent evolution .	2
9	HIV attacks and destroys the CD4 protein on the T-lymphocyte .It infects the T-lymphocyte and the genetic material of HIV (ss RNA) along with the reverse transcriptase enzyme. The RNA undergoes reverse transcription and multiplies the viral genetic content.	2

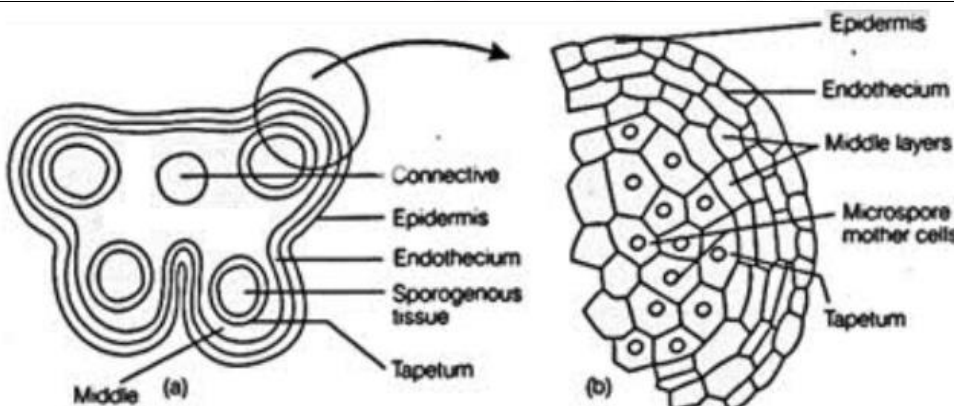
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10	Vasa efferentia, Vas deferens, Rete testis, Ejaculatory duct.(0.5m for each correct option)	0.5*4=2m									
11	Mating between organism of the same breed who are not related for 4-5 generations. Outcrossing is the method to increase the milk yielding in cows.	2m									
12	(a) 5' ATGCATGCATGCATGC 3' (b) 5' AUGCAUGCAUGCAUGC 3' Note: 3' – 5' is template strand 5' - 3' is coding strand	1+1=2m									
SECTION C											
13	<p>Hemophilia is sex-linked recessive disorder. Thus if the female is heterozygous, then she acts as a carrier but is not hemophilic. Since the son receives X chromosome from the mother, in most of the cases the heterozygous carrier female transmit the disease to sons.</p> <p>The possibility of a female becoming hemophilic is rare because mother of such female has to be at least carrier and the father should be hemophilic.</p> <p>The above mentioned possibilities can be explained using the following cross:</p> <p>Case 1:- Mother is carrier & Father is affected</p> <div style="text-align: center;"> <p>Mother (carrier) Father (affected)</p> $\begin{array}{c} XX^h \\ \swarrow \quad \searrow \\ X \qquad X^h \end{array} \qquad \begin{array}{c} X^hY \\ \swarrow \quad \searrow \\ X^h \quad Y \end{array}$ <table border="1" style="margin: auto;"> <tr> <td></td><td>X^h</td><td>Y</td></tr> <tr> <td>X</td><td>XX^h</td><td>XY</td></tr> <tr> <td>X^h</td><td>$X^h X^h$</td><td>$X^h Y$</td></tr> </table> <p>In this case 50% of son's and 50% of daughter are affected.</p> <p>Case 2: Mother is a carrier & father is unaffected</p> <p>Mother (carrier) Father (unaffected)</p> </div>		X^h	Y	X	XX^h	XY	X^h	$X^h X^h$	$X^h Y$	3m
	X^h	Y									
X	XX^h	XY									
X^h	$X^h X^h$	$X^h Y$									

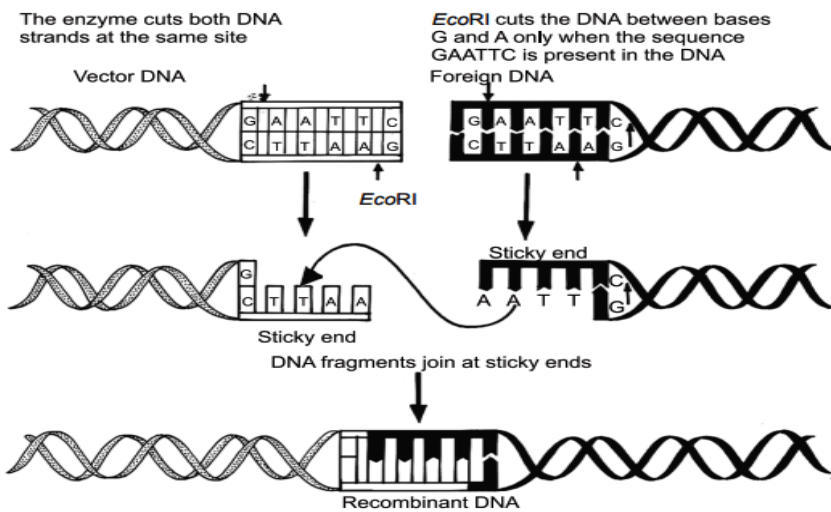
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	<div style="text-align: center;"> XX^h $\swarrow \quad \searrow$ $X \quad X^h$ </div> <div style="text-align: center;"> XY $\swarrow \quad \searrow$ $X \quad Y$ </div> <table border="1" style="margin: 10px auto; border-collapse: collapse;"> <tr> <td></td><td style="text-align: center;">X</td><td style="text-align: center;">Y</td></tr> <tr> <td style="text-align: center;">X</td><td style="text-align: center;">XX</td><td style="text-align: center;">XY</td></tr> <tr> <td style="text-align: center;">X^h</td><td style="text-align: center;">$X^h X$</td><td style="text-align: center;">$X^h Y$</td></tr> </table> <p style="text-align: center;">In this case 50% of son's are affected. But no daughter are affected.</p>		X	Y	X	XX	XY	X^h	$X^h X$	$X^h Y$	
	X	Y									
X	XX	XY									
X^h	$X^h X$	$X^h Y$									
	(OR)										
14	<p>Fruits developed from any other part of the plant other than the ovule is called false fruit. Thus apple is a false fruit as it is obtained from thalamus of the plant. Parthenocarpic fruit are those developed without fertilization and banana is a very good example for parthenocarpic fruit.</p>	3m									
15	 <p>0.5m for each correct labelling</p>	0.5*6=3m									
16	<p>When alien species are introduced unintentionally or deliberately, some of them turn invasive and cause decline or extinction of indigenous species. For example the Nile perch introduced into lake. Victoria in East Africa led to the extinction of more than 200 species of cichlid fish. Other alien species examples includes African cat fish; parthenium and water hyacinth. Introduction of these species have caused loss of biodiversity. (1.5m) Apart from Alien species invasion; the other causes of loss of biodiversity are (1.5m)</p> <p>(a) Co-extinction</p>										

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	(b) Habitat loss & Fragmentation (c) Over exploitation	
17	When the inoculum is added curdling of milk occurs. (1m)The end product formed is curd. The inoculum consists of Lactobacillus which digest the milk protein during the process of formation of curd. Thus presence of Lacto bacillus in curd is beneficial for human health as it enriches the Vit B ₁₂ content and also keeps a check on disease causing microbes in our stomach.(2m)	
18	 <p>The enzyme cuts both DNA strands at the same site</p> <p>Vector DNA</p> <p>Foreign DNA</p> <p><i>EcoRI</i> cuts the DNA between bases G and A only when the sequence GAATTC is present in the DNA</p> <p>Sticky end</p> <p>DNA fragments join at sticky ends</p> <p>Recombinant DNA</p> <p>The restriction endonuclease enzyme (<i>EcoRI</i>) identifies the palindromic sequence in the vector as well as foreign DNA.</p> <p>With reference to the diagram, the <i>EcoRI</i> makes a cut between the bases G and A. This results in the formation of the sticky ends in both vector as well as foreign DNA.</p> <p>The complementary sticky ends of the vector and foreign DNA using DNA ligase are joined together. Hydrogen bonds are formed between these sticky ends as they are complementary. Thus the new DNA formed is called recombinant DNA.</p>	3m
19	(a) Ori gene – Is responsible for replication of DNA(1m) (b) Antibiotic resistance gene – It's a selectable marker(1m) (c) ROP gene- produces protein that is responsible to regulate the copy number(1m)	1+1+1=3 m
20	(a) Chilli (b) Leafcurl Tobaccomosaic virus or chilli mosaic virus (c) Brassica (d) Pusa swarnim	0.5*6=3m

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	(e) Wheat (f) Hill bunt, Leaf and strip (each option 0.5m)	
	<p>(OR) The purposeful manipulation of plant species in order to create desired plant types that are better suited for cultivation, give better yields and are disease resistant is called plant breeding.(1m)</p> <p>Classical plant breeding involves the following steps(2m)</p> <p>(a) Crossing or hybridization of pure lines → Hybridisation is done between homozygous parent.</p> <p>(b) Artificial selection → Choosing the progenies with desirable characteristics. Higher yield, nutrition and resistance to diseases are few of the desirable characteristics based on which the hybrids are chosen.</p>	1+2=3m
21	<p>(a) A–Exponential growth; B- Logistic growth (1+1=2m)</p> <p>(b) When there is unlimited resources available the population grows exponentially. If the resources are limited then the population growth will be limited. This growth is called Logistic growth.(1m)</p>	2+1=3
	SECTION D	
22	<p>(a) Pyramid B → Declining(1m) Pyramid C → Stable(1m)</p> <p>(b) The above pyramids are plotted based on the number of organisms in different age groups. The human population are categorized into three age groups namely pre-reproductive, reproductive and post-reproductive. Pre-reproductive phase includes young children; Reproductive phase includes adults capable of reproduction; Post-reproductive includes people who are in their senescent or old age and has lost their reproductive ability.(1m)</p>	1+1+1=3m
23	<p>(a) Proinsulin has three polypeptide chains namely A, B and C. The chain C acts as a link between, chain A and chain B.</p> <p>Polypeptide C aligns chain A & B in such way that a disulphide bond is formed between polypeptide A and B. With the formation of disulphide bridge pro-insulin becomes functional. A functional insulin has only two polypeptide chain.(1m)</p>	1+1+1=3m

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	(b) r-DNA technology or recombinant DNA technology(1m) (c) The polypeptide chain are held together, by disulphide bridges between chain A and B.(1m)	
24	(a) A → Meiosis (1m) B → Mitosis(1m) (b) C → Parthenogenesis(1m)	1+1+1=3 m
	SECTION E	
25	<p>Phosphorous Cycle</p> <pre> graph TD RM[ROCK MINERALS] -- Weathering --> SS[SOIL SOLUTION] SS -- Uptake --> P[PRODUCERS] P -- Litter fall --> D[DETTRITUS] D -- Decomposition --> SS SS -- Run off --> P P --> C[CONSUMERS] C --> D </pre> <p>Consumers constitute animals that feed on producers (plants) when rocks are weathered minute amounts of phosphates dissolve in soil solution and are absorbed by the roots of the plants.</p> <p>Herbivores obtain the phosphorous from plants. Also phosphorous being the major constituents of biological membrane, when the animal decompose the phosphorous mixes upwith the soil.</p>	5
	<p>(OR) Increase in the concentration of DDT or any toxin in the successive trophic levels is called bio magnification.</p> <p>Following is an example of an aquatic food chain exhibiting bio magnification.</p> <p style="text-align: center;">Fish eating – birds (DDT 25 ppm) ↑ Large fish (DDT 2 ppm) ↑</p>	5

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	<div style="text-align: center;"><p>Small fish (DDT 0.5 ppm)</p><p>↑</p><p>Zooplankton (DDT 0.04 ppm)</p><p>↑</p><p>Water (DDT 0.003 ppm)</p></div> <p>From the food chain it can be determined the DDT level is increasing at every successive trophic level.</p> <p>This happens because the toxic substance cannot be metabolized or excreted by the organism at each trophic level.</p> <p>High concentration of DDT disturb calcium metabolism in birds which causes thinning of egg shell and their premature breaking, eventually causing decline in bird population.</p>											
26	<p>(a) Replication- it should be able to produce its copies.</p> <p>It should have chemical and structural stability.</p> <p>Mutation- it should offer a chance for evolution.</p> <p>It should possess hereditary unit which expresses in the form of "Mendelian Characters".</p> <p>(b)</p> <table><tr><th>DNA</th><th>RNA</th></tr><tr><td>More stable</td><td>Less stable</td></tr><tr><td>Double-stranded structure</td><td>Single-stranded structure</td></tr><tr><td>Presence of deoxyribose sugar</td><td>Presence of ribose sugar</td></tr><tr><td>Thymine is present as a nitrogenous base</td><td>Uracil is Present instead of Thymine</td></tr></table>	DNA	RNA	More stable	Less stable	Double-stranded structure	Single-stranded structure	Presence of deoxyribose sugar	Presence of ribose sugar	Thymine is present as a nitrogenous base	Uracil is Present instead of Thymine	<p>2.5+2.5=</p> <p>5m</p>
DNA	RNA											
More stable	Less stable											
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	<p>(OR) (a) Hardy – Weinberg Principle</p> <p>Hardy – Weinberg Principle mathematically explains the occurrence and consistency of gene frequency for a particular gene. The principle states that the allelic frequency remains constant through generations and the gene pool remains</p>	<p>3+2=</p> <p>5m</p>										

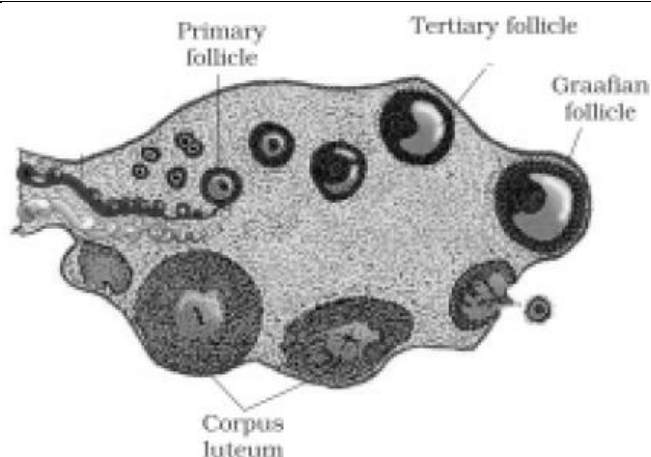
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	<p>constant. This phenomenon is called genetic equilibrium. Also, all the allelic frequencies sum up to 1.</p> <p>Let us assume, the frequency for the allele X in a population is a and that of the allele x is b.</p> <p>Thus, the frequency of XX is a^2, xx is b^2 and Xx is $2ab$. The equation can thus be represented as</p> $a^2 + b^2 + 2ab = 1 \text{ or } (a + b)^2 = 1 \quad (3m)$ <p>(b) All these factors contribute to the change in gene frequency of a species in an area. If a few individuals from a species migrate to another place, the gene frequency changes again. It decreases from the place from where the individuals migrate and increase in the place they migrate to. If the frequency of the genes is high enough in the newly migrated land to start a new species, the migrated individuals become the founder species, and the effect is called founder effect. (2m)</p>	
27	<p>(a) Steps involved in IVF.</p> <p>(i) Collection of gametes from Donor/Parents</p> <p>(ii) The egg is placed in a petridish and sperms are allowed to fertilise the egg.</p> <p>(iii) Once the fertilization is done the zygote is allowed to under go further cleavage</p> <p>(iv) Either at 8 celled stage its transferred into fallopian tube or at 32 celled stage its transferred into the uterus of the mother/surrogate mother. GIFT cannot be considered as IVF as the gamete is transferred into the fallopian tube and fertilization happens in vivo. Since fertilization does not occur under lab conditions, GIFT is not an IVF method.</p>	5
	(OR) (a)	2.5+2.5

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(b) The gonadotrophins are hormones released by the pituitary gland, associated with the primary sex organs.

Follicle stimulating hormone (FSH) and Lieutinisig hormone (LH) are the gonadotrophins.

As the FSH concentration increases follicular maturation begins in the ovary. The matured follicles secrete estrogen hormone.

High level of estrogen triggers the secretion of LH. The LH secretion reaches its peak. This is known as LH surge.

The surge causes the rupture of graafian follicle and thus the secondary oocyte is released. This is known as ovulation.