

CBSE Class 12 Biology Question Paper 2020 Set 3 Solution

CLASS XII BIOLOGY SET – III 57/1/3

S.NO	SOLUTION	MARK
	SECTION A	
1	(B) antigen and antibody interaction.	1
2	Micro propagation can be achieved by (C) Tissue culture.	1
	(OR) The microbes commonly used in kitchen are (A) Lactobacillus & Yeast.	1
3	(C) The normal DNA from ^{15}N -DNA	1
4	(C) The flower is cleistogamous	1
	(OR) (A) Chlamydomonas.	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)	0.5+1.5= 2m
	(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.	2m
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 .	2m
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 .	2m
9	During unfavorable conditions amoeba becomes round and forms a thick cyst around it. Followed by the formation of the cyst is the division of nucleus. Thus during unfavorable condition amoeba under goes multiple fission. As the favorable condition returns the cyst ruptures and the daughter cells are released	2m

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10	(a) Red blood cells of human (b) Stomach of female anopheles mosquito (c) Human being	2m
11	MOET stands for multiple ovulation embryo transfer. In this method the cow is administered hormones, with FSH like activity. This hormone induces follicular maturation and super ovulation. Thus instead of one-egg per cycle. We obtain around 6-8 eggs in a cycle. This animal is either mated with an elite bull or artificially recovered non-surgically & transferred to surrogate mother. The genetic mother is available for another round of super ovulation.	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.</p> <p>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="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>Mother (carrier)</p> $\begin{array}{c} XX^h \\ \diagup \quad \diagdown \\ X \quad X^h \end{array}$ </div> <div style="text-align: center;"> <p>Father (affected)</p> $\begin{array}{c} X^hY \\ \diagup \quad \diagdown \\ X^h \quad Y \end{array}$ </div> </div>	3m

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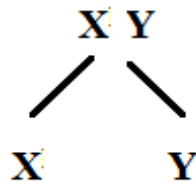
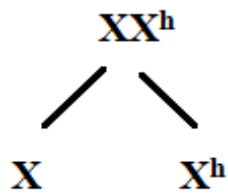
	X^h	Y
X	XX^h	XY
X^h	$X^h X^h$	$X^h Y$

In this case 50% of son's and 50% of daughter are affected.

Case 2: Mother is a carrier & father is unaffected

Mother (carrier)

Father (affected)

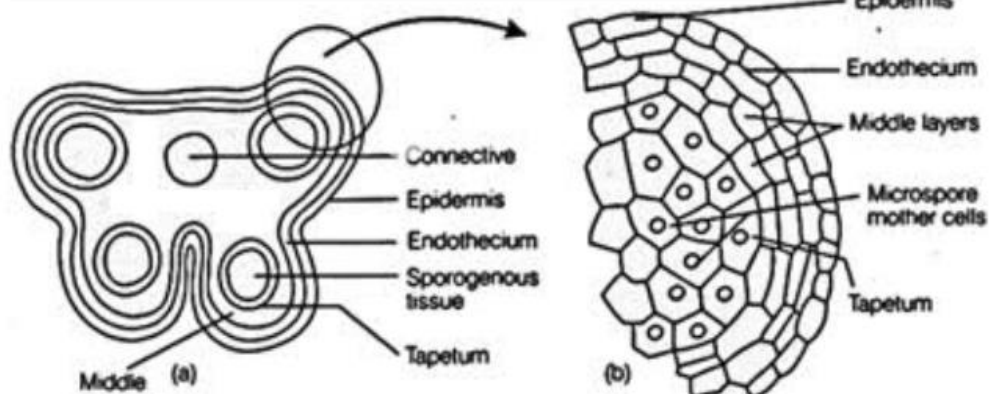


	X	Y
X	XX	XY
X^h	$X^h X$	$X^h Y$

In this case 50% of son's are affected. But no daughter are affected.

(OR)

15



Each labelling is 0.5m

0.5*6=
3m

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16	<p>When alien species are introduced un intentionally 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;-</p> <p>a) Co-extinction(0.5m)</p> <p>b) Habitat loss & Fragmentation (0.5m)</p> <p>c) Over exploitation(0.5m)</p>	3m
17	<p>When the inoculum is added curdling of milk occurs(1m). The end product formed is curd. The inoculum consists of <i>Lactobacillus</i> which digest the milk protein during the process of formation of curd. Thus presence of <i>Lacto bacillus</i> in curd is beneficial for human health as it enriches the Vit B₁₂ content and also keeps a check on disease causing microbes in our stomach.(2m)</p>	
18	<p>Plasmids and Bacteriophages are two natural closing vector.(1m) Plasmids have the ability to replicate within bacterial cells independent of the control of chromosomal DNA. Bacteriophages because of their high number per cell, have very high copy numbers of their genome within the bacterial cells.(1m)</p> <p>Two features that the engineered vectors made to posses are</p> <p>(1) ORI (0.5m)</p> <p>(2) Selectable marker.(0.5m)</p>	1+1+1= 3m
19	<p>(a) DNA fragments are negatively charged molecules. Using this property of DNA it is forced to move towards an anode under an electric field through an agarose medium. The DNA fragment separates according to their size through sieving effect provided by agarose gel. Hence the smaller the fragment in size, farther it moves.</p> <p>(b) The DNA fragments after separation are treated with ethidium bromide followed by UV radiation exposure. This enables us to visualize the DNA fragments.</p>	1.5+1.5= 3m
20	<p>(a) Chilli</p> <p>(b) Leafcurl Tobaccomosaic virus or chilli mosaic virus</p> <p>(c) Brassica</p> <p>(d) Pusa swarnim</p> <p>(e) Wheat</p> <p>(f) Hill bunt, Leaf and strip</p> <p>Each option carries 0.5m</p>	0.5*6= 3m

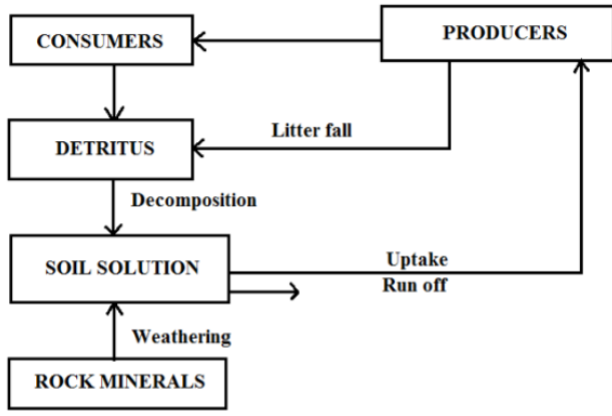
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	<p>(OR) The purposeful manipulation of plant species in order to create desired plant types that are better suited for cultivation, give better yields and are disease resistant is called plant breeding. (1m)</p> <p>Classical plant breeding involves the following steps:- (2m)</p> <ol style="list-style-type: none"> 1. Crossing or hybridization of purelines → <p>Hybridisation is done between homozygous parent.</p> <ol style="list-style-type: none"> 2. Artificial selection → <p>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>Natural ageing of lake is called as eutrophication. Its caused due to gradual accumulation of organic matter over a period of time.</p> <p>Due to uncontrolled human activities like deposition of waste into the water bodies, there is an increase in the organic matter. Thus polluting the water.</p> <p>The human activities accelerated the accumulation of organic matter, thus resulting in early aging of lake which is known as accelerated eutrophication.</p>	3m
	SECTION D	
22	<p>(a) A → Meiosis B → Mitosis</p> <p>(b) C → Parthenogenesis</p>	1+1+1=3m
23	<p>(a) Pyramid B → Declining (1m)</p> <p>Pyramid C → Stable (1m)</p> <p>(b) The above pyramids are plotted based on the number of organisms in different age groups.</p> <p>The human population are categorized into three age groups namely pre-reproductive, reproductive and post-reproductive.</p> <p>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
24	<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 function insulin has only two polypeptide chain.(1m)</p> <p>(b) r-DNA technology or recombinant DNA technology (1m)</p>	1+1+1=3m

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	(c) The polypeptide chain are held together, by disulphide bridges between chain A and B(1m)	
	SECTION E	
25	<p>Phosphorous Cycle</p>  <pre> graph TD PRODUCERS --> CONSUMERS CONSUMERS --> DETRITUS PRODUCERS -- "Litter fall" --> DETRITUS DETRITUS -- "Decomposition" --> SOIL_SOLUTION[SOIL SOLUTION] ROCK_MINERALS[ROCK MINERALS] -- "Weathering" --> SOIL_SOLUTION SOIL_SOLUTION -- "Uptake" --> PRODUCERS SOIL_SOLUTION -- "Run off" --> PRODUCERS </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>	5m
	<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)</p> <p style="text-align: center;">↑</p> <p style="text-align: center;">Large fish (DDT 2 ppm)</p> <p style="text-align: center;">↑</p> <p style="text-align: center;">Small fish (DDT 0.5 ppm)</p> <p style="text-align: center;">↑</p> <p style="text-align: center;">Zooplankton (DDT 0.04 ppm)</p> <p style="text-align: center;">↑</p>	5m

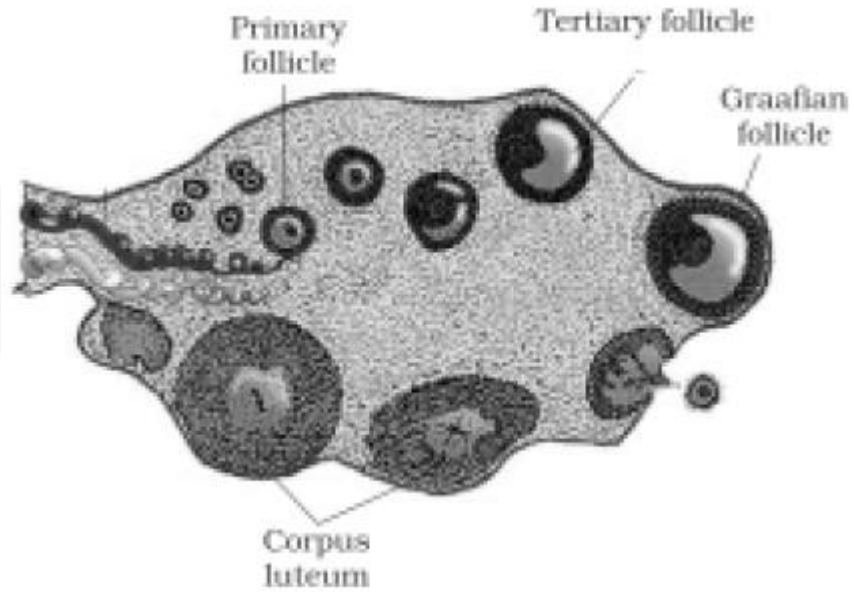
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	<p style="text-align: center;">Water (DDT 0.003 ppm)</p> <p>From the food chain it can be determined the DDT level is increasing at every successive trophic level.</p> <p>This happens because the toxic substance cannot be metabolized or excreted by 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) The DNA replication in prokaryotes takes place in the following place:</p> <ol style="list-style-type: none">1. The two strands of DNA unwind at the origin of replication.2. Helicase opens the DNA and replication forks are formed.3. The DNA is coated by the single-strand binding proteins around the replication fork to prevent rewinding of DNA.4. Topoisomerase prevents the supercoiling of DNA.5. RNA primers are synthesised by primase. These primers are complementary to the DNA strand.6. DNA polymerase III starts adding nucleotides at the end of the primers.7. The leading and lagging strands continue to elongate. <p>The primers are removed and the gaps are filled with DNA Polymerase I and sealed by ligase.</p>	5m
	<p>(OR) Oparin and Haldane suggested that life originated from non-living organic molecules like proteins and RNA. Stanley L. Muller and Harold C. Urey conducted an experiment to explain the origin of life on earth. They believed that the early earth's atmosphere was capable of producing amino acids from inorganic substances. The two biologists used water, methane, ammonia, and hydrogen which they believed were present in the early earth's atmosphere. The chemicals were sealed inside sterile glass tubes and flasks connected together in a loop and circulated inside the apparatus.</p> <p>One flask is half-filled with water and the other flask contains a pair of electrodes. The water vapour was heated and the vapour released was added to the chemical mixture. The released gases circulated around the apparatus imitating the earth's atmosphere. The water in the flask represents the water on the earth's surface and the</p>	5m

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	<p>water vapour is just like the water evaporating from lakes, and seas. The electrodes were used to spark the fire to imitate lightning and storm through water vapour. The vapours were cooled and the water condensed. This condensed water trickles back in the first water flask in a continuous cycle. After a week Miller and Urey analyzed the cooled water and observed that 10-15% of the carbon was in the form of organic compounds. 2% of carbon had formed 13 amino acids. Still, the Miller and Urey experiments were criticised by their fellow scientists.</p>	
27	<p>(a) Steps involved in IVF.</p> <ol style="list-style-type: none"> (1) Collection of gametes from Donor/Parents (2) The egg is placed in a petridish and sperms are allowed to fertilise the egg. (3) Once the fertilization is done the zygote is allowed to under go further cleavage (4) Either at 8 celled stage its transferred into fallopian tube or at 32 called stage its transferred into the uterus of the mother/surrogate mother. <p>(b) 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>	5m
	<p>(OR) (a)</p>  <p>(b) The gonadotrophins are hormones released by the pituitary gland ,associated with the primary sex organs. Follicle stimulating hormone (FSH) and Lieutinising hormone (LH) are the gonadotrophins.</p>	5m

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	<p>As the FSH concentration increases follicular maturation begins in the ovary .The matured follicles secrete estrogen hormone.</p> <p>High level of estrogen triggers the secretion of LH .The LH secretion reaches its peak .This is known as LH surge .</p> <p>The surge causes the rupture of graffian follicle and thus the secondary oocyte is released.This is known as ovulation.</p>	
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