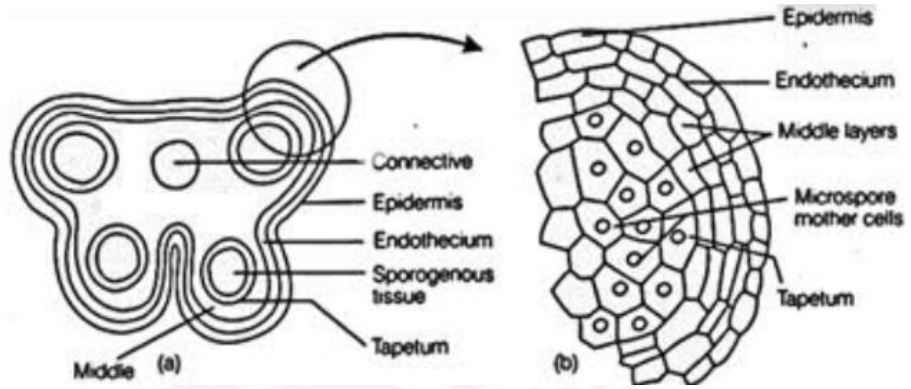
CBSE Class 12 Biology Question Paper 2020 Set 1 Solution

CLASS XII

BIOLOGY SET – I 57/1/1

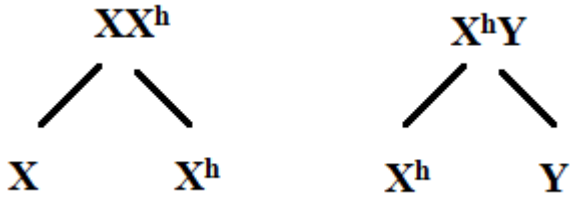
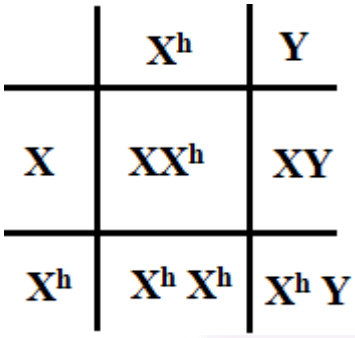
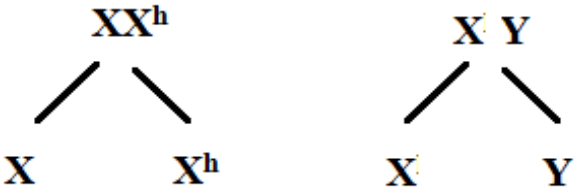
S.NO	SOLUTION	MARK
	SECTION A	
1	(C) The normal DNA from ^{15}N-DNA	1
2	(C) The flower is cleistogamous	1
	(OR) (A) Chlamydomonas.	1
3	(C) Tissue culture.	1
	(OR) (A) Lactobacillus & Yeast.	1
4	(D) skin	1
5	(D) Agrobacterium	1
6	a) 5` ATGCATGCATGCATGC 3`b) 5` AUGCAUGCAUGCAUGC 3` Note : 3` - 5` is template stand 5` - 3` is coding strand	1+1
	SECTION B	
7	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
8	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
9	Hormones like **HCG**, **HPL**, **Relaxin** are released in women only during pregnancy(1.5m) .The level of progesterone increases and level of estrogen is maintained as they help in **maintaining pregnancy**.(0.5m)	1.5+ 0.5
10	The student on field trip is experiencing **allergic reactions** which may have been caused by pollen or dust in the field trip(1m) .When a foreign particle enters our body ,in order to defend itself the body exhibits allergic reaction by releasing histamine(1m)	1+1
11	Cross breeding is the method by which superior male of one breed is mated with superior female of another breed .This practice allows the desirable characteristics of two breeds to be combined.(1m)	1+1

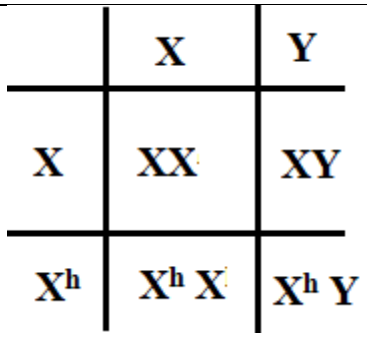
BIOLOGY SET – I 57/1/1

<table>
<tr><td></td><td>For examples :In Punjab Bikaneri ewes and Marino rams are two breeds of sheep .They were mated to obtain Hisardale (1m)</td><td></td></tr>
<tr><td>12</td><td>Bacoloviruses 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)</td><td>0.5+
1.5</td></tr>
<tr><td></td><td>(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.</td><td>2</td></tr>
<tr><td></td><td>SECTION C</td><td></td></tr>
<tr><td>13</td><td> 

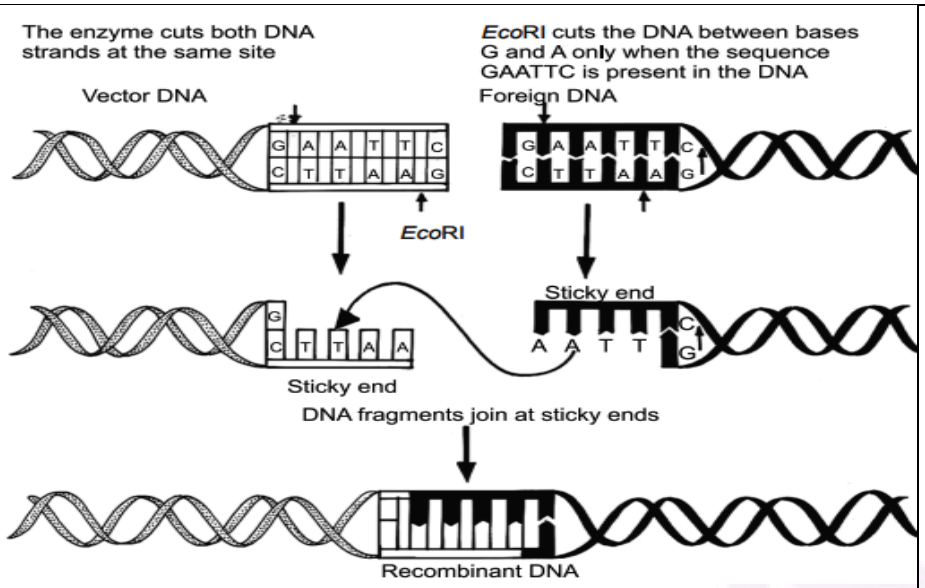
Each labelling carries 0.5m</td><td>3</td></tr>
<tr><td>14</td><td>
<table>
<tr><td>Wind Pollinated</td><td>Insect Pollinated</td></tr>
<tr><td>Wind pollinated flowers don not have nectar</td><td>Insect Pollinated flowers are rich in nectar to attract insects</td></tr>
<tr><td>The petals are dull and does not attract the insects</td><td>The petals of these flowers are very colorful and attractive</td></tr>
<tr><td>They dont have any scent</td><td>The scent of these flowers are another factor that attracts insects</td></tr>
<tr><td>The pollen grains are non-sticky ,light</td><td>The pollen grains are sticky</td></tr>
<tr><td>Stigma is feathery ,to catch the pollen grain</td><td>Stigma is non-feathery and sticky</td></tr>
</table>
</td><td>1*3=
3m</td></tr>
</table>

BIOLOGY SET – I 57/1/1

15	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. 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. The above mentioned possibilities can be explained using the following cross;- Case 1:- Mother is carrier & Father is affected Mother (carrier) Father (affected)   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)  	3

	 In this case 50% of son's are affected. But no daughter are affected.	
16	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)	1+2
17	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;- (1.5m) a) Co-extinction b) Habitat loss & Fragmentation c) Over exploitation	1.5+ 1.5
18	(a) Chilli (b) Leafcurl Tobaccomosaic virus or chilli mosaic virus (c) Brassica (d) Pusa swarnim (e) Wheat (f) Hill bunt, Leaf and strip (each option 0.5m)	0.5*6=3 m
	(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) Classical plant breeding involves the following steps:- (2m) 1. Crossing or hybridization of purelines → Hybridisation is done between homozygous parent. 2. Artificial selection → Choosing the progenies with desirable characteristics. Higher yield, nutrition and resistance to diseases are few of the desirable characteristics based an which the hybrids are chosen.	1+2= 3m

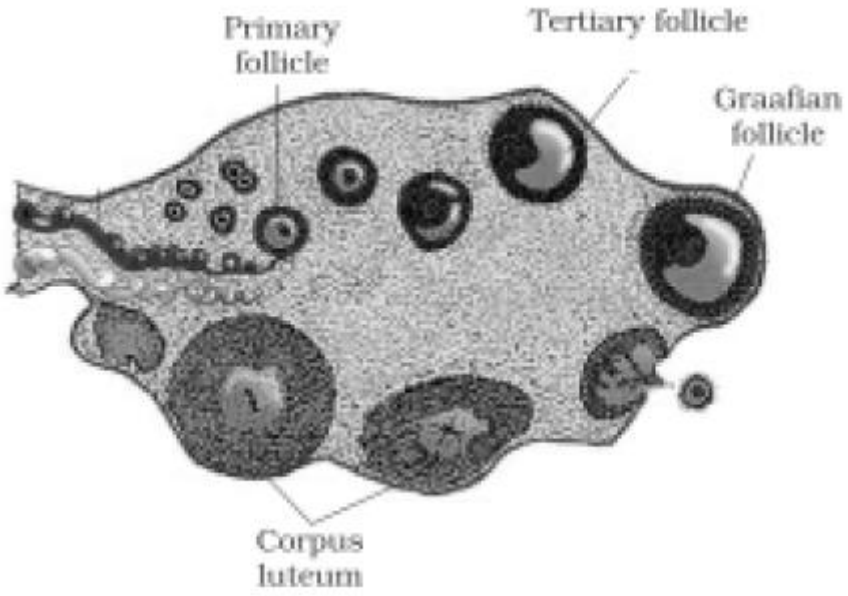
BIOLOGY SET – I 57/1/1

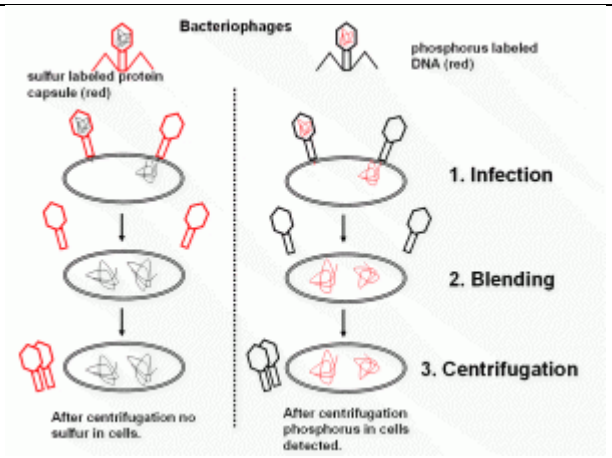
19	 The restriction endonuclease enzyme (EcoRI) identifies the palindromic sequence in the vector as well as foreign DNA. With reference to the diagram ,the EcoRI makes a cut between the bases G and A .This results in the formation of the sticky ends in both vector as well as foreign DNA The complementary 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.	3m
20	**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) Two features that the engineered vectors made to posses are (0.5+0.5=1m) (1) ORI (2) Selectable marker.	1+1+ 0.5+ 0.5=3
21	Commensalism is the type of interaction where one organism of a species is benefitted whereas the other is neither benefitted nor harmed . For eg : Sea anemone on a hermit carb .Here the organism benefitted is the Se anemone as it gets transported as the hermit crab moves . Mutualism is the type of interaction where organisms of two species are dependent on each other.Lichens are an example of mutualism ,wherein the algae is a source of nutrition for the fungi and the fungi provides shelter for the algae.	3
	SECTION D	

CLASS XII

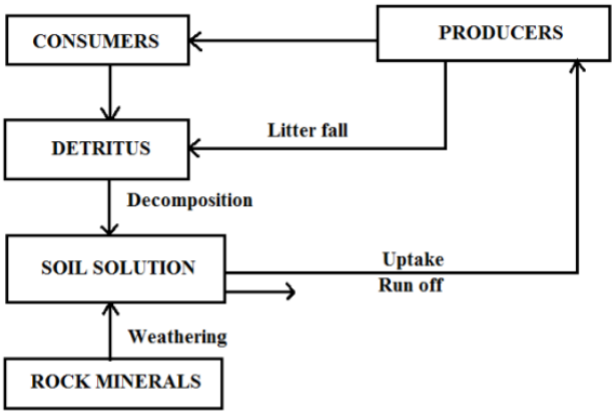
BIOLOGY SET – I 57/1/1

22	(a) Proinsulin has three polypeptide chains namely A, B and C .The chain C acts as a link between, chain A and chain B. 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) (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)	1+1+1= 3m
23	(a) A → Meiosis (1m) B → Mitosis (1m) (b) C → Parthenogenesis(1m)	1+1+1= 3m
24	(a) Pyramid B → Declining (1m) Pyramid C → Stable (1m) (b) The above pyramids are plotted based on the number of organisms in different age groups.(1m) 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.	1+1+1= 3m
	SECTION E	
25	(a) Steps involved in IVF. (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. (2.5m) (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.(2.5m)	2.5+2.5 =5m
	(OR) (a)	3+2=5m

	 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. 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 graffian follicle and thus the secondary oocyte is released.This is known as ovulation.	
26	The experiment was conducted by culturing bacteriophages in two types of medium. Bacteriophages are viruses that infects the bacteria.One set of Bacteriophages (A) was cultured in a medium of radioactive phosphorus whereas another set (B) was cultured in a medium of radioactive sulfur. They observed that the first set of viruses (A) consisted of radioactive DNA but not radioactive proteins. This is because DNA is a phosphorus-based compound while protein is not. The latter set of viruses (B) consisted of radioactive protein but not radioactive DNA. The process happen in three stages :1.Infection : The bacteriophage is allowed to infect the bacteria. 2.Blending :The viral DNA replicates in the host bacteria 3.Centrifugation:The bacterial DNA was lysed and centrifuged to obtain the viral DNA	5

	 **Observation:** E.coli bacteria which were infected by radioactive DNA viruses (A) were radioactive but the ones that were infected by radioactive protein viruses (B) were non-radioactive. **Conclusion:** Resultant radioactive and non-radioactive bacteria infer that the viruses that had radioactive DNA transferred their DNA to the bacteria but viruses that had radioactive protein didn't get transferred to the bacteria. Hence, DNA is the genetic material and not the protein.	
	(OR) Before industrialization ,the lichens were flourishing on the tree barks.As a result of which the barks appeared white in color.Therefore the white winged moth were able to camaflouge themselves and hide from the predators.Whereas the dark winged moths were clearly visible in the white background.As a result of which there were more prone to the predators.Thus the number of dark winged moth decreased ,whereas white winged moth increased. After the 1900s due to industrilisation ,the lichens presence declined.Now the color of the tree barks were no longer white.As a result of which the white winged moth count decreased whereas due to camfalouge the dark winged moth flourished. This is an example of natural selection.	5
27	Phosphorous Cycle	5

BIOLOGY SET – I 57/1/1



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.

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.

(OR) Increase in the concentration of DDT or any toxin in the successive trophic levels is called bio magnification. 5

Following is an example of an aquatic food chain exhibiting bio magnification.

Fish eating – birds
(DDT 25 ppm)
↑
Large fish
(DDT 2 ppm)
↑
Small fish
(DDT 0.5 ppm)
↑
Zooplankton
(DDT 0.04 ppm)
↑
Water
(DDT 0.003 ppm)

	From the food chain it can be determined the DDT level is increasing at every successive trophic level. This happens because the toxic substance cannot be metabolized or excreted by the organism at each trophic level. High concentration of DDT disturb calcium metabolism is birds which causes thinning of egg shell and their premature breaking, eventually causing decline in bird population.	