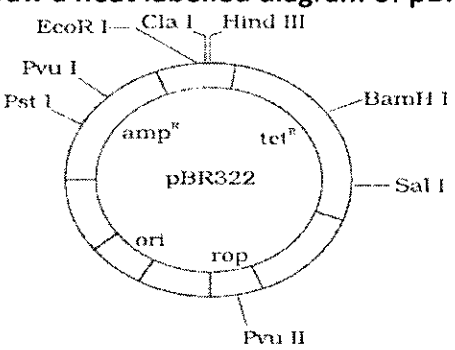
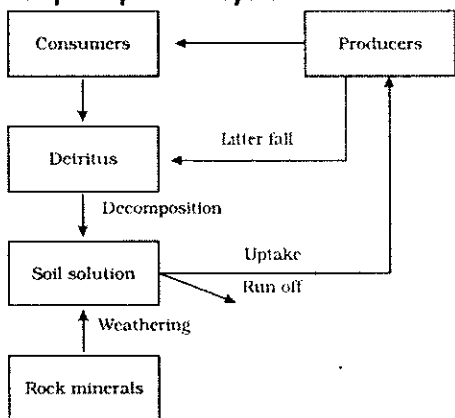


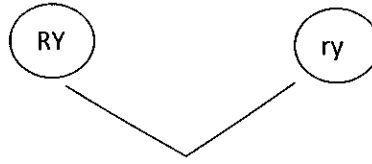
<p>20</p>	<p>Briefly explain sex determination in human being.</p> <ul style="list-style-type: none"> • In human sex determination is XX- XY type. • The chromosomal compliment of male is 44AA + XY. • Males are heterogametic because they produce two types of gametes (sperms) i.e., 50% gametes carrying X- chromosome (22A+X) and other 50% of gametes carrying Y- chromosome (22A+Y). • The chromosomal compliment of female is 44AA+ XX. • Females are homogametic and produce similar type of gametes (eggs) carrying X- chromosome (22A+X) • During fertilization, if egg fuses with sperm carrying X- chromosome develops into female offspring. • If egg fuses with sperm carrying Y- chromosome develops into male offspring. 	<p>1 1 1</p>	<p>86</p>
<p>21</p>	<p>Mention any three applications of DNA finger printing technique.</p> <ul style="list-style-type: none"> • It is used to identify the criminals connected with murder and rape (Forensic investigation). • It is used to solve the cases of disputed parentage and relationship i.e., maternity and paternity testing. • It helps in determining population and genetic diversity. • It solves the disputes arising from baby switch over in hospitals. <p style="text-align: right;">- ANY THREE</p>	<p>1 x 3</p>	<p>123</p>
<p>22</p>	<p>a) Differentiate between active immunity and passive immunity.</p> <p>Active immunity:</p> <ul style="list-style-type: none"> • The immunity developed due to exposure to infection. • It is slow and takes time to give its response. • It provides lifelong immunity. • Memory cells are produced for long term immunity. • The antibodies produced are harmless. <p>Passive immunity:</p> <ul style="list-style-type: none"> • The immunity developed due to injection of readymade antibodies. • It shows immediate response. • It provides temporary immunity. • Memory cells are not produced. • The antibodies which are injected are some time harmful <p style="text-align: right;">- ANY TWO</p> <p>b) Define allergy.</p> <ul style="list-style-type: none"> ▪ The exaggerated response of the immune system to certain antigens present in the environment is called allergy. 	<p>1 x 2 1</p>	<p>152 153</p>
<p>23</p>	<p>Draw a neat labelled diagram of pBR-322 plasmid.</p> 	<p>3</p>	<p>199</p>

24	<p>a) Mention the functional components of ecosystem.</p> <ul style="list-style-type: none"> Productivity, Decomposition, Energy flow, Nutrient cycling. <p>b) What is trophic level?</p> <ul style="list-style-type: none"> A specific position occupied by an organism in the food chain for getting their nutrition is called trophic level. 	<p>$\frac{1}{2} \times 4$</p> <p>1</p>	<p>242</p> <p>246</p>
25	<p>a) Mention any two causes of biodiversity losses.</p> <ul style="list-style-type: none"> Habitat loss and fragmentation Over exploitation Invasion of alien species Co-extinctions <p>b) What are endemic species?</p> <ul style="list-style-type: none"> The species which are confined to a particular area and not found anywhere else 	<p>- ANY TWO</p> <p>1 x 2</p> <p>1</p>	<p>264</p> <p>266</p>
26	<p>Write the schematic representation of phosphorus cycle.</p>  <pre> graph TD RM[Rock minerals] -- Weathering --> SS[Soil solution] SS -- Uptake --> P[Producers] P -- Letter fall --> D[Detritus] D -- Decomposition --> SS SS -- Run off --> RO[Run off] P --> C[Consumers] C --> D </pre>	<p>3</p>	<p>255</p>
<p>PART- D SECTION-I</p>			
27	<p>a) Explain any four outbreeding devices that prevents autogamy.</p> <ul style="list-style-type: none"> Unisexuality (Dicliny): The production of unisexual flowers in a plant to avoid self pollination. Ex: Papaya Dichogamy: It is a condition in bisexual flowers where maturation of stamens and pistil at different times to avoid self pollination. Heterostyly: Placement of anther and stigma at different positions, so that the pollen grains cannot come in contact with the same flower. Ex: Prim rose Self-incompatibility: It is a genetic mechanism in which the pollen grains fails to germinate on the stigma of the same flower. Ex: Passiflora Herkogamy: It is a condition in a flower, in which some physical barriers present between anthers and stigma to prevent self pollination. Ex: Calotropis <p style="text-align: right;">-(only mentioning- $\frac{1}{2}$ each)</p> <p>b) What is apomixis?</p> <ul style="list-style-type: none"> Production of seeds without fertilization. 	<p>1 x 4</p> <p>1</p>	<p>31</p> <p>38</p>
28	<p>Explain the inheritance of two genes in pea plants with suitable examples.</p> <ul style="list-style-type: none"> Mendel crossed a homozygous pea plant producing round and yellow seeds with a homozygous pea plant producing wrinkled and green seeds in F_1 generation all plants are heterozygous round and yellow seeded. When F_1 hybrid plants are allowed to self-pollinate, in F_2 generation round yellow, round green, wrinkled yellow & wrinkled green seeded plants are produced in the ratio of 9:3:3:1. 	<p>1</p>	

Parents -
genotype-

Homozygous round yellow $RRYY$ X Homozygous wrinkled green $rryy$

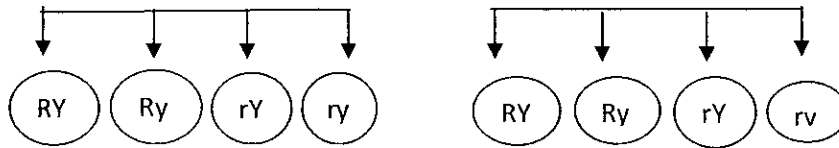
Gametes-



F₁ generation-
Selfing of F₁ hybrid-
Genotype-

$RrYy$ - round yellow (Heterozygous) X $RrYy$ - round yellow (Heterozygous)

Gametes-



F₂ generation-

gametes	RY	Ry	rY	ry
RY	$RRYY$ Round Yellow	$RRYy$ Round Yellow	$RrYY$ Round Yellow	$RrYy$ Round Yellow
Ry	$RRYy$ Round Yellow	$RRyy$ Round Green	$RrYy$ Round Yellow	$Rryy$ Round Green
rY	$RrYY$ Round Yellow	$RrYy$ Round Yellow	$rrYY$ Wrinkled Yellow	$rrYy$ Wrinkled Yellow
ry	$RrYy$ Round Yellow	$Rryy$ Round Green	$rrYy$ Wrinkled Yellow	$rryy$ Wrinkled Green

Round Yellow - 9
Round Green - 3
Wrinkled yellow - 3
Wrinkled Green - 1

Phenotypic ratio is 9 : 3 : 3 : 1

OR

- Detailed explanation with genotypic ratio

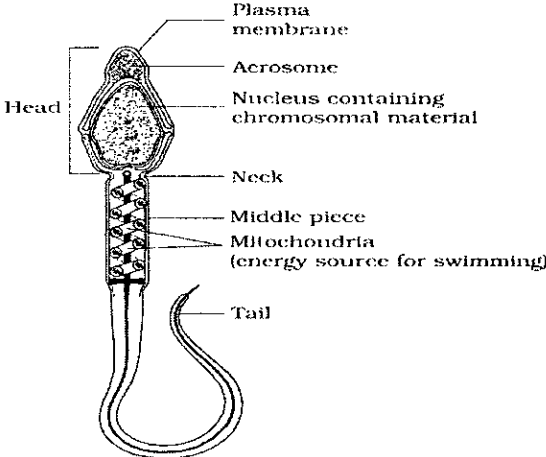
- 5 marks

1

78,
79

2

1

29	<p>Draw a neat labelled diagram of human sperm.</p>  <p>Labels in the diagram: Plasma membrane, Acrosome, Nucleus containing chromosomal material, Neck, Middle piece, Mitochondria (energy source for swimming), Tail.</p>	5	48
30	<p>What is infertility? Explain IVF-ET and ZIFT methods to assist infertile couple to have children.</p> <ul style="list-style-type: none"> • Infertility is the inability to produce children inspite of unprotected sexual co-habitation / sexual contact. <p>1. IVF-ET (In vitro Fertilization & Embryo Transfer):</p> <ul style="list-style-type: none"> • It is one of the advanced assisted conception techniques popularly known as test tube baby technique. • In this method ova from the wife or donor female and sperms from the husband or donor male are collected. • The sperms and the ova are incubated to form zygote under simulated condition in the laboratory. • This type of fertilization outside the body of the mother in simulated condition is called invitro fertilization. • The zygote or early embryo (8 celled blastocyst) could be transferred into the fallopan tube of surrogate mother, where she provide suitable conditions for further development of embryo. <p>2. ZIFT (Zygote Intra Fallopan Transfer):</p> <ul style="list-style-type: none"> ▪ In this technique after in-vitro fertilization the zygote is transferred into the fallopan tube. ▪ After the transfer of zygote early stages of development, implantation and maintenance of pregnancy takes place in the normal method. 	1 2 2	63, 64
31.	<p>Enumerate any five salient features of genetic code.</p> <ul style="list-style-type: none"> ▪ Codon is triplet: A sequence of 3 nucleotides on m- RNA that codes for a specific amino acid. ▪ Codon is universal: A particular codon on mRNA codes for the same amino acid in all organisms. Ex: UUU codes for phenylalanine. ▪ Codons are non-overlapping: The arrangement of codons on mRNA is sequentially one after the other without overlapping. ▪ Codon is degenerative: Same amino acid is coded by more than one codon. Ex: Valine is coded by GUU, GUC, GUA and GUG. ▪ Codon is comma less: The codons are read on mRNA in a continuous fashion without any punctuation mark. ▪ Codon is unambiguous or specific: a particular codon codes a specific amino acid. ▪ Initiator codon: Out of 64 codons, there is an initiator codon AUG that codes for 		112

	<p>methionine amino acid and initiates protein synthesis (rarely GUG).</p> <ul style="list-style-type: none"> ▪ Non-sense or terminator codons: Out of 64 codons, 3 codons namely UAA, UAG and UGA do not code for any amino acids and terminates protein synthesis. (-only mentioning - ½ each) 	1 x 5	
32	<p>What is tissue culture? Mention any four applications.</p> <ul style="list-style-type: none"> • The technique of regenerating whole plants in culture medium using explants under sterile conditions is called tissue culture. <p>Applications:</p> <ul style="list-style-type: none"> • Micropropagation- production of large number of plants. • Production of virus free plants through apical meristem culture. • Production of somaclones- genetically similar plants. • Production of somatic hybrids by the fusion of protoplast of two different varieties of plants. Ex: Pomato 	1	177
SECTION-II			
33	<p>With the help of neat labelled diagram explain Stanley Miller's experiment in support of chemical evolution.</p> <div style="text-align: center;"> </div> <ul style="list-style-type: none"> • In 1953 Stanley Miller demonstrated chemical evolution of life by creating conditions similar to primordial earth in a laboratory scale. • A mixture of methane (CH_4), ammonia (NH_3) and hydrogen (H_2) was pumped into the spark discharge chamber. • Mean while water was boiled at 800°C to produce water vapour in the boiler. • The mixture was treated with electric sparks in the chamber. • The product of chamber was allowed to condense and after analysis he observed the formation of amino acids. 	3	127, 128
34	<p>Describe the role of microbes as biofertilizers.</p> <ul style="list-style-type: none"> • The main source of biofertilizers are bacteria, fungi and cyanobacteria which helps to enrich the soil nutrients. • Rhizobium – A symbiotic bacteria present in root nodules in leguminous plants and fix atmospheric nitrogen into organic forms which is used by the plant as nutrient. • Free living soil bacteria like Azospirillum and Azotobacter enrich the nitrogen content of the soil. • Mycorrhiza -The symbiotic association of fungi with roots of higher plants. Many members of the genus Glomus form mycorrhiza. <ul style="list-style-type: none"> ○ They absorb phosphorus from the soil and pass it to the plants. ○ Show resistant to root-borne pathogens. 	1 1 1 1	188

	<ul style="list-style-type: none"> ○ Increase tolerance to salinity and drought. ● Cyanobacteria like <i>Anabaena</i>, <i>Nostoc</i>, <i>Oscillatoria</i> etc. fix atmospheric nitrogen and enriches the fertility of soil and also add organic matter to the soil. 	1	
35	<p>What is RNA interference? How does RNA interference helps to develop resistance in tobacco plant against nematode infection?</p> <ul style="list-style-type: none"> ● The silencing of a specific mRNA due to a complementary dsRNA molecule that binds and prevents translation of mRNA is called RNA interference. ○ A nematode <i>Meloidogyne incognitia</i> infects the roots of tobacco plants and reduce their yield. ○ Nematode-specific genes were introduced into the host plant using Agrobacterium vectors. ○ The introduced DNA produces both sense and anti-sense RNA in the host cells. ○ These two RNA's being complementary to each other formed a double stranded RNA (dsRNA) that initiates RNAi and silenced the specific mRNA of the nematode. ○ The result was that the parasite could not survive in a transgenic host and the transgenic plant got itself protected from the parasite. 	1 1 1 1 1	209
36	<p>a) List the responses of living organisms to abiotic factors.</p> <ul style="list-style-type: none"> ● The responses of living organisms to abiotic factors are- 1) Regulate 2) Conform 3)Migrate 4) Suspend <p>b) What is commensalism? Give an example.</p> <ul style="list-style-type: none"> ● It is a type of interaction in which one species benefits and the other is neither benefitted nor harmed. <p>Ex:</p> <ul style="list-style-type: none"> ▪ Orchids growing as an epiphyte on mango trees. ▪ Barnacles growing on the back of a whale. ▪ The cattle Egret and grazing cattle. ▪ Sea anemone and clown fish. <p style="text-align: right;">-ANY ONE</p> <p>c) Name the type of interaction between algae and fungi in Lichens.</p> <ul style="list-style-type: none"> ○ Mutualism 	½ x 4 1 1	224, 225 236 237
37	<p>What is global warming? Mention the causes and effects of global warming.</p> <ul style="list-style-type: none"> ● Considerable heating of earth due to increased concentration of green house gases is called global warming. <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> ● Increase in the mean temperature of earth is called global warming. <p>Causes :</p> <ul style="list-style-type: none"> ● Increased level of green house gases like carbon dioxide (CO₂) methane (CH₄), Chlorofluorocarbons (CFCs) and Nitrogen oxides (N₂O) in the atmosphere <p>Effects:</p> <ul style="list-style-type: none"> ● Rise in temperature. ● Odd climatic changes or El Nino effect. ● Melting of polar ice caps and Himalayan snow caps. ● Rise in sea level that can submerge many coastal areas. <p style="text-align: right;">-ANY TWO</p>	1 ½ x 4 2	281, 282