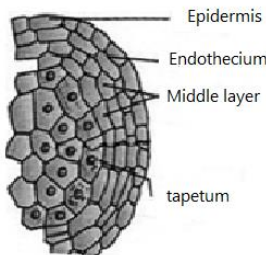
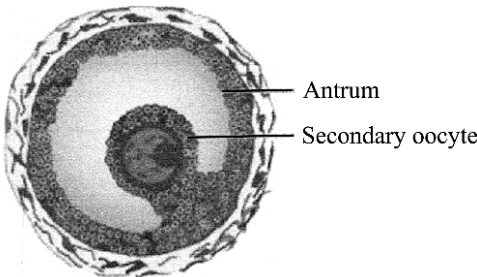
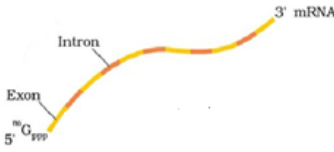


	(ii) - Nutrition: It facilitates the supply of nutrients to embryo. - Hormonal regulation: Acts as an endocrine gland and produces hCG /Human Chorionic Gonadotropin, hPL / Human Placental Lactogen, estrogen, progestogens. (Any two hormones) OR (b) (i) Fertilisation can only occur if the ovum and sperms are transported simultaneously to the ampullary region / use of contraceptive devices / low sperm count or poor sperm quality / absence of ovulation / lactational amenorrhea / coitus interruptus / periodic abstinence (Any other correct reason) (ii) <table><tr><td>Meiosis I in Spermatogenesis</td><td>Meiosis I in Oogenesis</td></tr><tr><td>Starts at puberty</td><td>Starts during embryonic stage</td></tr><tr><td>Results in production of two equal haploid secondary spermatocyte</td><td>Results in production of unequal haploid secondary oocyte and first polar body</td></tr></table> (Any One correct difference)	Meiosis I in Spermatogenesis	Meiosis I in Oogenesis	Starts at puberty	Starts during embryonic stage	Results in production of two equal haploid secondary spermatocyte	Results in production of unequal haploid secondary oocyte and first polar body	$\frac{1}{2}$ $\frac{1}{2}+\frac{1}{2}$ 1 1 2	
Meiosis I in Spermatogenesis	Meiosis I in Oogenesis								
Starts at puberty	Starts during embryonic stage								
Results in production of two equal haploid secondary spermatocyte	Results in production of unequal haploid secondary oocyte and first polar body								
	SECTION C								
22.	(a) Propagation of large number of plants in short duration, new plants are genetically identical to the original plants from which they have grown, production of disease free plants. (Any two) (b) Tomato, Banana, Apple (Any other two correct examples)	1+1 $\frac{1}{2}+\frac{1}{2}$	3						
23.	(a) <i>Drosophila melanogaster</i> (b) - They could be grown on simple synthetic medium in the laboratory. - Complete their life cycle in about two weeks. - Single mating produces large number of progeny flies. - Clear differentiation of sexes – male and female flies are easily distinguishable. - Has many types of hereditary variations that can be seen under low power microscopes. / (Any other correct reason) (Any four)	1 $\frac{1}{2} \times 4$	3						
24.	- 	$\frac{1}{2} \times 4$							

	(Award ½ marks for each correct labelling) - Outermost layer: Epidermis helps in protection / in dehiscence of anther to release the pollens. - Innermost layer: Tapetum provides nourishment to the developing pollen grains	½ ½	3
25.	(a) - Amniocentesis - Some of the amniotic fluid of the developing foetus is taken to analyse the fetal cells and dissolved substances. - Advantage: It tests the presence of certain genetic disorders /down syndrome / haemophilia / sickle cell anaemia / determine the survivability of the foetus - Disadvantage: to determine the sex of unborn child and if found female may lead to female foeticide. (b) Saheli is different from other pills in term of: - Composition: It is non-steroidal. - Advantage: Once a week pill / low side effects / high contraceptive value	½ ½ ½ ½ ½ ½	3
26.	(a) To prove that formation of life was preceded by chemical evolution/ organic molecules can form spontaneously from inorganic molecules (b) - Gases used: CH₄, NH₃, H₂, Water vapours. - Source of energy - Electric discharge	1 1 1	3
27.	(a) Genetic Code: It is the sequence of three nitrogenous bases (codon) on mRNA that directs the sequence of amino acids during synthesis of proteins. (b) To provide complementarity between nucleotides and amino acids / to support the notion that change in nucleic acids was responsible for change in amino acids in proteins / to establish the correlation between genetic information and protein synthesis / to constitute a combination of four bases to code twenty amino acids. (c) As a codon from bacteria to human code for the same amino acid.	1 1 1	3
28.	(a) Due to immune response shown by the body / due to ability of the body to fight against foreign agents (pathogens) (b) Physical barrier, Skin on our body prevents entry of pathogens / Mucus coating (of respiratory, gastrointestinal, urinogenital tract) help in trapping microbes entering our body. - Physiological barrier, Acid from stomach / saliva in the mouth / tears from eyes – all prevent microbial growth. - Cellular barrier, Neutrophils and monocytes in the blood as well as macrophages in tissues can phagocytose and destroy microbes. - Cytokine barrier, Virus infected cell secrete proteins interferons that protect non-infected cells from further viral infection (Any Two)	1 ½ x4	3
SECTION D			

29.	(a) Genetic Engineering / Recombinant DNA Technology (b) - Plasmid is an autonomously replicating circular extra chromosomal DNA. - It is used as a vector to transfer foreign genes into host cells. (c) Antibiotic resistant gene, <i>Salmonella typhimurium</i> OR (c) - Exonuclease: Remove the nucleotides from the ends of DNA strand. - Endonuclease: Make cuts at specific positions within DNA strand.	1 1 1 ½+½ ½ ½	4				
30.	(a) Water, Soil, sunlight, temperature, organic substances, inorganic substances (Any two) (b) <table border="1"><thead><tr><th>Role of producers</th><th>Role of decomposers</th></tr></thead><tbody><tr><td>Conversion of inorganic molecules into organic material with the help of sunlight through the process of photosynthesis</td><td>Break down of dead and decayed organic material into simpler inorganic substances through the process of decomposition</td></tr></tbody></table> (c) Food Chain : Phytoplanktons → zooplanktons → Fish Trophic Levels : producers/ Primary consumer/ Secondary consumer/ 1st trophic level 2nd trophic level 3rd trophic level OR (c) Some energy is dissipated and lost as heat to the environment / only 10% of energy being transferred to the next trophic level.	Role of producers	Role of decomposers	Conversion of inorganic molecules into organic material with the help of sunlight through the process of photosynthesis	Break down of dead and decayed organic material into simpler inorganic substances through the process of decomposition	½+½ 2 1 1	4
Role of producers	Role of decomposers						
Conversion of inorganic molecules into organic material with the help of sunlight through the process of photosynthesis	Break down of dead and decayed organic material into simpler inorganic substances through the process of decomposition						
	SECTION E						
31.	(a) (i) Stigma has the ability to recognise the right or compatible and wrong or incompatible type of pollen (ii) - Compatible pollen grain germinates on the stigma to produce pollen tube that grows through the tissues of stigma and style and reaches to the ovary - Generative cell divides into two male gametes while moving through style and Pollen tube enters the ovule through the micropyle and then enters one of the synergids through the filiform apparatus - The pollen tube releases the two male gametes in the cytoplasm of Synergid and one male gamete moves towards the egg cell and fuses with its nucleus forming a zygote (syngamy)	1 1x4					

	- The other male gamete moves towards the two polar nuclei present in the central cell and fuses with them to form Primary Endosperm Nucleus / PEN (triple fusion). (Since syngamy and triple fusion both occur in embryo sac so it is termed as Double Fertilization) OR (b) (i) During menstrual phase in the menstrual cycle of human female endometrium lining of the uterus and its blood vessels which forms liquid comes out through vagina and flow lasts for 3-5 days. (ii) As the regeneration of endometrium through proliferation takes place. (iii) Graafian follicle ruptures to release secondary oocyte, remaining part of graafian follicle transforms into corpus luteum (iv) 	1 1 1+1' $\frac{1}{2} + \frac{1}{2}$	5
32.	(a) (i) - Splicing - Introns or non-coding sequences are removed and axon or coding sequences are joined.  - Capping - An unusual nucleotide Methyl guanosine triphosphate is added at 5' end of hn RNA  - Tailing - About 200 – 300 adenylate residues are added at 3' end of hnRNA in a template independent manner  (ii) Polypeptide will not be synthesized as translation will not take place because RNA I transcribes r RNAs which plays catalytic and structural role in protein	1 1 1 1+1	

synthesis, RNA polymerase III helps in transcription of tRNA which is the adaptor molecule and transfers amino acids to the site of protein synthesis.

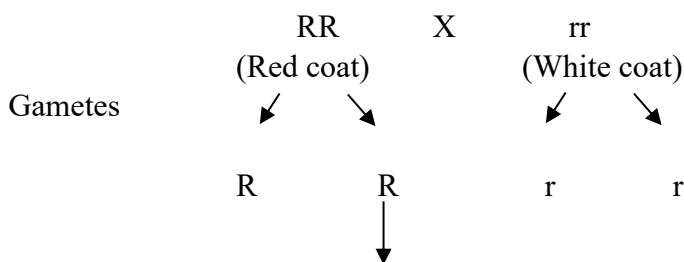
OR

(b) (i) Co-dominance, as two different alleles for a genetic trait are able to express / both characters are expressed equally.

$\frac{1}{2} + \frac{1}{2}$

(1) Red is dominant over white

if pure breeding red coat cattle are represented as 'RR' and pure breeding white coat cattle as 'rr'. Then



$\frac{1}{2}$

F₁ generation — Rr
(All with red coat)

$\frac{1}{2}$

↓

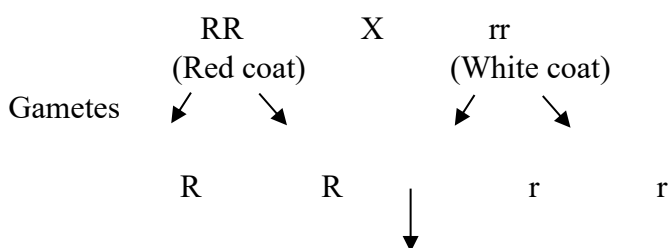
	Rr	X	Rr
	R		r
R	RR Red coat	Rr Red coat	
r	Rr Red coat	rr White coat	

$\frac{1}{2}$

F₂ phenotypic ratio: 3 Red Coat : 1 White Coat

$\frac{1}{2}$

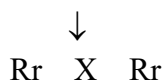
(2) Red is incompletely dominant



$\frac{1}{2}$

F₁ generation — Rr
(All with Pink coat)

$\frac{1}{2}$



[illegible]

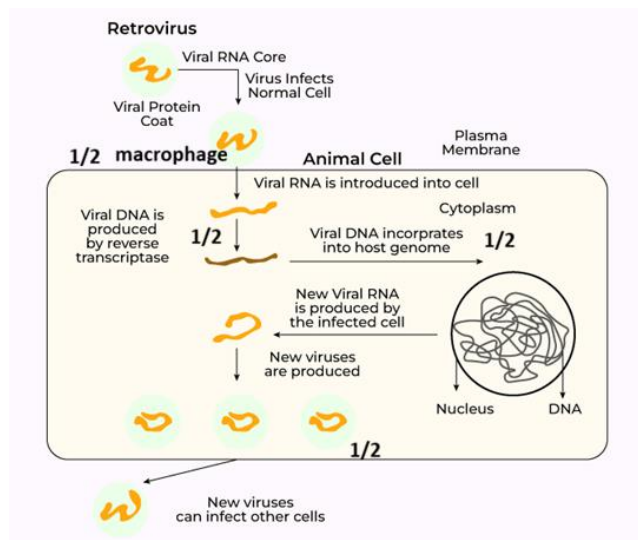
(a) (i)

- Disease : Acquired Immuno Deficiency Syndrome /AIDS
- Causative Agent : Human Immuno deficiency Virus / HIV

(ii)

- After getting the entry into the body of the person virus enters macrophages
- RNA genome of the virus replicates to form viral DNA with the help of enzyme reverse transcriptase
- The viral DNA gets incorporated into the host cell's DNA and directs the infected cells to produce virus particles.
- Simultaneously HIV enters into helper T-lymphocytes (T_H) and produce progeny viruses which attack other T-lymphocytes leading to weakened immune system.

//



(iii)

- By Sexual contact with infected person.
- Transfusion of contaminated blood and blood products.
- Sharing of infected needles by intravenous drug abusers.
- Infected mother to her child through placenta.

(Any Two)

OR

- (b)** (i) They reduce our dependence on toxic chemicals and pesticides / They create a system where insects called pests are not eradicated but kept at manageable

	level by complex system of checks and balances / No negative impact on plants mammals birds fish or non – target insects (Any other correct reason) (ii) (1) A Bacterium: <i>Bacillus thuringensis</i>, controls butterfly caterpillars, larvae eat the spores and toxin is released in the gut of larvae thus killing it (2) A Fungi: <i>Trichoderma</i> are free living fungi common in root ecosystem, effective biocontrol agents against several plant pathogens. (3) Virus: Baculoviruses under genus <i>Nucleopolyhedrovirus</i> , shows species specific , narrow spectrum insecticidal application.	$\frac{1}{2} \times 3$ $\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2} \times 3$	5
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