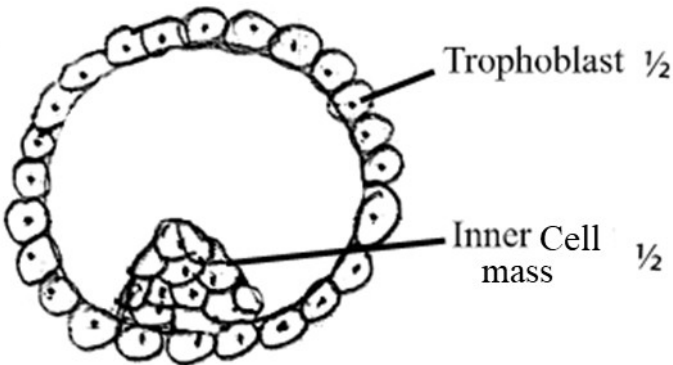
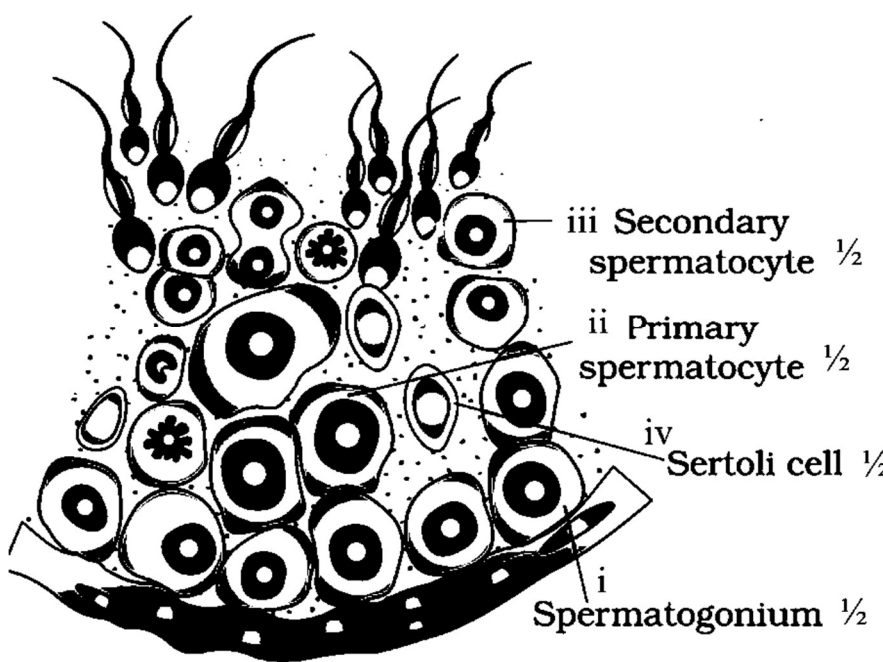


SOLUTIONS
Biology (Subject Code-044)
(PAPER CODE : 57/5/2) (26-05-44N)

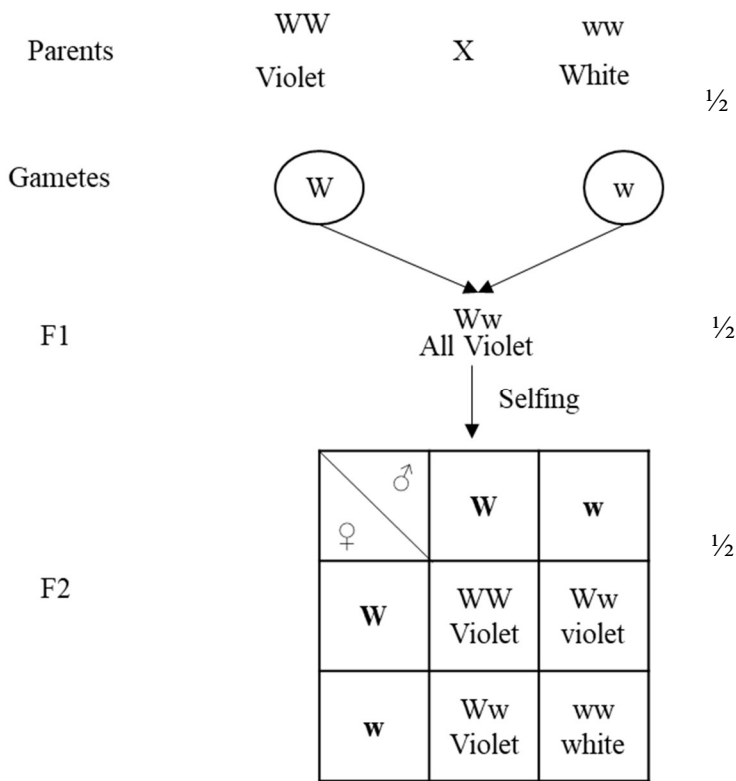
Q. No.	EXPECTED OUTCOMES/VALUE POINTS	Marks	Total
SECTION – A			
1.	(D) / Both (A) and (B)	1	1
2.	(A) / 8	1	1
3.	(C) / FSH, Estrogen, Progesterone	1	1
4.	(B) / 64	1	1
5.	(C) / (ii), (iii), (i)	1	1
6.	(A) / S-Cocaine, T-Dopamine	1	1
7.	(D) / Thorns of Bougainvillea and Tendrils of Cucurbita.	1	1
8.	(D) / Statins	1	1
9.	(D) / 5' C-T-G-C-A G 3' 3' G A-C-G-T-C 5'	1	1
10.	(B) / Tropical rain forests	1	1
11.	(C) / (iii) and (iv)	1	1
12.	(C) / (i), (iii) and (iv)	1	1
13.	(B) / Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).	1	1
14.	(B) / Both Assertion (A) & Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A)	1	1
15.	(C) / Assertion (A) is true but Reason (R) is false.	1	1
16.	(B) / Both Assertion (A) & Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A)	1	1
SECTION-B			
17.	 The diagram shows a cross-section of a blastocyst. It consists of an outer ring of cells labeled 'Trophoblast' with a value of 1/2 next to it. Inside this ring is a cluster of cells labeled 'Inner Cell mass' with a value of 1/2 next to it.	1/2 x2	

	(i) Gets attached to the endometrium/Implantation/placenta formation.	½									
	(ii) It forms ectoderm mesoderm and endoderm/forms germ layers / form embryo.	½	2								
18.	(a) (i) Award marks if attempted. (ii) It provides nourishment to the embryo. OR (b) Production of hybrid seed is very costly, no segregation of characters in the hybrid progeny in apomictic seeds, farmers need not to buy hybrid seeds every year, use of apomictic seeds would be cost effective, any other correct reason (any two correct reasons)	1 1 1+1	2								
19.	(a) The meristem is removed from a diseased plant, and grown in-vitro/ by tissue culture method plant produced is virus free. OR (b) – Treat the bacterial cell with a specific concentration of a divalent cation such as Ca⁺⁺. – Incubating bacteria (host) with recombinant DNA on ice. – Place them at 42⁰C/ give heat shock at 42⁰C – Put them back on ice this enables the bacteria to take up the recombinant DNA.	1+1 ½ x 4	2								
20.	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">Grazing food chain</td> <td style="width: 50%; text-align: center;">Detritus food chain</td> </tr> <tr> <td>– Starts from producers.</td> <td>– Starts from Detritus/decomposers/dead organic matter.</td> </tr> <tr> <td>– It is the major conduit for energy flow in aquatic ecosystem</td> <td>– It is the major conduit for energy flow in terrestrial ecosystem</td> </tr> <tr> <td>– Less fraction of energy flow (because food chain is large)</td> <td>– Larger fraction of energy flow (because food chain is smaller)</td> </tr> </table> (any other relevant difference, any two) OR (b) – It does not take into account the same species belonging to two or more trophic levels. – It assumes a simple food chain, something that almost never exists in nature – It does not accommodate a food web. – saprophytes are not given any place in ecological pyramids even though they play a vital role in the ecosystem. (Any two)	Grazing food chain	Detritus food chain	– Starts from producers.	– Starts from Detritus/decomposers/dead organic matter.	– It is the major conduit for energy flow in aquatic ecosystem	– It is the major conduit for energy flow in terrestrial ecosystem	– Less fraction of energy flow (because food chain is large)	– Larger fraction of energy flow (because food chain is smaller)	 1 x 2 1 x 2	2
Grazing food chain	Detritus food chain										
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– Less fraction of energy flow (because food chain is large)	– Larger fraction of energy flow (because food chain is smaller)										
21.	The exceptions are found is -										

	(i) mitochondrial codons. (ii) some protozoans. - Some codes are said to be degenerate because some amino acids are coded by more than one codon.	$\frac{1}{2}$ $\frac{1}{2}$ 1	2
SECTION-C			
22.	(a)  (b) Leydig cells secrete testosterone/ androgens (which is necessary for spermatogenesis)	$\frac{1}{2} \times 4$ 1	 3
23.	- Polygenic inheritance – In this one character is controlled by three or more genes and each gene contributes to phenotype so it is the additive (cumulative) effect of all the genes that is expressed. - e.g. Human skin colour is controlled by three genes, where dominant genes (ABC) are responsible for dark skin colour and recessive ones (abc) is responsible for light skin colour. AABBCC X aabbcc Dark skin light skin $\frac{1}{2}$ Gamete → ABC abc F1 – AaBbCc $\frac{1}{2}$ Intermediate skin colour (or any other relevant example)	1 1 1	3

24.	(a) Beverages/Ethanol / Bakery products/ Bread (b) Swiss Cheese (c) Citric acid (d) Cyclosporin-A/Immunosuppressive agent (e) Acetic acid (f) Streptokinase/ Clot buster enzyme	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	3
25.	(a) <i>Psilophyton</i> (b) Seed ferns (c) Chlorophyte ancestors (d) Ferns, Conifers, Seed ferns (e) Tracheophyte ancestors (f) Chlorophyte ancestors	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	3
26.	(a) • <i>Meloidegyne incognitia</i> • Tobacco roots are infected (b) Using <i>Agrobacterium</i> the nematode specific genes were introduced into the host plant, the introduction of DNA was such that it produced both sense and anti-sense RNA in the host cells, these two RNA's being complementary to each other formed a double stranded (dsRNA) that initiated RNAi and thus silenced the specific mRNA of the nematode, the consequence was that the parasite could not survive in a transgenic host expressing specific interfering RNA.	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2} \times 4$	3
27.	– Genetic diversity - It refers to the high diversity of a species at the genetic level over its distributional range, e.g. India has more than 50,000 genetically different strains of rice/The genetic variation shown by the medicinal plant <i>Rauwolfia vomitoria</i> growing in different Himalayan ranges might be in terms of the potency and concentration of the active chemical (reserpine) that the plant produces/India has about 1000 varieties of mango/any other correct example. – Species diversity - Diversity at species level / the number of different species in a given region, e.g. Western Ghats have a greater amphibian species diversity than Eastern Ghats/any other correct example. – Ecological diversity - Diversity at the ecosystem level / presence of different types of ecosystems in a particular area. e.g. India has a number of ecosystems like rain forests, coral reefs, deserts /any other correct example.	$\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$	3
28.	– Gause's competitive exclusion principle states that two closely related species competing for the same limited resources cannot co-exist indefinitely, and competitively inferior one will be eliminated eventually/ If resources are limited the stronger competitor will dominate, driving the weaker one to extinction. – Example: In some shallow American lakes visiting flamingoes and resident fishes compete for their common food, the zooplankton in the lake / The	$1+1$ 1	

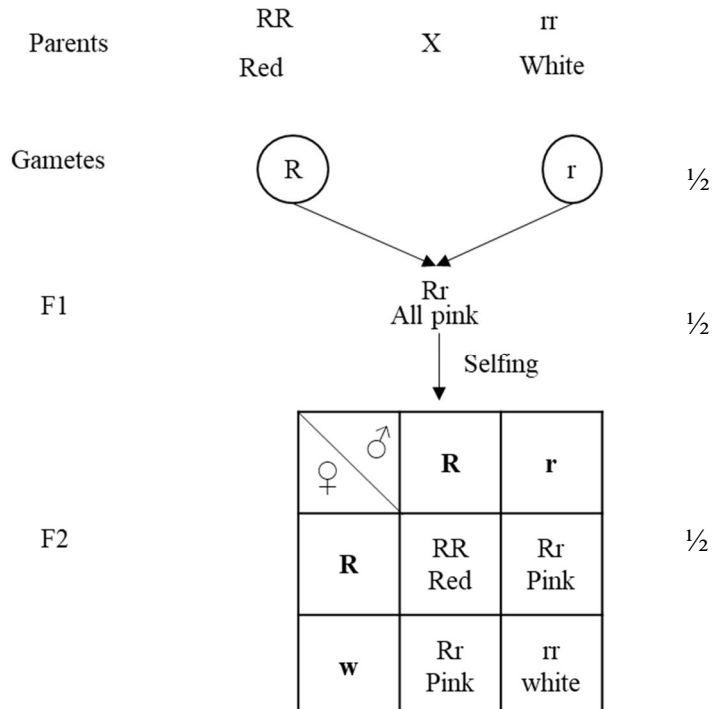
	Abingdon tortoise in Galapagos islands became extinct within a decade after the goats were introduced into the island probably due to the greater browsing efficiency of the goat or the feeding efficiency of one species (tortoise) is reduced by the interfering presence of the other species (goat)/any other correct example.		3
SECTION-D			
29.	(a) Plasmids and bacteriophages have the ability to replicate / They multiply within the bacterial cells independently of the chromosomal DNA / an alien piece of DNA can be ligated to them / They can be multiplied equal to their specific copy numbers. (b)(i) (I) ori (II) Pvu II OR (b) (ii) G : amp^R /ampicillin-resistance gene, H : tet^R/ tetracycline-resistance gene. (c) Pst I , Pvu I, BamH I, Sal I	1 $\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2} \times 4$	4
30.	(a) Because RNA polymerase carries out polymerisation in 5' → 3' direction only. (b) (i) Since hnRNA contains both exons or coding sequence and introns or non coding sequence undergo splicing to remove the introns or non-coding sequence / for the removal of introns. OR (b) (ii). - Capping / addition of ^mG_{ppp} (Methyl Guanosine Triphosphate) at 5' of hnRNA. - Tailing / Adenylate residue (200-300) are added at the 3' end in a template strand as poly A tail. (c) – If a segment of DNA produces two polypeptides the genetic information machinery becomes complicated / two different polypeptides will be formed and one of which may not be useful for the cell. The two complementary RNA molecules produced simultaneously will form a double-stranded RNA that will not be translated into polypeptides.	1 1 $\frac{1}{2}$ $\frac{1}{2}$ 1 1	4
SECTION-E			
31.	(a) • In Pea plants:		



Phenotypic ratio:- violet : white = 3 : 1 $(\frac{1}{2})$

Conclusion: This is the case of dominance $(\frac{1}{2})$

• In *Antirrhinum* plant



Phenotypic ratio:- Red : Pink : white = 1 : 2 : 1 $(\frac{1}{2})$

Conclusion: This is a case of incomplete dominance $(\frac{1}{2})$

OR

(b) (i)

Mendelian disorder	Chromosomal disorder
– Occurs due to mutation / alteration in single gene / follow mendelian inheritance pattern	– Occurs due to addition or deletion of one or more chromosomes / Does not follow mendelian inheritance pattern

Example of mendelian disorder: Haemophilia / Cystic Fibrosis / Sickle Cell Anaemia / Colour Blindness / Phenylketonuria / Thalassaemia / any other correct example.

Example of chromosomal disorder: Turner's syndrome / Down's syndrome / Klinefelter's syndrome / any other correct example.

(ii)

- Aneuploidy/Monosomy
- Turner's syndrome
- Symptoms:
 - lack of secondary sexual characters.
 - ovaries are rudimentary
 - sterile
 - short stature
 - underdeveloped feminine characters (any three)

Karyotype – 44+XO (45)

1

$\frac{1}{2}$

$\frac{1}{2}$

$\frac{1}{2}$

$\frac{1}{2}$

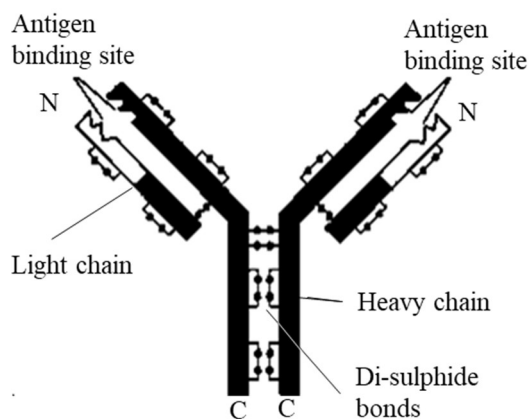
$\frac{1}{2} \times 3$

$\frac{1}{2}$

5

32.

(a) (i)



(Any four labellings)

(ii)

Active Immunity	Passive Immunity
– When antibodies are produced in our body in response to an antigen then it is called active immunity	– When preformed antibodies (readymade) are injected into the body for protection then it is called passive immunity.
– It is slow and take time to give its full effective response	– It gives quick response

1 x 3

	<table><tr><td>– It lasts for longer period</td><td>– It lasts for shorter period</td></tr><tr><td>– Memory cells are formed</td><td>– Memory cells are not formed</td></tr><tr><td colspan="2">(any three correct difference)</td></tr></table>	– It lasts for longer period	– It lasts for shorter period	– Memory cells are formed	– Memory cells are not formed	(any three correct difference)			
– It lasts for longer period	– It lasts for shorter period								
– Memory cells are formed	– Memory cells are not formed								
(any three correct difference)									
OR									
(b) (i)		$\frac{1}{2} + \frac{1}{2}$							
(I) <i>Wuchereria bancrofti</i> , and <i>Wuchereria malayi</i>		1							
(II) Chronic inflammation of the organs/ swelling in lower limbs / gross deformities in genital organs.		1							
(III) Transmitted by the bite of female mosquito vector.		$\frac{1}{2} + \frac{1}{2}$							
(ii)									
(I) Mast cells, cause allergy		$\frac{1}{2} + \frac{1}{2}$							
(II) Virus infected cells, Protect the non-infected cells of our body from viral infections		$\frac{1}{2} + \frac{1}{2}$	5						
33.	(a) – Fertilisation Fertilisation occurs in the ampulla/ampullary-isthmic junction of the fallopian tube, when sperm comes in contact with the ovum, it induces changes in the zona pellucida of the ovum that block the entry of additional sperms and thus ensures only one sperm, the secretions of the acrosome help the sperm to enter the cytoplasm of the ovum by dissolving the zona pellucida and plasma membrane, after the entry of sperm into the cytoplasm of ovum induces completion of meiosis II (of secondary oocyte), fusion occurs between the nucleus of ootid (ovum) and that of sperm to form a diploid zygote – Implantation: – The trophoblast layer gets attached to the endometrium. – The uterine cells divide rapidly and cover the blastocyst as a result the blastocyst becomes embedded in the endometrium of uterus OR (b) (i)Hormones in sequence of their secretion in a pregnant woman. FSH; LH; hCG; Relaxin. (ii) – FSH: Source: Anterior Pituitary. Function: Stimulates follicular development – LH: Source: Anterior Pituitary. Function: It causes rupture of Graafian follicle and release of ovum into fallopian tube/Ovulation – hCG: Source: Placenta. Function: It supports foetal growth, metabolic changes in mother and maintenance of pregnancy. – Relaxin:	$\frac{1}{2} \times 6$ <							

	Source: Ovary. Function: It facilitates parturition.	$\frac{1}{2} + \frac{1}{2}$	5
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