MODEL QUESTION PAPER

BIOLOGY-XII

Section-A

Q.1 Function of tapetum is

(A) Protective (B) Nutritive

(C) Respiratory (D) All the above 1

Q.2 Which of the following is a test cross?

(A) Tt x Tt (B) Tt x tt

(C) Tt x TT (D) TT x tt 1

Q.3 An insect repellent 'Neem' Product is

(A) Azadirachtin (B) Rotenone

(C) Parathion (D) Endrin 1

Q.4 Study of population is

(A) Seismonasty (B) Desmography

(C) Demography (D) Population graphics 1

Q.5 The concept of 10% law was given by

(A) Weisman (B) Stanley

(C) Transley (D) Lindeman 1

Q.6 Secondary Nucleus is formed of

(A) Two Polar Nuclei (B) Egg Apparatus

(C) Synergids (D) Antipodal Cells 1

Q.7 Trisomy of 21st Chromosome causes

(A) Kline Felter's Syndrome

(B) Turner's Syndrome

(C) Down's Syndrome

(D) Sickle Cell Anaemia 1

Q.8 Cirrhosis of Liver is caused by

(A) Morphine (B) Cocaine

(C) LSD (D) Alcohol 1

Q.9 Oral Contraceptive pill function by inhibiting

(A) Fertilization (B) Ovulation

(C) Reproduction (D) Implantation 1

Q.10 Eutrophication is often seen in

(A) Sea (B) Mountains

(C) Deserts (D) Fresh Water Lake 1

SECTION-B

Q.11 What is the difference between Syngamy and Triple fusion? 2

OR

Q. Define the following .

(i) Porogamy

(ii) Polyembryony

(iii) Corpus Luteum

Q.12 Give atleast three functions of DNA. 2

Q.13 Write a short note on Biofortification. 2

OR

What measures should be taken to care for Public Hygiene?

Q.14 What are the different components of an Ecosystem? **2**

Q.15 What are Vestigial Organs? Give any one example in Man. **2**

OR

What is Genetic Drift? Explain.

Q.16 What is Colostrum? How is milk production hormonally regulated? **2**

Q.17 What is Plasmid? What is the role of 'ORI' gene and selectable marker' gene on a plasmid.? **2**

Q.18 What are the functions of Placenta? 2

Q.19 Give graphic representation of Oceanic Food Chain. 2

OR

Q. Define - (i) Commensalism
(ii) Symbiosis

Q.20 Name the causative agent, symptoms and diagnostic test for Typhoid. 2

SECTION-C

Q.21 Give three Avian and Reptilian features of Archaeopteryx. 3

Q.22 Draw well labelled diagram of L.S. Anatropous Ovule. 3

OR

Give Graphic representation of Spermatogenesis in human male.

Q.23 Define the following terms
(i) Cryopreservation
(ii) Orthodox Seeds
(iii) Expland 'IUCN' 3

Q.24 Differentiate between Leading and Lagging S trand. 3

OR

Give schematic representation of Lac Operon in E. Coli.

Q.25 Write the role of Hybridization in plant breeding. 3

SECTION-D

Q.26 Briefly explain the Principle of Independent Assortment in terms of a dihybrid cross with a suitable example. 5

OR

Q. Explain Griffth experiment to prove that DNA is the Genetic Material.

Q.27 (i) What are the main causes of Water Pollution? 3

(ii) Name the unlabelled areas 'a' and 'b' of the pie chart representing Biodiversity of plants showing their proportionate number of species of major taxa. 2

Q.28 (i) Write note on PCR (Polymerase Chain Reaction) 2

(ii) How cotton plant is able to resist the attack of cotton Bollworms. 2

(iii) Name the bacterium from which Tag polymerase enzyme is derived. 1

+2 BIOLOGY
UNIT WISE MARKING SCHEME

UNIT			Marks
1.	Sexual Reproduction	1+1, 2, 2, 2, 3 =	11
2.	Genetics and Evolution	1+1, 2 2, 3, 3, 5 =	17
3.	BIOLOGY and Human Welfare	1+1+1, 2, 2, 3 =	10
4.	Biotechnology and its applications	1, 2, 3, 5 =	10
5.	Ecology and Environment	1+1, 2, 3, 5 =	12

		Total	60

SOLVED MODEL QUESTION PAPER

As per new marking scheme issued by H.P. Board

BIOLOGY-XII

Time Allowed : 3 Hrs **Max. Marks : 60**

Special Instructions :-

1. All questions are compulsory and are divided into four sections.
2. Answer should be to the point.
3. Question Nos. 1 to 10 (Section-A) are of one mark each and are of MCQ type.
4. Question Nos. 11 to 20 (Section-B) are of two marks each. Answer each of them in 30-40 words.
5. Question Nos. 21 to 25 (Section-C) are of three marks each. Answer each of them in 80-90 words.
6. Question Nos 26 to 28 (Section-D) are of 5 (Five) marks each. Answer each of them in 150-180 words.
7. Draw neat and clean diagrams where ever necessary.

MODEL QUESTION PAPER
BIOLOGY-XII
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Ans. (C) Demography

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Ans. (D) Lindeman

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Ans. (A) Two Polar Nuclei

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(D) Sickle Cell Anaemia 1

Ans. (C) Down's Syndrome

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Ans. (D) Alcohal

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(A) Sea (B) Mountains
(C) Deserts (D) Fresh Water Lake 1

Ans. (D) Fresh Water Lake

SECTION-B

Q.11 What is the difference between Syngamy and Triple fusion? 2

Ans. For fertilization in angiosperms, one male gamete of pollen tube fuses with egg cell to form zygote. This fusion is called syngamy.

Second male gamete from pollen tube fuses with secondary nucleus to form primary endosperm (3N) This is called Triple fusion.

OR

Q. Define the following .

(i) Porogamy
(ii) Polyembryony
(iii) Corpus Luteum

Ans. **(i) Porogamy:-** It is the phenomenon for the entry of pollen tube through micropyler end of ovule.

(ii) Polyembryony :- It is phenomenon of formation of more than one embryo during the development of seed.

(iii) Corpus Luteum :- It is the yellow coloured structure formed after the

expulsion of ovum from graffian follicle in the ovary.

Q.12 Give atleast three functions of DNA. 2

Ans. (i) It is the genetic material and carries hereditary characters.
(ii) It maintain the size of cell, growth and division.
(iii) It produces RNA's by transcriptions for protein synthesis.

Q.13 Write a short note on Biofortification. 2

Ans. Biofortification is the process by which the nutritional quality of food crops is improved through agronomic practices, conventional plant breeding or modern biotechnology.

OR

What measures should be taken to care for Public Hygiene?

Ans. (i) Awareness of diseases and their effect.
(ii) Vaccination against infectious diseases.
(iii) Proper disposal of wastes.
(iv) Maintenance of hygienic food and water resources.

Q.14 What are the different components of an Ecosystem? **2**

Ans. The ecosystem consist of two major components, biotic and abiotic.
Biotic components are plants, animals and micro organisms.
Abiotic components are air, water, soil, temperature, humidity etc.

Q.15 What are Vestigial Organs? Give any one example in Man. **2**

Ans. These are organs which are reduced and functionless in organisms which are homologous to fully formed and functional structures in related organisms.
eg- Wisdom teeth in man.

OR

What is Genetic Drift? Explain.

Ans. The elimination of genes of certain traits when a small section of a population migrates or dies due to natural calamity. It changes the gene frequency of the remaining population.

Q.16 What is Colostrum? How is milk production is hormonally regulated? **2**

Ans. First milk which comes out from mother's mammary glands just after child birth.

It's synthesis is stimulated by prolactin and release is stimulated by oxytocin hormones.

Q.17 What is Plasmid? What is the role of 'ORI' gene and 'selectable marker' gene on a plasmid.? 2

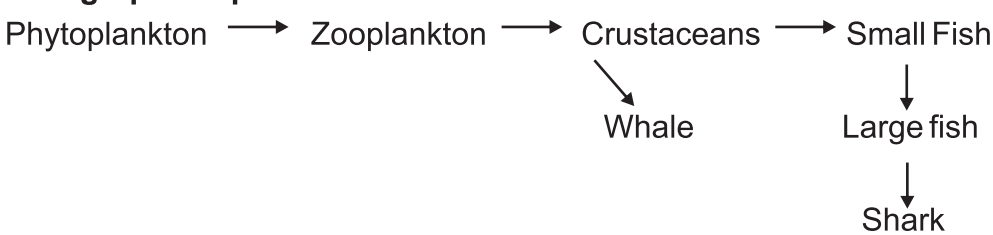
Ans. Plasmid is a extra circular chromosomal DNA replicating itself. It is used in biotechnology as a vector to deliver alien piece of DNA into host organisms.
'ORI', origin of replication is required to initiate replication. Some genes called selectable marker are required to recognise transformants among the non-transformants.

Q.18 What are the functions of Placenta? 2

Ans. (i) It supplies all the nutrients by mother to developing foetus.
(ii) It helps in the exchange of respiratory gases.
(iii) It eliminate nitrogenous wastes of foetus.
(iv) Placenta prevent the passage of pathogens and toxins from mother to foetus.

Q.19 Give graphic representation of Oceanic Food Chain. 2

Ans.



OR

Q. Define - (i) Commensalism
(ii) Symbiosis

Ans. (i) Commensalism is an interspecific interaction between individuals of two species where one species is benefitted and other is not affected.
(ii) Symbiosis is a mutual interaction between two species in which both of them get benefitted to each other.

Q.20 Name the causative agent, symptoms and diagnostic test for Typhoid. 2

Ans. Causative Agent :- Salmonella typhi
Symptoms :- High fever in steps, later sustained 102^0-104^0F
- Headache
- Gastrointiestnal diarrhoea
- Rose coloured rash on chest and upper abdomen.

Diagnostic Test :- Widal Test.

SECTION-C

Q.21 Give three Avian and Reptilian features of Archaeopteryx. **3**

Ans. **Avian Features:-**

(i) Presence of feathers all over the body.

(ii) Fore-limbs modified into feathered wings.

(iii) Prolongation of Jaws into beak.

Reptilian Features :-

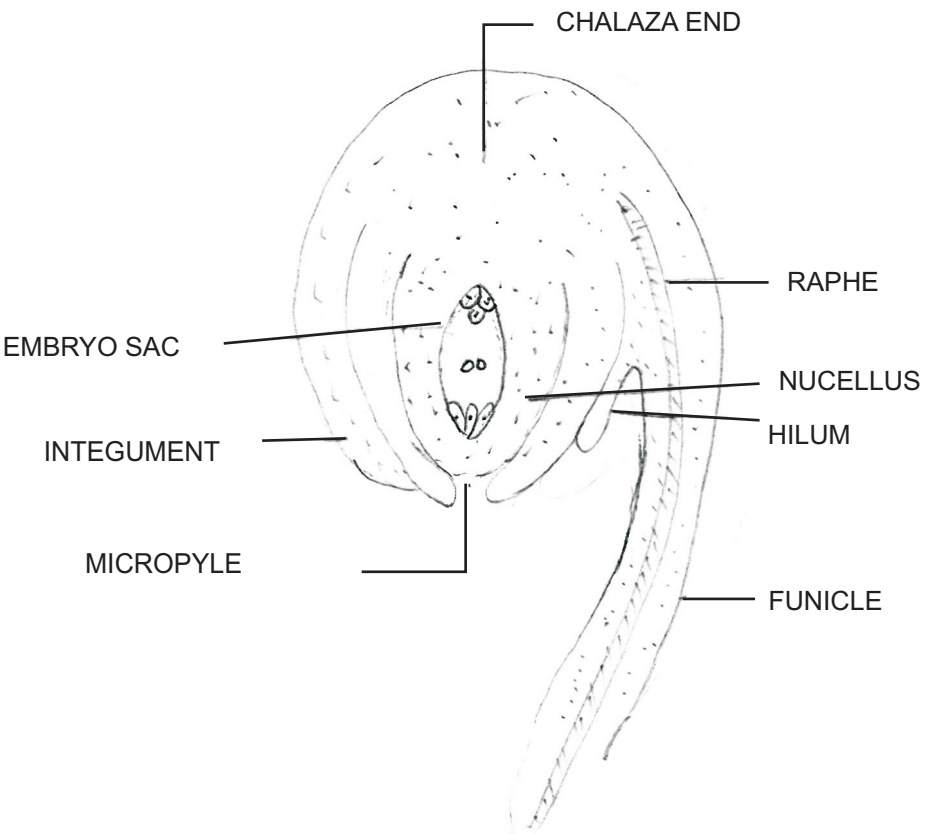
(I) Toothed jaws

(ii) Presence of claws on fingers

(iii) Free caudal vertebral.

Q.22 Draw well labelled diagram of L.S. Anatropous Ovule. **3**

Ans.



L.S. OF ANATROPOUS OVULE

or

Give Graphic representation of Spermatogenesis in human male.

Ans. Spermatogenesis is the process of formation of sperms.

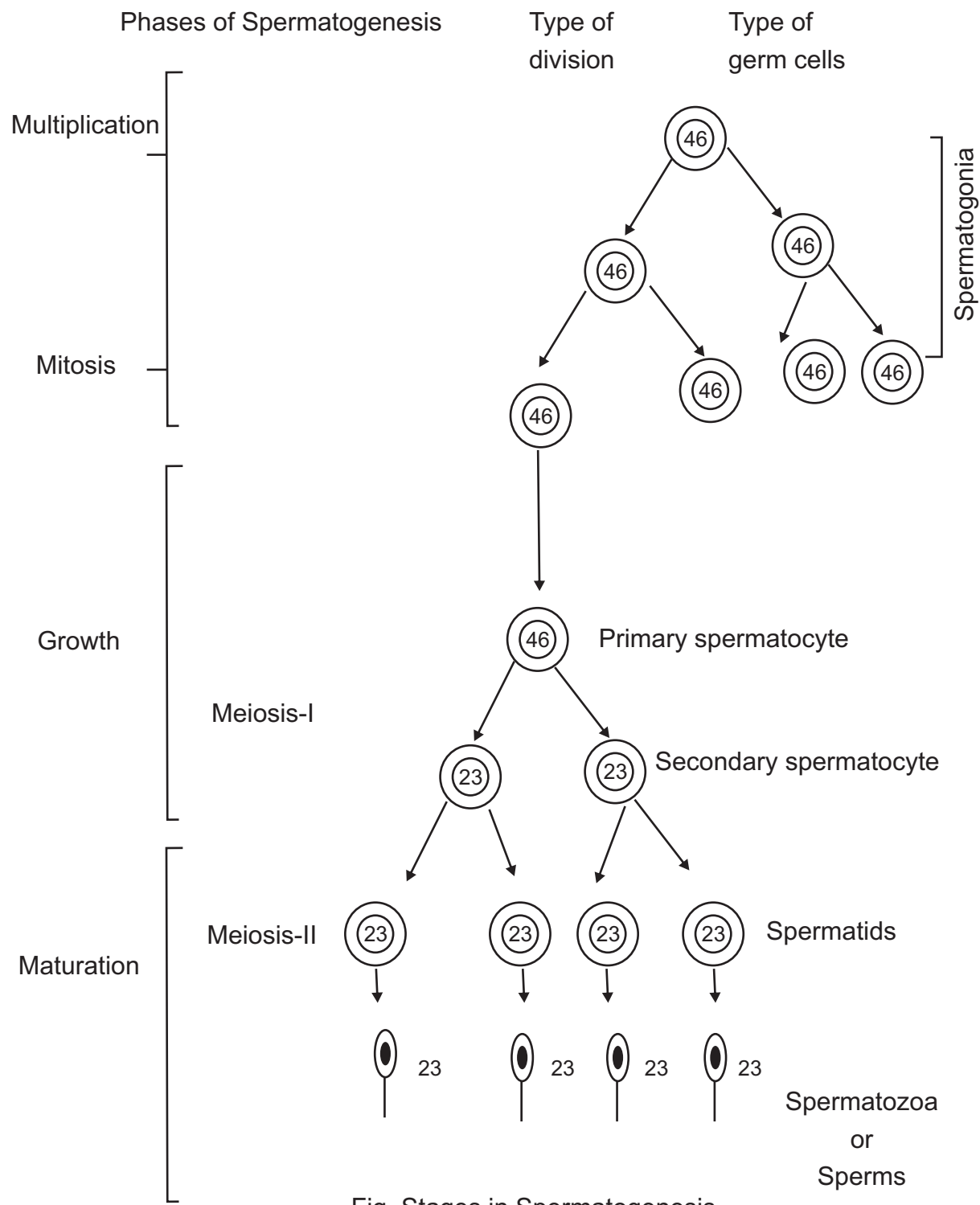


Fig. Stages in Spermatogenesis

Q.23 Define the following terms

(i) Cryopreservation

(ii) Orthodox Seeds

(iii) Explain 'IUCN' **3**

Ans. **(i) Cryopreservation :-** Preservation of germplasm under low temperature conditions (-196^{0}C) in liquid nitrogen.

(ii) Orthodox Seeds :- These are those seeds which are able to withstand long exposure of low temperature conditions and low moisture content.

(iii) IUCN- International Union for Conservation of Nature and Natural Resources.

Q.24 Differentiate between Leading and Lagging strand. **3**

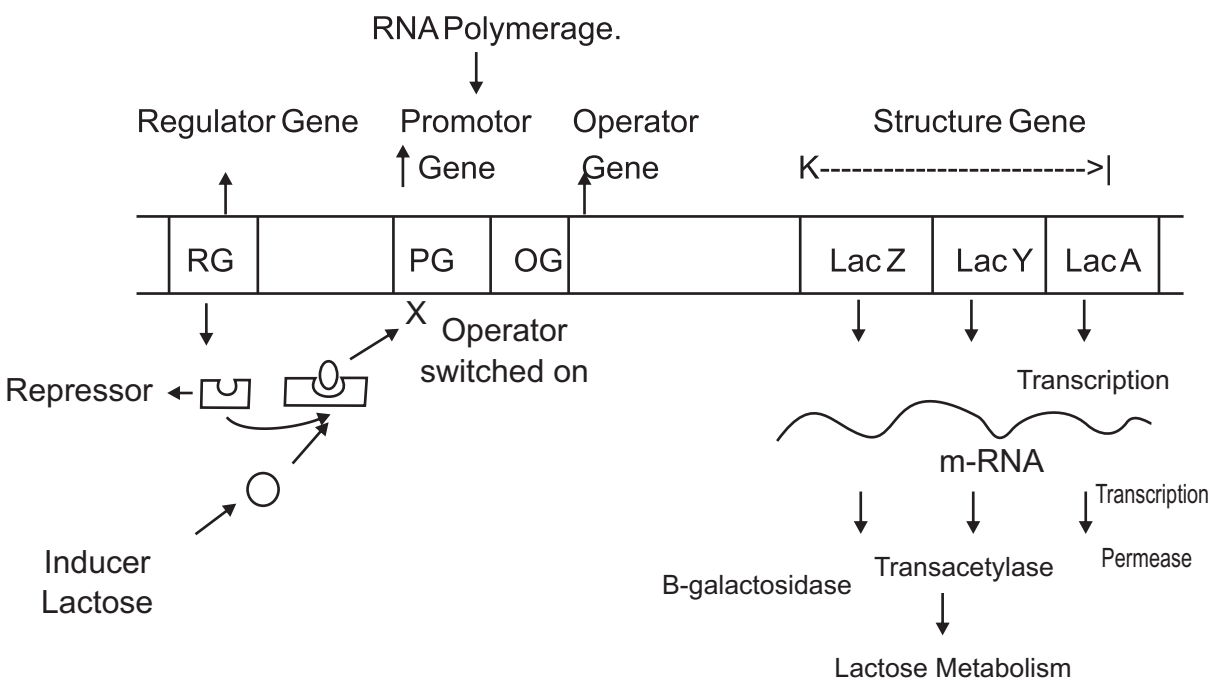
Ans.

	Leading Strand	Lagging Strand
(i)	It grows continuously as a single piece.	It is formed as short segments is called okazaki fragments.
(ii)	It needs a single RNA primer to start its growth.	Each segment needs a separate RNA primer to start.
(iii)	Direction of growth is 5' ⟶ 3'	Direction of growth is 3' ⟶ 5', but each okazaki fregments grows 5' ⟶ 3'

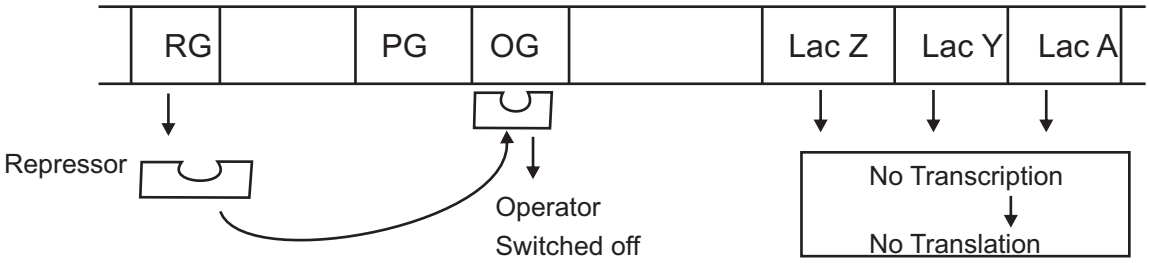
OR

Give schematic representation of Lac Operon in E. Coli.

Ans. Operon Model in the presence of Lactose



Operon Model in the presence of Lactose



Q.25 Write the role of Hybridization in plant breeding. 3

Ans. Hybridization is the intermixing of characters of two different species. It is beneficial in plant breeding because

(i) Hybridization introduces new characters in parent plant.

(ii) The hybrid becomes resistant to disease, drought and other environmental conditions.

(iii) It also bring heterosis (hybrid vigour)

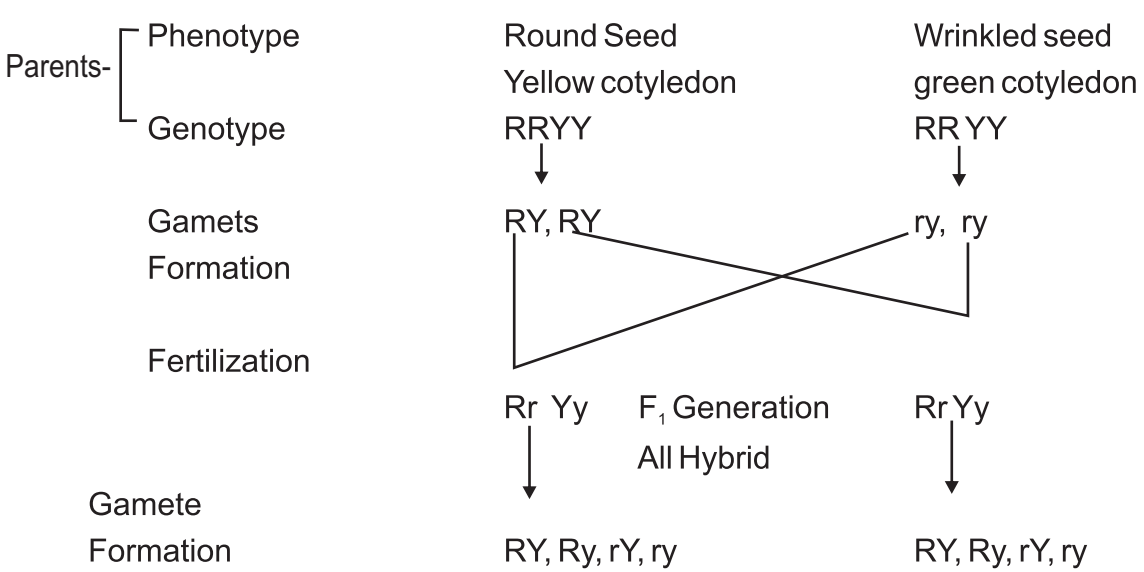
(iv) It also increase the yield of crops.

SECTION-D

Q.26 Briefly explain the Principle of Independent Assortment in terms of a dihybrid cross with a suitable example. 5

Ans. It states that the factors and alleles for different characters assort or Segregate independent of each other during the process of gametogenesis.

eg. A dihybrid cross is made between pure round shape, yellow colour seeds (RRYY) pea plant and wrinkled shape, green colour seeds (rryy) pea plant. Round shape (RR) is dominant overwrinkled shape (rr) and yellow colour (YY) is dominant over green colour (yy). In F_1 generation we get hybrid plants with Round shape and yellow colour (RrYy).



A self cross between hybrid plants produces F_2 generation.

F_2 generation

♀ \ ♂	RY	Ry	rY	ry
RY	RRYY	RRYy	RrYY	RrYy
Ry	RRYy	Rryy	RrYy	Rryy
rY	RrYY	RrYy	rrYY	rrYy
ry	RrYy	Rryy	rrYy	rryy

Phenotypic ratio

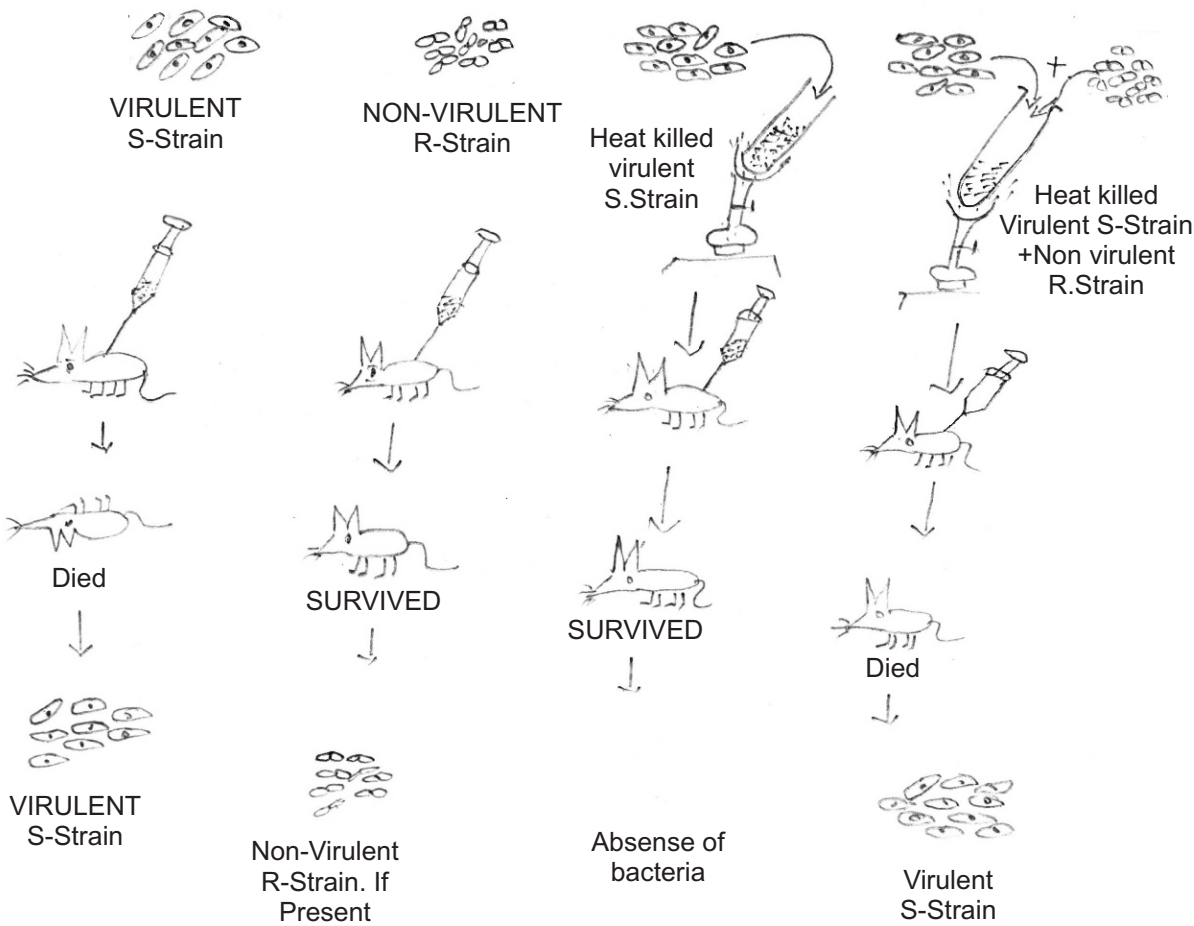
9 :	3 :	3 :	1
Round Yellow	Round green	Winkled yellow	Wrinkled green

OR

Q. Explain Griffth experiment to prove that DNA is the Genetic Material.

Ans. In 1928, Frederick Griffth, with bacterium Streptococcus pneumoniae showed transformation when Streptococcus pneumonial bacteria are grown on a culture plate, some produce mucus (polysaccharide) coat containing–smooth shiny colonies (S-strain) while others produce rough colonies (R-strain) without a mucus coat. Mice infected with the S-strain die from pneumonia infection but mice infected with R-strain do not develop pneumonia.

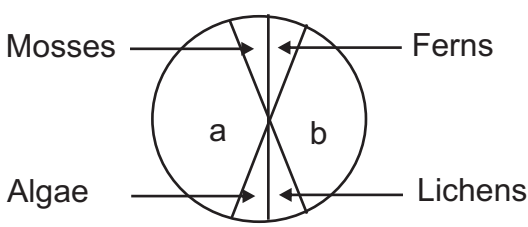
Griffth killed bacteria by heating and observed that heat-killed S-strain bacteria injected into mice did not kill them. But a mixture of heat killed S-strain and live R-strain bacteria killed the mice and living S-bacteria were found from the dead mice.



conclusion of experiment prove that S-strain bacteria has been transformed by the heat-killed S-strain bacteria due to the transfer of the genetic material.

Q.27 (i) What are the main causes of Water Pollution? 3

(ii) Name the unlabelled areas 'a' and 'b' of the pie chart representing Biodiversity of plants showing their proportionate number of species of major taxa. 2



Ans. (i) Causes of Water Pollution.

(a) Domestic Sewage :- Domestic sewage from home and hospitals may

also contain pathogens and cause disease like typhoid, dysentery etc,

(b) Industrial Wastes :- Industrial wastes like petroleum, paper manufacturing, metal and chemical manufacturing industries release their wastes into water bodies.

(c) Agricultural Run-Off :- The run off from agriculture land is polluted with pesticides and fertilizers.

(ii) **(a) Fungi**

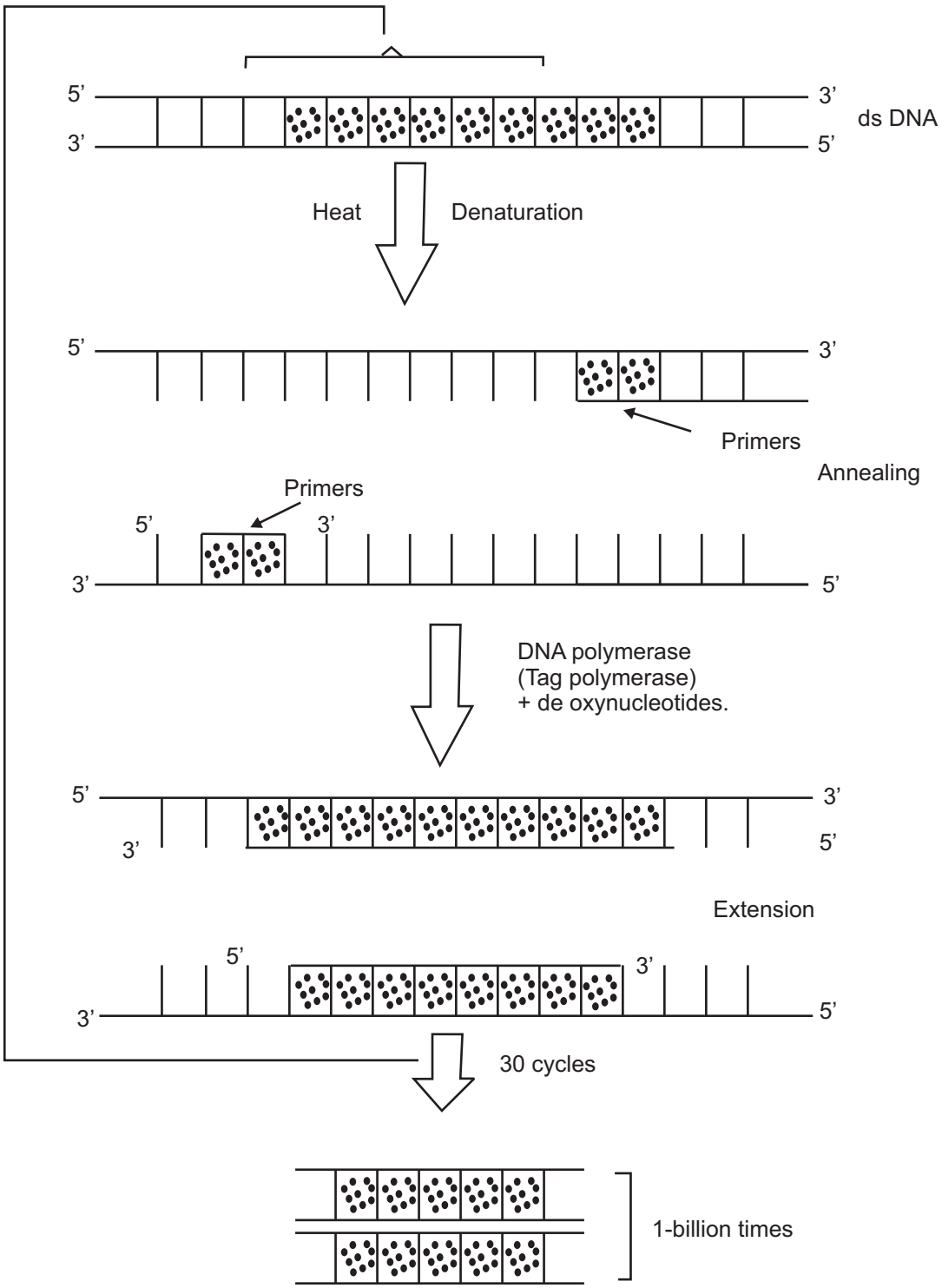
(b) Angiosperms.

Q.28 (i) Write note on PCR (Polymerase Chain Reaction) 2

(ii) How cotton plant is able to resist the attack of cotton Bollworms. 2

(iii) Name the bacterium from which Tag polymerase enzyme is derived. 1

Ans. In polymerase chain reaction, multiple copies of gene of interest are synthesised in vitro using two sets of primers and enzyme DNA polymerase. So that enzyme may extend the primer using nucleo tide provided in reaction and genomic DNA as template so DNA can be amplified to billion copies. This is done by thermostable DNA polymerase.


5'
3'
3'
5'
ds DNA
Heat
Denaturation
5'
3'
Primers
Annealing
Primers
5'
3'
3'
5'
DNA polymerase
(Tag polymerase)
+ de oxynucleotides.
5'
3'
3'
5'
Extension
5'
3'
3'
5'
30 cycles
1-billion times

(ii) Soil bacterium Bacillus thuringienesis possesses a gene family cry gene (1-40) over its plasmid which synthesis an endotoxic protein, Cry protein, capable of killing larvae of certain insects.

As the toxic Cry proteins are obtained from Bacillus thuringiensis, they are also called Bt-toxins and the genes Bt-toxin genes.

These genes have been cloned from bacteria and incorporated in many plants eg. Bt cotton, Bt corn, rice, potato etc. These genetically modified crop plants having cry or Bt-toxin genes do not require protection from insecticides. These proteins are produced by bacterial genes in inactive protoxin state.

As an insect feeds over the plant, the inactive protoxin crystals pass into its gut, where alkaline pH solubilise the crystals and converts protoxin into toxin. Hence the insect dies.

(iii) Thermus aquaticus