



# माध्यमिक शिक्षा मण्डल, मध्यप्रदेश, भोपाल

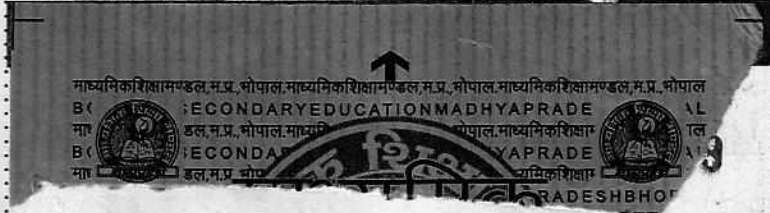
परीक्षार्थी द्वारा भरा जायें ↓

24 पृष्ठीय

विशेष नोट :- सिलाई खुली हुई अथवा क्षतिग्रस्त उत्तर पुस्तिका को न तो पर्यवेक्षक वितरण करे और न ही छात्र उपयोग में ले। ऐसी उत्तर पुस्तिका में लिखे उत्तरों का मूल्यांकन नहीं किया जायेगा। परीक्षार्थी द्वारा भरा जायें ↓

परीक्षा का विषय	विषय कोड			परीक्षा का माध्यम
BIOLOGY	2	3	1	ENGLISH

स्टीकर तीर के निशान ↓ से मिलाकर लगायें



अंकों में परीक्षार्थी का रोल नम्बर

2 2 4 5 2 8 0 5 9

शब्दों में

TWO TWO FOUR FIVE TWO EIGHT ZERO FIVE NINE

उदाहरणार्थ

1	1	2	4	3	9	5	6	8
एक	एक	दो	चार	तीन	नौ	पाँच	छः	आठ

क - पूरक उत्तर पुस्तिकाओं की संख्या अंको में  शब्दों में

ख - परीक्षार्थी का कक्ष क्रमांक

ग - परीक्षा की दिनांक

परीक्षा का नाम एवं परीक्षा केन्द्र क्रमांक की मुद्रा **2022**  
हायर सेकेण्डरी परीक्षा 451025

पर्यवेक्षक का नाम एवं हस्ताक्षर <i>N. Bahar</i>	केन्द्राध्यक्ष/सहायक केन्द्राध्यक्ष के हस्ताक्षर <i>Howar</i>
--	--

परीक्षक एवं उपमुख्य परीक्षक द्वारा भरा जायें ↓

प्रमाणित किया जाता है कि मूल्यांकन के समय पूरक उत्तर पुस्तिकाओं की संख्या उपरोक्तनुसार सही पाई हो। क्राफ्ट स्टीकर क्षतिग्रस्त नहीं पाया गया अन्दर के पृष्ठों के अनुरूप मुख्य पृष्ठ पर अंकों की प्रविष्टि अंकों का योग सही है।  
निर्धारित मुद्रा : नाम, पदनाम, मोबाईल नम्बर, परीक्षक क्रमांक एवं पदाकित संस्था के नम्र की मुद्रा

उप मुख्य परी	मुद्रा	एवं निर्धारित मुद्रा
--------------	--------	----------------------

नोट :- "हायर सेकेण्डरी परीक्षा में केवल वाणिज्य संकाय के विषयों तथा हाईस्कूल परीक्षा में प्रायोगिक विषय को छोड़कर शेष विषयों हेतु नियमित एवं स्वाध्यायी छात्रों के लिये प्रश्न पत्र 100 अंकों का होगा किन्तु नियमित छात्रों को 100 अंक के प्राप्तांक का 80% अधिभार परीक्षक एवं उपमुख्य परीक्षक द्वारा भरा जायें ↓

केवल परीक्षक द्वारा भरा जायें  
प्रश्न क्रमांक के सम्मुख प्राप्तांकों की प्रविष्टि करें

प्रश्न क्रमांक	पृष्ठ क्रमांक	प्राप्तांक	अंक
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			

Oddy

99.1mm x 33.9mm x 16

Laser, Inkjet & Copier Label ST-16 A4



प्रश्न क्र.

Question-1

Answer-1

(i) simple

(ii) Scrotum

(iii) Gregor Johann Mendel

(iv) Bacterial (Wuchereria)

M

Penicillium notatum

undifferentiated

S

(vii) protein antiviral protein

E

Question-2

Answer-2

(i) Amoeba is such creature which is immortal.

(ii) AUG is also known as start codon. It codes for amino acid methionine.

(iii) Bacillus Thurengiensis  
Bt Toxin



प्रश्न क्र.

(iv) Methane is the main constituent of biogas.

(v) Types of curves obtained in the growth of organism are -

(1) Exponential or J-shaped

(2) Logistic or S-shaped

(vi) Pyramid of energy in forest / pond ecosystem is erect or upright.

M

P (vii) Percent of energy lost at each level of energy flow is 90%.

B

S

E

Question-3

Answer-3

(i) (c) Reproduction

(ii) (b) Triploid

(iii) (a) X-linked gene

(iv) (e) Alex Jeffery

(v) (d) Cancer

(vi) (b) Insulin



प्रश्न क्र.

(vii) (d) Eucalyptus plant

Question-4

Answer-4

(i) Budding - (b) Hydra

(ii) Vasectomy - (g) Male sterilization

M (iii) Colour blindness - (d) Gender linked disease

P (iv) Entamoeba histolytica - (e) Amoebiasis

B (v) Interferon - (f) Antimicrobial substance

(vi) Gene therapy - (h) Genetic disorder

(vii) Transgenic animal - (e) Transgenic

Question-5

Answer-5

Apple is known as a virtual fruit because it develops from the part other than ovary.

True fruits develop from ovary.



प्रश्न क्र.

The fleshy thalamus of apple forms the fruit.

Question-6

Answer-6

GIFT - Gamete Intra Fallopian Transfer

Question-7

Answer-7

**M**  
**P**  
**B**  
**S**  
**E**  
Test Tube Baby - It is the method of In-vitro fertilisation (IVF) in which sperms are collected from the donor male and ovum is taken from the donor female and they are made to fertilize in a test tube in laboratory conditions. The zygote thus formed is allowed to grow up to 8-celled stage and then it is transferred to the fallopian tube of female.

Question-8

Answer-8

A sudden change in position, sequence, morphology of chromosome, which is not inherited is known as mutation.



प्रश्न क्र.

Mutation can be genetic or chromosomal.

If there is change in only position of one base, then it is known as point mutation.

Ex - Sickle Cell Anaemia.

If there is change in more than one base, then it is known as frameshift mutation.

Ex - Thalassaemia.

M

P

B

S

E

Question - 9

Answer - 9

DOMINANT

RECESSIVE

10. The character which expresses itself freely in heterozygous condition is called as dominant.

Ex - Tt (Tall)

T - dominant

The character which is unable to express itself freely in heterozygous condition is called as recessive.

Ex - tt (dwarf)

t - Recessive

It produces functional enzyme.

It produces non-functional enzyme.



प्रश्न क्र.

Question-10

Answer-10

AIDS - Acquired Immuno Deficiency Syndrome.

HIV - Human Immuno Deficiency Virus

Question-11

Answer-11

M

P

B

S

E

Allergy is the exaggerated immune response of our body to a certain type of its antigen. It is the hypersensitivity. The substance which causes allergy is known as allergen. It may appear when we move to any new surroundings. Some common allergen which cause allergy are dust, pollen grains, mites, etc. It can be reduced by giving anti-histamines and steroids.

Question-12

Answer-12

GMO is the abbreviation of Genetically Modified Organisms. They are the transgenic organisms whose gene composition

प्रश्न क्र.

has been manipulated or changed by the introduction of genes of some other organisms.

These organisms are helpful in the field of biotechnology. Some genetically modified plants are Flavr Savr Tomato.

Bt toxin modified crops are resistant to pests.

M  
P  
B  
S  
E

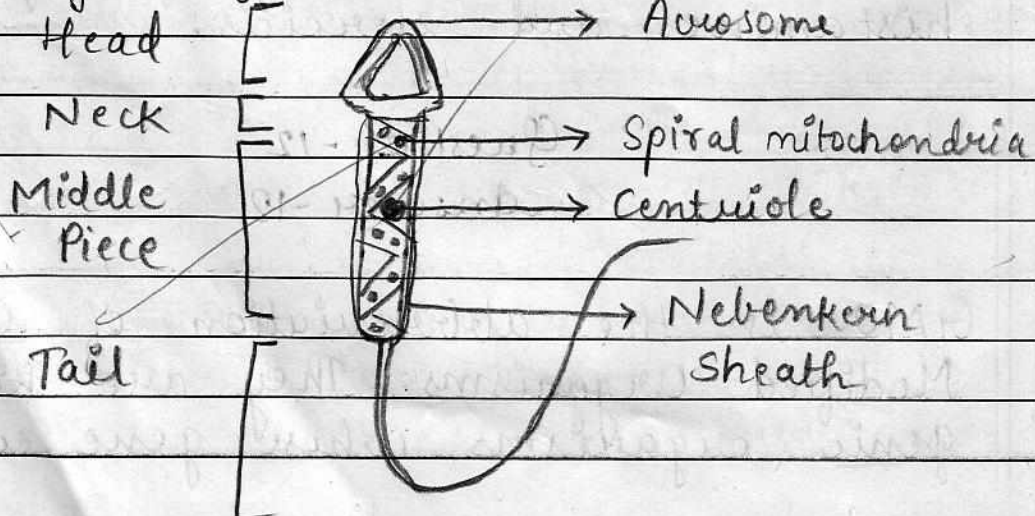
Genetically modified animal is the cow Rosie, which produces human protein lactalbumin (2.4g per litre).

- GMO reduce post harvest losses.
- Less dependency on pesticides.

Question-13

Answer-13

Diagram of Sperm -







प्रश्न क्र.

Question-14

Answer-14

Sickle cell anaemia is a disorder caused due to mutation. In this disorder, the shape of red blood cells change from biconcave and become sickle shaped. Thus the oxygen carrying area decreases.

It is a qualitative disorder of haemoglobin.

→ It is caused due to point mutation.

→ GUG codes for glutamic acid. The base U of this changes to A and becomes GAG which codes for amino acid valine. Hence there is change in 6th position of  $\beta$ -chain of haemoglobin.

This is known as sickle cell anaemia.

Question-15

Answer-15

Antigen -

↳ These are the substances which



प्रश्न क्र.

induce antibody production.

2. They are complex glycoprotein or polysaccharides.

3. They have special binding sites on their surface. This is the essential characteristic of an antigen.

M

Question-16

P

Answer-16

B

Producer - In environment, green plants are considered as producers.

S

They receive light energy from sun and convert it into chemical energy of food. They provide food for the organisms. Their number is highest in the food chain thus they occupy the lowermost place in energy ecological pyramid.

E

Consumer - The organisms which feed upon producers or depend on producer for their food are known as consumers. They occupy the second trophic level in

प्रश्न क्र.

ecological pyramid.

Ex - Human

Decomposers - Decomposers are also known as detritivores. They decompose complex ~~to~~ organic molecules into simple inorganic molecules. They provide essential nutrients to the soil and enrich soil fertility.

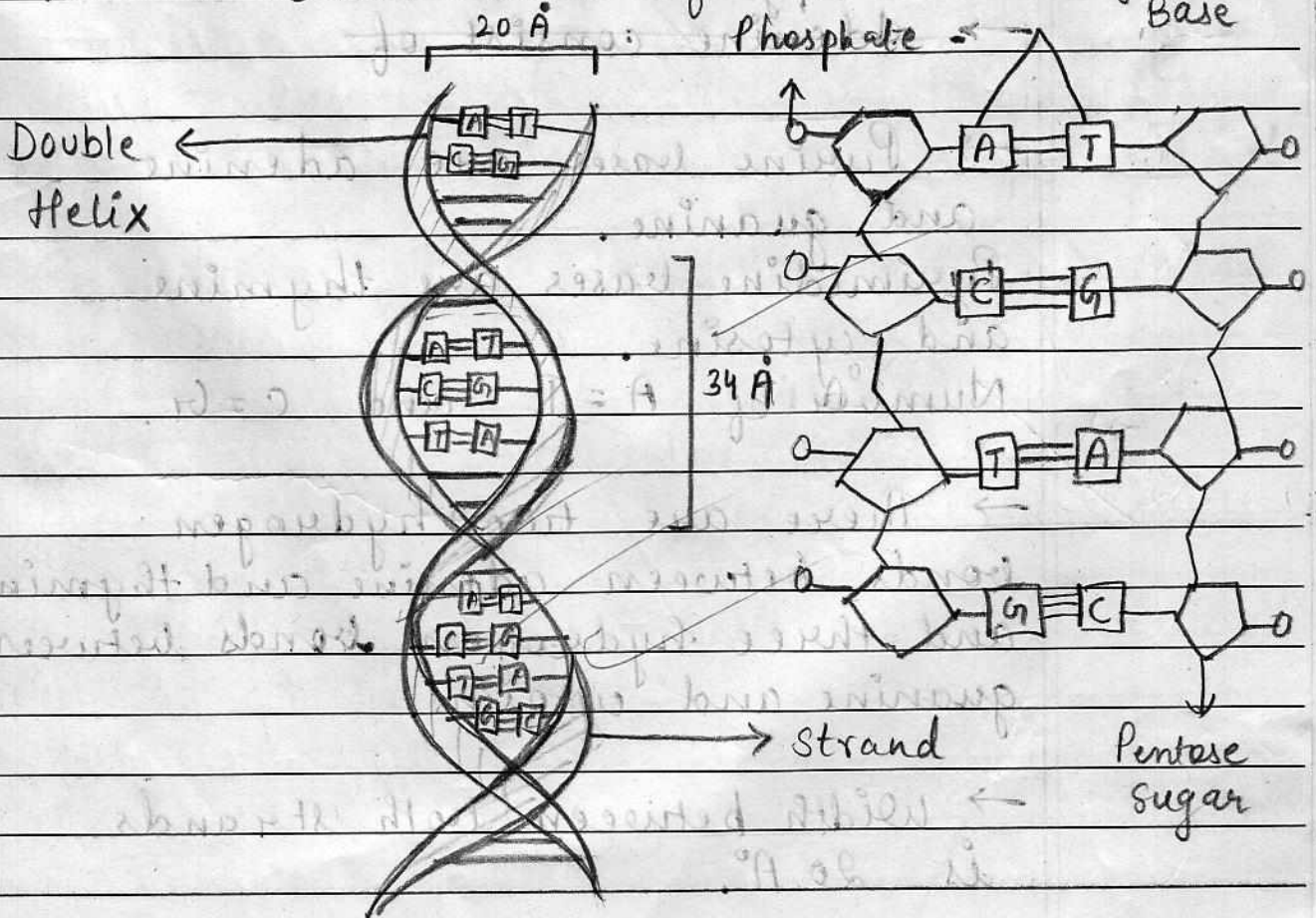
Ex - Earthworm

M  
P  
B  
S  
E

Question-17

Answer-17

Watson-Crick Model of DNA :- Nitrogenous Base





प्रश्न क्र.

→ DNA is a long molecule made up of two polynucleotide strands which are complementary to each other.

→ The strands are antiparallel to each other and coiled in right-handed helix.

M

P

B

S

E

→ There are 10 nucleotides in a helix and consist of sugar, phosphate and nitrogenous bases Adenine and Guanine, purine and pyrimidine.

→ Adenine consist of

→ Purine bases are adenine and guanine.

Pyrimidine bases are thymine and cytosine.

Number of  $A = T$  and  $C = G$ .

→ There are two hydrogen bonds between adenine and thymine and three hydrogen bonds between guanine and cytosine.

→ Width between both strands is  $20 \text{ \AA}$ .

प्रश्न क्र.

→ Length of one nucleotide is  $3.4 \text{ \AA}$ .

→ Nucleotides are joined together by phosphodiester bond.

→ Hydrogen bonds provide additional stability to the DNA molecule.

→ Sugar is pentose. One strand runs  $3' \rightarrow 5'$  while other runs  $5' \rightarrow 3'$ .

Question - 18

Answer - 18

PCR → Full form of PCR is polymerase chain Reaction.

Principle → It is based on the principle that DNA strand gets denatured at high temperature. Hence both strands can be separated and new copies can be formed with the help of a thermostable enzyme.

One billion copies of DNA can be obtained in 30 cycles.



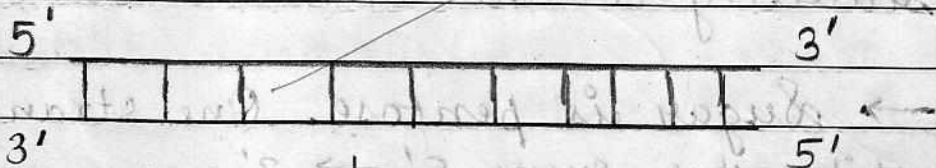
प्रश्न क्र.

Requirements →

\* DNA nucleotide which has to be amplified

\* Thermostable enzyme Taq polymerase.

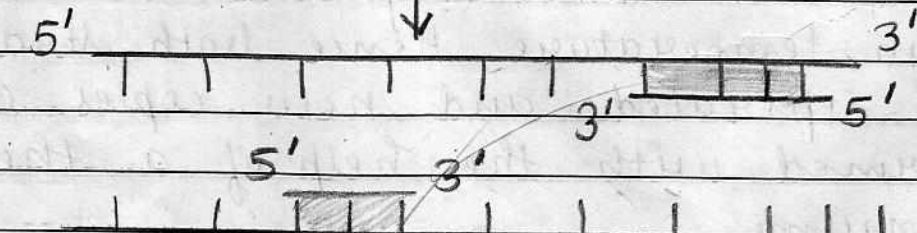
M  
P  
B  
S  
E



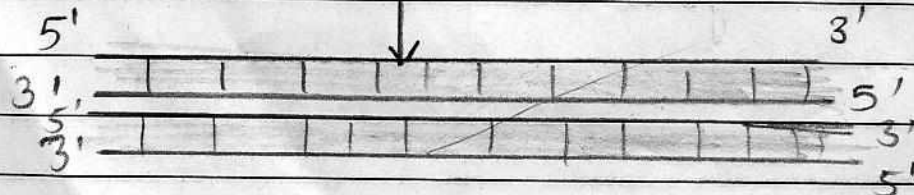
Denaturation 94°C



Annealing



Extension





प्रश्न क्र.

Procedure →

Denaturation - The DNA segment is heated at  $94^{\circ}\text{C}$  and hence both strands separate.

Annealing - The thermostable enzyme Taq Polymerase gets attached at one end and cause hybridisation of DNA.

M  
P  
B  
S  
E

Extension - The taq polymerase forms complementary DNA strand by the help of  $3' \text{OH}$ . The complementary strands start extending towards each other and form copies.

Thus amplification of DNA can be done.

Uses - Importance

- In the diagnosis of disease.
- To identify genome.
- In DNA fingerprinting.
- Used in DNA polymorphism.
- Used to identify criminal



पृष्ठ 16 के अंक

कुल अंक

16

प्रश्न क्र.

Question-19

Answer-19

Ecological pyramids are the graphical representation of various trophic level of food chain and depicts the energy flow in at various levels.

The green plants are producers, they occupy first trophic level in the food chain and occupy lowermost position in ecological pyramids.

They convert the light energy absorbed from sun into chemical energy.

They are highest in number in a food chain and act as a source of food for all.

Herbivores are considered as primary consumers which depend on plants for food. They occupy second trophic level.

Secondary consumers are the organisms which eat primary consumers. They are carnivores and occupy third trophic level.

Top carnivores have no natural predator and occupy 4<sup>th</sup> level in food chain.

M  
P  
B  
S  
E



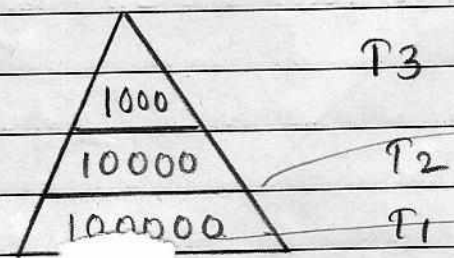


प्रश्न क्र.

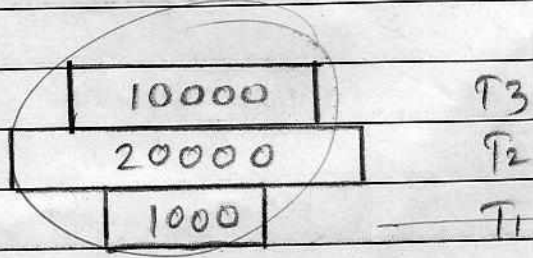
Ecological pyramids are of three types -

- \* Pyramid of energy
- \* Pyramid of number
- \* Pyramid of biomass

Pyramid of energy - It gives information about the energy flow at all trophic levels. At each trophic level 90% energy is consumed in metabolic activities or lost to the environment and 10% energy is transferred to next level. The highest level has the least energy. These pyramids are always upright.



Pyramid of number :- It gives information of number of organisms at each trophic level. They may be erect or inverted. Pyramid of number of tree ecosystem is inverted.

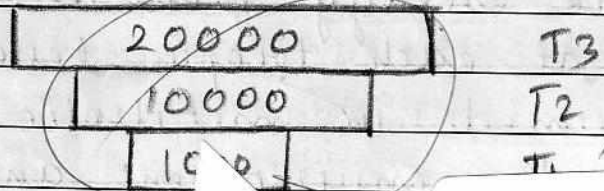


M  
P  
B  
S  
E



प्रश्न क्र.

Pyramid of biomass :- It provides the information about the dry weight of organism at each trophic level. It is upright but pyramid of biomass of aquatic ecosystem is inverted.



M  
P  
B  
S  
E

MPSE