

उत्तराखण्ड विद्यालयी शिक्षा परिषद्, रामनगर (नैनीताल)

इण्टरमीडिएट परीक्षा 'अ'  
(उत्तराखण्ड) 12 पन्ने

11000

### Question 1

- (क) (ii) Lamarck
- (ख) (ii) Testis
- (ग) (i) Rhizobium
- (घ) (ii) to produce pest-resistant varieties of plants
- (ङ) (ii) always upright
- (च) (iii) spines
- (छ) (iii) Twenty three pairs
- (ज) (ii) Typhoid
- (झ) (iii) (A) is correct but (R) is incorrect
- (ञ) (i) Both (A) and (R) are correct and (R) is the correct explanation of (A).

### Question 2

Ans Maize is a wind-pollinated plant.

### Question 3

Ans Gene is the structural and functional unit of DNA which stores hereditary information for transmission to offsprings.

### Question 4

Ans The levels of carbon monoxide (CO) gas are increased in the blood due to smoking.

### Question 5

Ans The unauthorized exploitation of the bioresources of a nation by multinational companies without prior permission and proper compensation is termed as biopiracy.

### Question 6

Ans Meiosis (reduction division) takes place during microsporogenesis. One meiotic division gives rise to four pollen grains.  
1 division = 4 pollen grains

$$100 \text{ pollen grains} = \frac{1}{4} \times 100 \text{ divisions}$$

$$= 25 \text{ divisions.}$$

Therefore, 25 meiotic divisions are required to form 100 pollen grains.

### Question 7

Ans

#### Spermatogenesis

#### Oogenesis

- |  |  |
|--|--|
| 1. Formation of sperms in males is called spermatogenesis. | Formation of ovum in females is called oogenesis.                      |
| 2. Starts at puberty and continued throughout life.        | Starts during embryonal stage and stops at the age of around 50 years. |

### Question - 8

~~What is test tube baby programme?~~

Write four functions of placenta.

Ans

Four functions of placenta are:-

1. It provides nutrition to the growing foetus along with oxygen and nutrients.
2. It removes waste and excretory products from the foetus.
3. It provides antibodies (IgG) to the foetus. This is also an example of

- passive immunity.
4. It acts as a temporary endocrine gland and secretes several hormones such as HCG (Human chorionic gonadotrophin), HPL (Human placental lactogen) etc.

### Question - 9

Ans Vestigial organs are rudimentary organs present in the body which do not serve any function in the body.

- Two examples of vestigial organs are:-
1. Vermiform appendix.
  2. Third molar (wisdom tooth).

### Question 10

Ans Two roles of ribosome during translation are:-

1. Structural role - larger and smaller subunit of ribosome - 60s and 40s form the protein synthesizing assembly i.e. forms polypeptide chain from m-RNA
2. Functional role - 23s rRNA in prokaryotes and 28s rRNA in eukaryotes acts as enzymes (peptidyl transferase) and form peptide bond between amino acids.

### Question 11

Ans Four micro organism based industries are:-

1. Alcohol / Beverage industry
2. Antibiotic industry
3. Sewage treatment industry.
4. Bread and cakes industry.

### Question - 12

(क)

D.N.A. Ligase - D.N.A. Ligase, also known as molecular glue is an enzyme used in recombinant D.N.A. technology to create recombinant D.N.A. by joining molecules/nucleotides of D.N.A. It joins D.N.A. molecules/strands by creating phosphodiester bonds between the two strands.

(ख)

Cloning vehicles or vectors - Cloning vectors are certain molecules such as plasmids and retroviruses which contain an ori (origin of replication) site and help in the transfer of recombinant DNA (rDNA) to the host cell.

### Question - 13

Ans 1. Gene therapy is a collection of methods used to treat a defective gene in an individual.

The first clinical gene therapy was given to a 4-year old girl with adenosine deaminase (ADA) deficiency.

This condition, <sup>(SCID)</sup> is caused due to deletion of gene that codes for ADA.

2. A functional ADA gene was introduced in the lymphocytes of the girl in-vitro using a disarmed retrovirus and then introduced back into the body.

### Question - 14

Ans Cry proteins are <sup>crystalline</sup> ~~crystallisable~~ proteins which are toxic to certain group of insects.  
Example - cry I ab is toxic to corn borer.

These proteins are produced by a bacteria called Bacillus thuringiensis. (Bt).

### Question - 15

Ans The slope of regression coefficient ( $Z$ ) denotes the species diversity in an area. More the value of slope ( $Z$ ), more is the species diversity.

The value of  $Z$  is found to be amazingly similar for a wide variety of taxa and lies in the range of 0.1 to 0.2.

However, for large areas such as continents, the slope is found to be much steeper. ( $Z$  lies in between 0.6 to 1.2). This shows higher species diversity in large areas such as continents.

### Question - 16

<u>Ans</u>	<u>Turner's syndrome</u>	<u>Klinefelter's syndrome</u>
1.	Caused due to <u>loss</u> of chromosome in females (monosomy)	Caused due to <u>addition</u> of a chromosome in males (trisomy)
2.	Karyotype :- $XO$ with total <u>45</u> chromosomes	Karyotype :- $XXY$ with total <u>47</u> chromosomes.
3.	Female secondary sexual characters are <u>reduced</u> - small breasts and rudimentary ovaries.	Female characters are <u>enhanced</u> - <u>gynaecomastia</u> (enlargement of breasts).

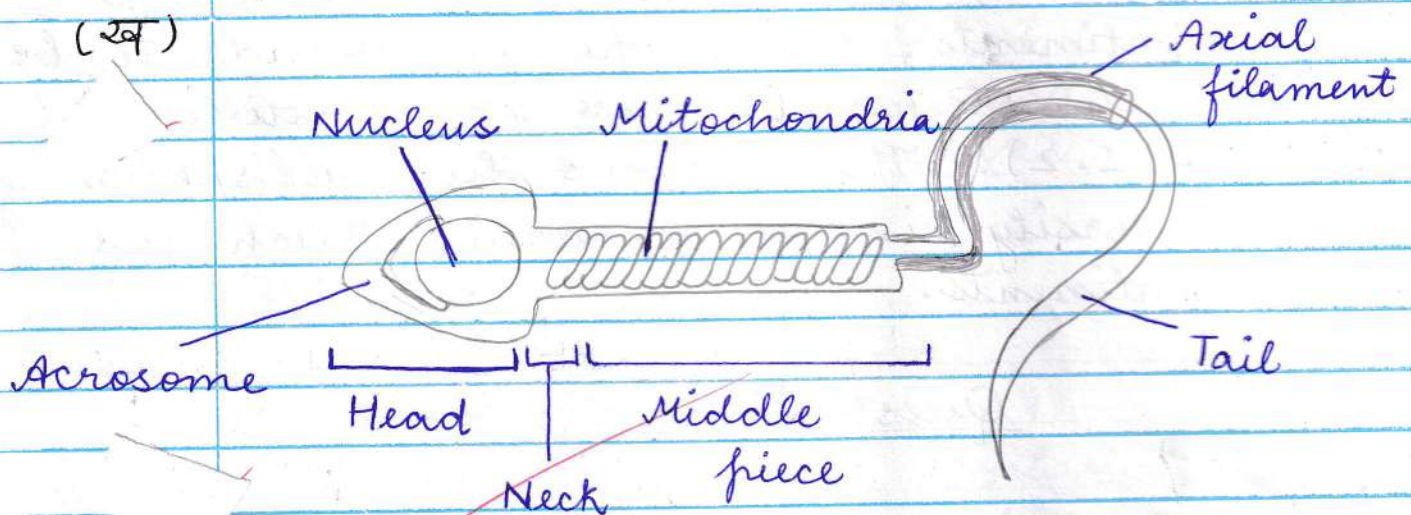
### Question - 17

(क) What is menarche? At what age does it usually start?

Ans Menarche is the onset/beginning of menstrual cycle in young women.

It usually starts at the age of around 10-14 years.

(ख)



Human sperm

### Question - 18

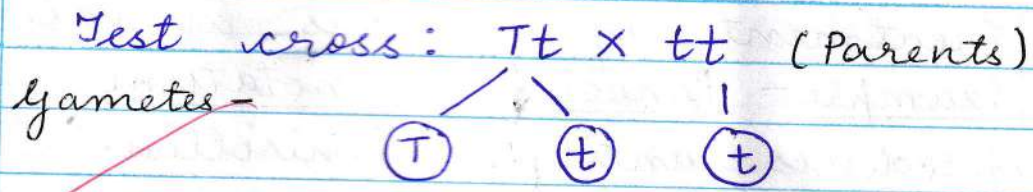
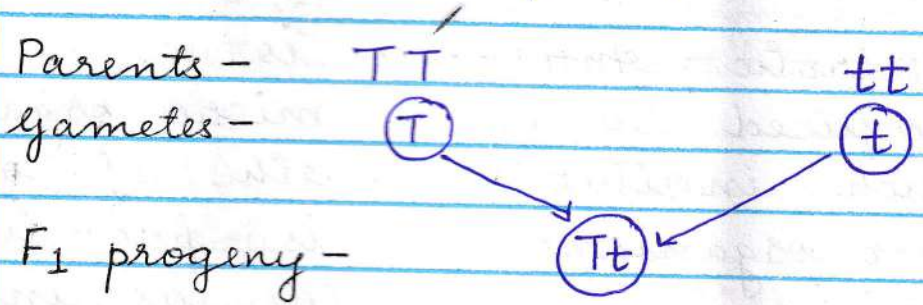
Ans DNA fingerprinting is a technique used to determine genetic variations and differences between the members of a population.

- Two uses of DNA finger printing are:-
1. To solve criminal cases - DNA on crime scene can be identified using DNA finger printing.
  2. To settle maternity and paternity cases if there is a dispute.

Question - 19

Ans The cross of the heterozygous  $F_1$  progeny with its recessive parent is known as test cross.

Example - Cross for plant height.



	t	t	
T	Tt	Tt	] → Tall plants
t	tt	tt	] → Dwarf plants

Phenotypic ratio (Tall : dwarf) = 1 : 1  
 Genotypic ratio ( $Tt$  :  $tt$ ) = 1 : 1.

## Question - 20

(क)

Cancer - It is a deadly disease in which there is uncontrolled growth of cells, causing tumors.

(ख)

Interferons - Interferons, also called biological response modifiers are certain proteins produced by the body during a viral infection which protects non-viral infected cells from further viral infection. Certain interferons are used in the treatment of cancer.

(ग)

Antibiotic - Antibiotic is a chemical produced by some micro organisms which inhibit growth of other micro organisms. It is pro-life for humans i.e. it helps us in treatment of various diseases.  
Example - Penicillium notatum (fungi) produces antibiotic Penicillin.

Q 20 - (क)

~~Repeat~~ Cancer (continued) - Cancer is caused due to carcinogens such as X-rays (radiations), smoking, tobacco chewing and certain genes (proto oncogenes) which mutate under certain conditions to form oncogenes.

## Question - 21

Ans Organisms which have had their DNA modified by genetic engineering and carry recombinant molecules of DNA are called genetically modified organisms.

Advantages of genetically modified crops are:-

1. Made plants more tolerant to abiotic stresses (drought etc.)
2. Enhanced nutritional value of food.  
Example:- Golden rice - enriched in Vitamin A.
3. Reduced reliance on chemical pesticides.  
Example:- Bt cotton is pest resistant so does not require use of pesticides.

Disadvantages of genetically modified crops are:-

1. These crops may cause allergy and other infections in some people.
2. These crops may develop some resistance in microbes of the gut.

## Question - 22

(क) Population growth - It is the growth in population due to <sup>ve</sup> several reasons such as better healthcare facilities, increase in people in reproductive age group, decrease in infant and maternal morbidity etc.

{ 24 }  
{ 1 }

Parasitism - It is a population interaction in which one species is benefitted and the other is harmed.

Example - 1) Ticks on dogs

2) Lice ~~of~~ on human head

3) Human liver fluke inside human body.

{ 25 }

Red Data Book - It is a book released by IUCN (International Union for Conservation of Nature) which contains a list of extinct, critically endangered, endangered, vulnerable species etc. of plants and animals.

### Question - 23

Ans

Biodiversity is the diversity in living organisms ranging from macromolecules within cells to biomes.

Major components of biodiversity are:-

1. Genetic diversity - Diversity between organisms of the same species is known as genetic diversity. Example - Rauwolfia vomitoria shows genetic diversity in terms of potency of reserpine.

2. Species diversity - Diversity of different species found in an area.  
Example - western ghats has more amphibian diversity than the eastern ghats.

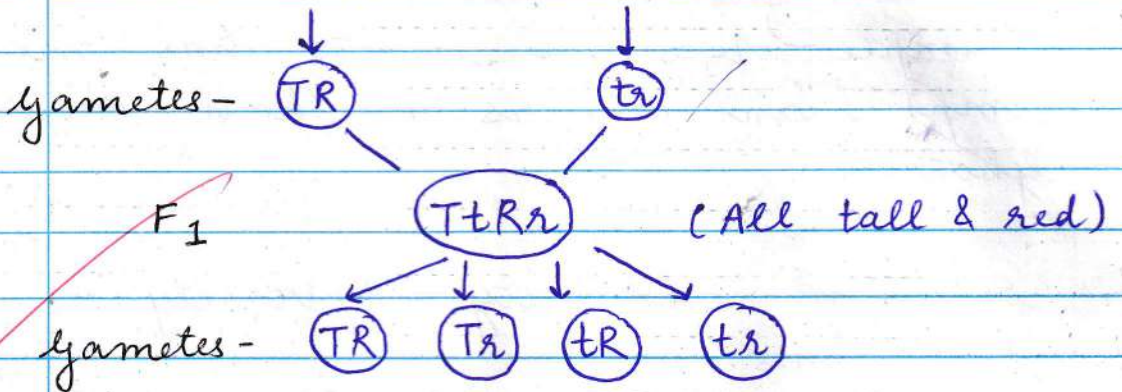
3. ecosystem diversity - Diversity of different ecosystems.  
Example - India with its rainforests, deserts and ice peaks has more ecosystem diversity than a Scandinavian country like Norway.

### Question-24

- (4)
- Characteristic features of genetic code are:-
1. Each codon is triplet in nature.
  2. There are total 64 codons - 61 codons code for polypeptides and 3 codons which do not code for polypeptides acts as stop codons (UAA, UAG, UGA).
  3. One amino acid is coded by more than one codon i.e. the genetic code is degenerate.
  4. The genetic code is commaless, i.e. it is read in a continuous manner.

(24)

Tall Red plant X Dwarf white plant  
Parents -  $TTRR \times ttrr$



$F_2$  progeny:

	TR	Tr	tR	tr
TR	$TTRR$ Tall, red	$TTRr$ Tall, red	$TtRR$ Tall, red	$TtRr$ Tall, red
Tr	$TTRr$ Tall, red	$TTrr$ Tall, white	$TtRr$ Tall, red	$Ttrr$ Tall, white
tR	$TtRR$ Tall, red	$TtRr$ Tall, red	$ttRR$ Dwarf, red	$ttRr$ Dwarf, red
tr	$TtRr$ Tall, red	$Ttrr$ Tall, white	$ttRr$ Dwarf, red	$ttrr$ Dwarf, white

In  $F_2$  -

Phenotypic ratio - 9:3:3:1

genotypic ratio - 1:2:1:2:4:2:1:2:1

## Question - 25

(क)

(क)

Allergy - Allergy is the exaggerated response of the immune system to certain antigens present in the environment. It causes sneezing, runny nose, hay fever and in severe cases bronchitis and asthma.

(ख)

Addiction - Addiction is the psychological attachment to certain effects of drugs such as hallucination, temporary feeling of well being etc.

(ग)

Sewage - Sewage is the municipal waste water containing human excreta and other organic materials. It is passed on for cleaning/treatment to Sewage Treatment Plants.

(घ)

Ascariasis - Ascariasis is a disease caused by Ascaris, the common roundworm and is spread by contaminated food and water. Its symptoms include intestinal pain, internal bleeding, anaemia and intestinal blockage.

## Question-26

(क)

Amniocentesis is the analysis of the foetal cells present in the amniotic fluid to detect genetic defects of the foetus.

(ख)

Foeticide is the killing of the foetus inside the womb. Generally, female foeticide is performed in India to kill the girl child.

(ग)

The basic purpose of amniocentesis was to diagnose genetic disorders of the foetus. However, these days it is being misused for prenatal sex determination and premature killing of the girl child in the womb.

(घ)

Female foeticide is generally performed in India, due to which the number of females are decreasing in comparison to males. Hence, the female to male sex ratio decreases due to female foeticide.