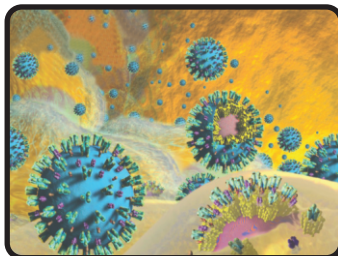


*EtG*

# **OLYMPIAD EXPLORER BIOTECHNOLOGY**

**EduHeal Foundation**  
**Nationwide Biotechnology Olympiad**  
and other  
**National/International Biotechnology Olympiads/Talent Search Exams.**



**Class-5**

*EtG* **BOOKS**

103, Taj Apartment, Near VMMC, Ring Road,  
New Delhi - 110029, Ph. 011-26197342, 26161014

E-mail : [edusys.in@gmail.com](mailto:edusys.in@gmail.com)

Website : [www.edusys.in](http://www.edusys.in)

# Contents

<b>S.No.</b>	<b>Chapters</b>	<b>Page No.</b>
1.	Plants .....	1
2.	Animals Life .....	4
3.	Human Body- Bones & Muscles .....	7
4.	Nervous System .....	10
5.	Health & Diseases .....	13
6.	Air & Water .....	16
7.	Miscellaneous Questions .....	17
8.	Revision Questions .....	34
9.	NBTO Sample Paper .....	40



(For additional science topics the child can also refer to science work books)

# SYLLABUS GUIDELINES

## CLASS - V

### Based on CBSE, ICSE & GCSE Syllabus & NCF guidelines devised by NCERT

#### Family Tree

Can you make a family tree with as many of your relatives you can get information about? Who are the relative whom you have never seen? Where do they live? *What is pedigree charting and what is its usefulness? Can you get characteristics similar to your grandpa?*

#### Shifting from place to place

Have you always lived at the place that you now live in? If not, where does your family come from? Can you trace out from where our forefathers came. *How Biotechnological Techniques help us do that?*

#### Team games – your heroes

Do you play any games in teams? Have you ever been captain of the team? Do boys and girls play together? Have you heard of any Indian team playing in another country? Which is your favourite team sport? Do you know any National level player?

#### Local games/martial arts

What are the local games/martial arts of your area? Do you know someone who is good at them? Have you seen a young acrobat or wrestler practicing? Who taught them? For how long have they learnt the art/game? What are the new games in your area that were not played earlier? What do you do in the evenings for leisure? What if there no TV? Who decides what programmes to watch?

#### Blow hot blow cold

How many times do you breathe in a minute- on sitting still, just after a run? How much can you expand your chest by breathing deeply? Can you make a glass cloudy by blowing in it? How do you blow to make something cold? Do you also blow to keep a fire going?

#### How animals find their food?

If you leave some food outside your house do some animals take it away? How do they find it? Do these animals also hear/speak/see/ smell/eat/sleep? *What are Nanosensors & where would you find their potential uses?*

#### What we take from animals?

What animal products do we use for clothing, shelter, etc?

#### People who depend on animals

Do you know people who catch/trap/ hunt/entertain using animals? Have you seen how snake charmers depend on animals? What do you understand by cruelty to animals? do you think a snake charmer is cruel to the snake? Have you seen scenes of hunting in rock paintings or on ancient seals?

#### Growing plants

How does a plant grow from a seed? *Can you grow a plant without seeds with help of biotechnology?* How do you grow mangoes potatoes? Where does the seed come from? Have clothes/drift in the water? *How can you grow/ improve or produce high yield variety of seeds?*

**Forests and forest people** Have you seen or heard about a forest? How do people live in forests? How is their life threatened by forests being cut? What kinds of foods do they collect from the plants there? What leaves are used for eating on? Do your parents remember places with trees/forests where there are none today? Why were the trees cut and what is there today? *How can we save endangered plants by tissue culture?*

#### Protected trees

Have you head of a park/sanctuary? Who looks after it? Does any body own it? Have you seen a place where trees are worshipped or protected by the villagers? Plants that have come from far Does tea come from a plant? Where did people first grow tea and what does

## Class - 5

## V

the plant look like? Does it grow only in some places/climates? What did people drink when there was no tea in India?

#### When food gets spoilt

How does food spoil? How do we know that food is spoilt? Which food spoil sooner than others? *What is the Biotechnology behind all these questions? What can we do to prevent food from getting spoilt?* What do we do to keep it fresh during travel. *Why do we need to preserve food?* Do you leave food in your plate?

#### Who produces the food we eat?

Do you know of different kinds of farmers? Do all farmers own their land? How do farmers get the seeds they plant every year? What else besides seeds is required for a crop to grow? *What is GM (Genetically modified) crop? which GM crop was introduced in India? Why were farmers against it? Which company produced it?*

#### What did people grow earlier?

Did your grandparents or any elderly person eat the same food you eat today. Do all of us eat the same kind today? Why do we eat different kinds of food? *What role has BT played in helping us grow different types of food?*

#### When people do not get food

Do you know of times when many people do not get enough food to eat? *How can one use BT to overcome this?* Have you seen where extra grain is stored? How do you know when you are hungry? Do you know of people who get ill because they do not have enough to eat?

#### Our Mouth tastes and even digests food!

How do we taste food? what happens in the mouth to the food we eat? Why do we give glucose to patients? What is glucose? *How BT can be used to improve tastes of inedible foods*

#### Food of plants?

What do plants need for food? do you know of any plants that eat insects? What do nimals eat? Do all animals eat the same food? Do Animals eat other animals?

#### Why different houses

Why do you have different kind of houses in different places? Different houses in the same place?

#### A shelter for everyone?

Does everyone have a shelter to live in? Why do people live together in villages, hamlets, colonies, neighborhoods?

#### Water flow

From where do farmers get water to grow crops? Do all crops need the same amount of water? Have you seen water flowing upwards? What are the different ways in which you have seen water being lifted? How is flowing water used to grind grain?

#### Plants and animals in water

What kinds of animals and plants live in water? Are there weeds that are covering your Pond/lake/river? Can you classify all the animals you see around you to show which ones live in water and which live on land? *What is spirulina and why it is famous. Can use BT to put all qualities of spirulina in a food capsule which can be used by astronauts?*

#### What floats, sinks or mixes?

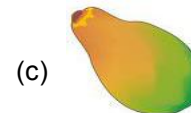
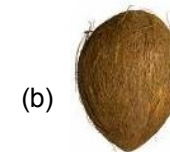
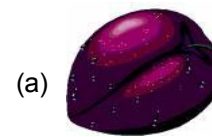
Have you ever seen anything floating in water? Can you classify as many things around you to see which float, which sink and which mix with water? Does oil mix with water? What are the similarities and differences in water, oil, milk, cold drink, etc.? How do we measure these?

#### Mosquitoes and malaria

Is their any stagnant water in you locality? Do you find more mosquitoes in stagnant water? Is there any way to reduce the mosquitoes in water? Have you heard of malaria? In what season do you find more people getting ill with malaria? *What role can BT play in making mosquitoes less dangerous? How do we produce vaccine against malaria?*






- Q.1.** The dispersal of pea pod, balsam seeds take place by  
(a) Explosion (b) Water  
(c) Wind (d) None of these
- Q.2.** Seeds don't need sunlight to germinate, because  
(a) The seeds germinate in cold  
(b) The seeds germinate in hot  
(c) The baby plant get food from the seed leaves  
(d) none of these
- Q.3.** Which of these will grow into a new plant?  
(a) A fallen seed (b) A fallen flowers  
(c) A fallen leaf (d) None of these
- Q.4.** In Bryophyllum plant, buds are present in the  
(a) Stem (b) Roots  
(c) Leaves (d) None of these
- Q.5.** Wheat, Barleys and Mustard are  
(a) Kharif crops (b) Fiber crops  
(c) Rabi crops (d) None of these
- Q.6.** Summer crops are called  
(a) Kharif crops (b) Edible crops  
(c) Rabi crops (d) None of these
- Q.7.** Rice, Maize and Wheat are  
(a) Fiber crops (b) Producing crops  
(c) Food crops (d) None of these
- Q.8.** The seeds dispersed by water are



(d) None of these

- Q.9.** Which of these seeds of plants have wings, which help them to disperse through wind?  
(a) Coconut (b) Mango  
(c) Cotton (d) None of these

- Q.10.** During germination \_\_\_\_\_ in the cotyledons are used for growth.  
 (a) Pollen stored (b) Food stored  
 (c) Water stored (d) None of these
- Q.11.** A seed that has two seed leaves that contains stored food is a  
 (a) Monocot seed (b) Double seed  
 (c) Dicot seed (d) None of these
- Q.12.** The two ear shaped lobes inside the seed are  
 (a) Seed coat (b) Cotyledons  
 (c) Baby plant (d) None of these
- Q.13.** The baby plant gets its food from the  
 (a) Seed coat (b) Vacuoles  
 (c) Seed leaves (d) None of these
- Q.14.** The outer covering of a seed is called  
 (a) Seed coat (b) Hard shell  
 (c) Cotyledons (d) None of these
- Q.15.** What are the three main parts of a seed?  
 (a) Pollen grain, sperm and egg  
 (b) Seed coat, pollen grain, flower  
 (c) Seed coat, stored food and an embryo  
 (d) None of these
- Q.16.** Development of a seed into a new plant is called  
 (a) Fertilization (b) Germination  
 (c) Pollination (d) None of these
- Q.17.** Method of obtaining new plant from the leaves, stems and roots of the parent plant is called  
 (a) Vegetative propagation  
 (b) Fertilization  
 (c) Pollination  
 (d) None of these
- Q.18.** The process of scattering or spreading of seeds to different places is called  
 (a) Migration (b) Roaming  
 (c) Dispersion (d) None of these
- Q.19.** Seeds are scattered by  
 (a) Birds and animals (b) wind and water  
 (c) All of these (d) None of these
- Q.20.** In flowering plants, reproduction involves the creation of  
 (a) Seeds (b) Pollen

- (c) Spores (d) None of these
- Q.21.** Ferns reproduce with \_\_\_\_\_ that are on the underside of their leaves.  
 (a) Roots  
 (b) Stomata  
 (c) Spores  
 (d) None of these
- Q.22.** The underground stem that grows into a new plant is a  
 (a) Nodes (b) Roots  
 (c) Bulb (d) None of these
- Q.23.** Which of the following reproduces from stem?  
 (a) Rose and Bougainvillea  
 (b) Potato and Ginger  
 (c) All of the above  
 (d) None of these
- Q.24.** Reproductive organs of flowering plants are
- (a)  (b) 
- (c)  (d) None of these
- Q.25.** Flowering plants reproduce through  
 (a) Spores (b) Body parts  
 (c) Seeds (d) None of these








### ANSWERS

1. (a) 2. (c) 3. (a) 4. (c) 5. (c) 6. (a) 7. (c) 8. (b)  
 9. (c) 10. (b) 11. (c) 12. (b) 13. (c) 14. (a) 15. (c) 16. (b)  
 17. (a) 18. (c) 19. (c) 20. (a) 21. (c) 22. (c) 23. (c) 24. (b)  
 25. (c)












# Chapter 2 ANIMALS LIFE

- Q.1.** The long winter sleep is called  
 (a) Nap (b) Nocturnal  
 (c) Hibernation (d) None of these
- Q.2.** The animals living in cold regions have \_\_\_\_\_ on their bodies.  
 (a) Scales (b) Spines  
 (c) Fur (d) None of these
- Q.3.** Birds have feathers  
 (a) To help them to fly (b) To keep them warm  
 (c) Both (a) and (b) (d) None of these
- Q.4.**  and  have hard covering on their body called  
 (a) Scales (b) Trunk  
 (c) Shell (d) None of these
- Q.5.** Which type of fins helps the fish to change its direction?  
 (a) Tail fins (b) Both  
 (c) Unpaired fins (d) None of these
- Q.6.** Which type of fins helps the fish to move forward?  
 (a) Unpaired fins (b) Tail fins  
 (c) Paired (d) None of these
- Q.7.** Animals active during the day time are  
 (a) Nocturnal (b) Diurnal  
 (c) Both (a) and (b) (d) None of these
- Q.8.** Of the following which is a scavenger?  
 (a)  (b)   
 (c)  (d) None of these
- Q.9.** Animals which eat dead animals are called  
 (a) Scavengers (b) Omnivorous  
 (c) Predators (d) None of these
- Q.10.** The animal which eat both plants and animals are

Class - 5

5

- (a)  (b) 
- (c)  (d) None of these
- Q.11.** The animal having hollow bones is  
 (a) Birds (b) Insect  
 (c) Earth worm (d) None of these
- Q.12.** The animal which breathe through moist skin is  
 (a) Fish (b) Insect  
 (c) Earth worm (d) None of these
- Q.13.** Of the following, which are warm blooded animals?  
 (a)  (b)   
 (c)  (d) None of these
- Q.14.** The animal whose body temperature remain constant during all seasons are called  
 (a) Cold blooded animals  
 (b) Both  
 (c) Warm Blooded animals  
 (d) None of these
- Q.15.** Which class of animals can live both on land and in water?  
 (a) Amphibians (b) Mammals  
 (c) Reptiles (d) None of these
- Q.16.** Air holes on the body through which insects breathe are called  
 (a) Lungs (b) Spiracles  
 (c) Stomata (d) None of these
- Q.17.** An invertebrate which is able to fly is  
 (a)  (b)   
 (c)  (d) None of these
- Q.18.** Animals without backbone are called  
 (a) Invertebrate (b) Vertebrate  
 (c) Insects (d) None of these

- Q.19.** Animals with backbone are called  
 (a) Invertebrate (b) Insects  
 (c) Vertebrate (d) None of these
- Q.20.** The science which deals with the study of animals is  
 (a) Astronomy (b) Zoology  
 (c) Botany (d) None of these

<b>TRUE OR FALSE</b>
----------------------

**Write T for TRUE and F for FALSE in the given statement**

- Q.21.** The fat deposition under the skin protects animals from cold climate.
- Q.22.** The surroundings in which an animals lives and survives is called its habitat.

**Match the following**

- | <b>Q.23. Column I</b>                       | <b>Column II</b> |
|---|------------------|
| A. Animals that eat plants                  | (P) Omnivorous   |
| B. Animals that eat animals                 | (Q) Herbivorous  |
| C. Animals that eat both plants and animals | (R) Scavengers   |
| D. Animals that eat dead animals            | (S) Carnivorous  |

☺☺☺

<b>A N S W E R S</b>
----------------------

1. (c) 2. (c) 3. (b) 4. (c) 5. (a) 6. (c) 7. (b) 8. (a)  
 9. (a) 10. (b) 11. (a) 12. (c) 13. (c) 14. (c) 15. (a) 16. (b)  
 17. (c) 18. (a) 19. (c) 20. (b) 21. (T) 22. (T)  
 23. (A-Q, B-S, C-P, D-R)




☺☺☺

# Chapter 3 HUMAN BODY-BONES & MUSCLES

- Q.1.** Strong tissue which binds the bone at the joint is called  
 (a) Ligaments (b) Blood  
 (c) Bone marrow (d) None of these
- Q.2.** The strong fibre with which muscles are attached to the bones are  
 (a) Spine (b) Ligaments  
 (c) Tendons (d) None of these
- Q.3.** The muscles of heart are called  
 (a) Pumping muscles (b) Biceps  
 (c) Cardiac muscles (d) None of these
- Q.4.** Muscles which work automatically are  
 (a) Involuntary muscles (b) Voluntary muscles  
 (c) both (a) and (b) (d) None of these
- Q.5.** The muscles which can be moved by us, whenever we wish are called  
 (a) Involuntary muscles (b) Voluntary muscles  
 (c) Both (a) and (b) (d) None of these
- Q.6.** Blood cells are produced in  
 (a) Arteries (b) Heart  
 (c) Bone marrow (d) None of these
- Q.7.** Each small bone of the long backbone is called  
 (a) Spinal cord (b) Vertebrae  
 (c) Tendon (d) None of these
- Q.8.** The longest bones of our body is  
 (a) Femur (b) Humerus  
 (c) Spinal cord (d) None of these
- Q.9.** Long bones of the skeleton are filled with a soft, fatty substance called  
 (a) Bone marrow (b) Bone juice  
 (c) Ligaments (d) None of these
- Q.10.** Which jaw moves?  
 (a) Only lower jaw (b) Only upper jaw  
 (c) Both (a) and (b) (d) None of these
- Q.11.** The joints in our fingers are called  
 (a) Pivots joints (b) Gliding joints  
 (c) Hinge joints (d) None of these





- Q.12.** Femur, tibia and Fibula are the bones of  
 (a) Palm (b) Legs  
 (c) Arms (d) None of these
- Q.13.** Humerus, radius and ulna are bones of  
 (a)  (b)   
 (c)  (d) None of these
- Q.14.** Bones store  
 (a) Minerals (b) Hormones  
 (c) Vitamins (d) None of these
- Q.15.** Ribcage protects  
 (a) Brain (b) Heart and lungs  
 (c) Only lungs (d) None of these
- Q.16.** The backbone is made up of  
 (a) 33 bones (b) 31 bones  
 (c) 24 bones (d) None of these
- Q.17.** The skull is made up of  
 (a) 4 bones (b) 33 bones  
 (c) 22 bones (d) None of these
- Q.18.** The human skeleton is made up of  
 (a) 206 bones (b) 350 bones  
 (c) 306 bones (d) None of these
- Q.19.** The skeleton system gives  
 (a) Movement to the body  
 (b) Shape to the body  
 (c) Strength to the body  
 (d) None of these
- Q.20.** The skeletal system consists of  
 (a) Brain & spinal cord (b) Muscles  
 (c) Bones (d) None of these

<b>TRUE OR FALSE</b>
----------------------

**Write T for True and F for False in the given statement.**

- Q.21.** Hip bone of a female is bigger than that of a man.
- Q.22.** The bones in our body are of same sizes and shapes.
- Q.23.** A new born baby has more bones than an adult.
- Q.24.** All the bones are grouped into five classes - the skull, backbone, ribs, limbs and girdles.

- Q.25.** Bone marrow produces new bones.
- Q.26.** Only floating ribs are joined to the backbone.
- Q.27.** We can bend that part of our body only, where there is a joint.
- Q.28.** The backbone consists of one long bone.
- Q.29.** All joints in the body allow movements.
- Q.30.** The frame work of bones is called skeleton system.
- Q.31. Match the following**
- | Column I                   | Column II                |
|----------------------------|--------------------------|
| 1. Elbow and knee          | A. Pivot joint           |
| 2. Ankle and wrist         | B. Hinge joint           |
| 3. Skull and vertebrate    | C. Ball and socket joint |
| 4. Shoulder and thigh bone | D. Gliding joint         |
| (a) 1-B, 2-D, 3-A, 4-C     | (b) 1-A, 2-C, 3-B, 4-D   |
| (c) 1-C, 2-A, 3-B, 4-D     | (d) 1-D, 2-C, 3-B, 4-A   |



<b>A N S W E R S</b>
----------------------

1. (a) 2. (c) 3. (c) 4. (a) 5. (b) 6. (c) 7. (b) 8. (a)  
 9. (a) 10. (a) 11. (c) 12. (b) 13. (a) 14. (a) 15. (b) 16. (a)  
 17. (c) 18. (a) 19. (b) 20. (c) 21. (T) 22. (F) 23. (T) 24. (T)  
 25. (F) 26. (T) 27. (T) 28. (F) 29. (F) 31. (a)





**NATIONWIDE BIOTECHNOLOGY  
OLYMPIAD (NBTO)  
SAMPLE PAPER**

Total duration : 40 Minutes

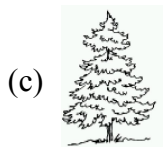
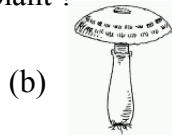
Total Marks : 25

**GENERAL KNOWLEDGE**

1. Which of the following cannot be recycled ?  
(a) Milk cartons            (b) Glass containers  
(c) Paper bags              (d) None of these
2. What effects traps the heat next to the earth?  
(a) The refrigerator effect   (b) The green house effect  
(c) The hot house effect    (d) None of these
3. Renewable source of energy like solar and wind power \_\_\_\_\_.  
(a) Can use coal, oil or gas  
(b) Don't use coal, oil or gas  
(c) Only use nuclear fuels   (d) None of these
4. The natural cycle of water is called?  
(a) Hydrologic cycle        (b) Percolation cycle  
(c) Ground water cycle    (d) None of these
5. A place where the water is treated to make it safe to drink  
(a) Water treatment plant   (b) Waste water treatment plant  
(c) Dry cleaners              (d) None of these

**E.V.S.**

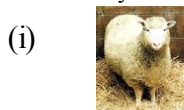
6. Which of these is not a plant ?



7. Which of the following picture represents clones.

Dolly sheep

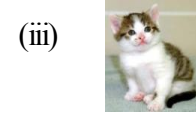
Andi monkey



Class - 5

41

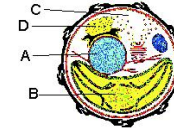
Copy cat kitten



(iv) None of these

- (a) Only (i)                      (b) Only (i) and (ii)  
(c) All the three              (d) None of these

8. Which part represents **Nucleus** where the DNA is found in the cell



- (a) A                                (b) C  
(c) D                                (d) None of these

9. Which of the following best define microbes?

- (a) Microbes are diseases causing organism which live in our body  
(b) Microbes are useful/harmful minute organisms which we cannot see with naked eyes.  
(c) Microbes are non living things useful for mankind  
(d) None of these

10. Which of the following activity the friendly bacteria can do?

- (a) Give you disease  
(b) Clean the environment  
(c) Help cow to digest hard to digest fibres  
(d) Both (b) and (c)

11. Which of the following is true about fermentation?

- (a) Fermentation makes things hard.  
(b) Fermentation occurs in absence of air  
(c) Fermentation needs oxygen to takes place  
(d) None of these

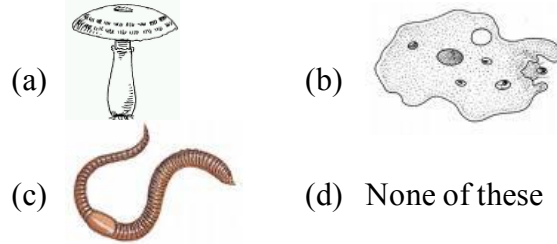
12. Which is not required for cloning?

- (a) Nucleus                      (b) Electric shock  
(c) Both of these              (d) None of these

13. Structurally living things are made up of

- (a) Bricks                        (b) Cells  
(c) Air and Water              (d) None of these

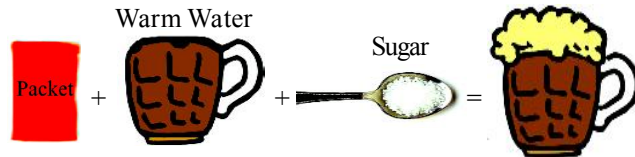
14. Which of the following organism is made up of one cell?



15. Bacteria living in the stomach of cows are helpful because they

- (a) Immunise them to fight against diseases
- (b) Help them to digest the fibers of plants and grasses which are hard to digest.
- (c) Form antibiotics in their stomach so that cow give medicated milk
- (d) None of these

16. Krish was performing an experiment. He added a packet of substance in a cup of warm water and added 1 teaspoon of sugar.



He waits for 10 minutes and then he saw that it bubbled like crazy. What could be in the packet?

- (a) Carbon dioxide
- (b) Yeast
- (c) Flour
- (d) None of these

17. Which is correctly arranged?

- (a) DNA  $\xrightarrow{\text{in}}$  Cell  $\xrightarrow{\text{in}}$  Nucleus  $\xrightarrow{\text{in}}$  Body
- (b) DNA  $\xrightarrow{\text{in}}$  Chromosomes  $\xrightarrow{\text{in}}$  Nucleus  $\xrightarrow{\text{in}}$  Cell  $\xrightarrow{\text{in}}$  Body
- (c) Nucleus  $\xrightarrow{\text{in}}$  DNA  $\xrightarrow{\text{in}}$  Chromosomes  $\xrightarrow{\text{in}}$  Body  $\xrightarrow{\text{in}}$  Cells
- (d) None of these

18. “Finger prints of identical twins are identical”

This statement is

- (a) True
- (b) False
- (c) Can't say
- (d) None of these

19. Which of the following will be least helpful in DNA fingerprint analysis?

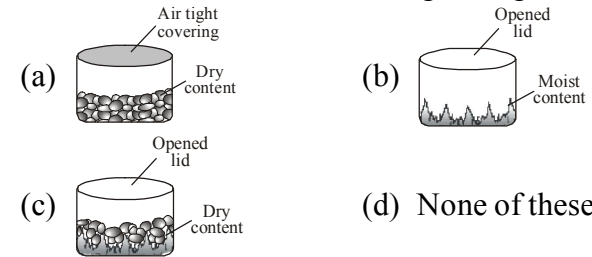
- (a) bits of bones at that place
- (b) Photographs of crime scene
- (c) Blood spots of the person present there
- (d) None of these

20. We can protect our biodiversity through

- (a) Destruction
- (b) Conservation
- (c) Erosion
- (d) None of these

### INTERACTIVE QUESTIONS

21. In which Beaker the chances of growing bacteria is highest?



22. In making of which of the following items microbes play an important role.



- (a) (1), (4) and (3)
- (b) (1), (2), (4), (5)
- (c) (2), (3)
- (d) None of these

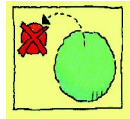
23. You must have studied about cloning in your Biotechnoactivity book. Recall that and say which picture is missing in the series.



Take A cell From a Champion cow.....



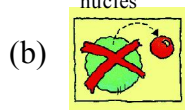
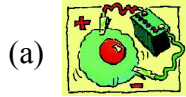
Remove the nucleus and discard the rest



Take an egg cell from a different cow .....Remove and discard its nucleus

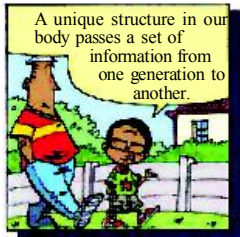


Insert first nucleus into empty egg cell



(d) None of these

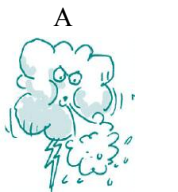
24.



About which structure is the boy talking about?

- (a) Liver
- (b) DNA
- (c) Brain
- (d) None of these

25.



Natural degredation of Biodiversity



Mountain of Biodiversity



Human caused degradation of biodiversity

Look at the pictures shown above. Which pictures will you use to symbolise 'Volcano'.

- (a) A
- (b) B
- (c) C
- (d) None of these

**ANSWERS**

- 1. (d)
- 2. (b)
- 3. (b)
- 4. (a)
- 5. (a)
- 6. (b)
- 7. (c)
- 8. (a)
- 9. (b)
- 10. (d)
- 11. (b)
- 12. (d)
- 13. (b)
- 14. (b)
- 15. (b)
- 16. (b)
- 17. (b)
- 18. (b)
- 19. (b)
- 20. (b)
- 21. (b)
- 22. (b)
- 23. (b)
- 24. (b)
- 25. (a)

