



BIOLOGY

BOOKS - CENGAGE BIOLOGY

WORLD OF MICROBES

Question

1. When , historically, did people begin to be aware of the existence of micro-organisms and understand that they are the agents

responsible for many modifications done of food ?



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2. Why is a virus particle not considered to be a cell ?



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3. How does the reproduction of a virus differ from that of a bacterium ?



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Mandatory Exercise Exercise Set I

1. The table below refers to the structural features of cells of *Bacillus*, *Chlamydomonas*, and *Saccharomyces*. If the structure is present, place a tick (right) in the appropriate box, and if the structure is absent, place a cross

(wrong) in the appropriate box.

Structure	<i>Bacillus</i>	<i>Chlamydomonas</i>	<i>Saccharomyces</i>
Cellulose cell wall			
Chloroplast			
True nucleus			



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2. Identify the type of bacterial reproduction described using the following choices:

binary fission, conjugation

Bacterium with a new genetic makeup is produced _____



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3. Identify the type of bacterial reproduction described using the following choices:

binary fission, conjugation

Circular chromosome is copied _____



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4. Identify the type of bacterial reproduction described using the following choices:

binary fission, conjugation

Genetic material is transferred through a pilus



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5. Identify the type of bacterial reproduction described using the following choices:

binary fission, conjugation

Two identical cells are produced -----



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6. Identify the type of bacterial reproduction described using the following choices:

binary fission, conjugation

Sexual reproduction occurs _____



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7. Examine the following statements. If the statement is true, write true. If it is not, rewrite the italicised part to make it a true statement.

Saprophytic fungi use intracellular digestion to obtain nutrients.



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8. Examine the following statements. If the statement is true, write true. If it is not, rewrite the italicised part to make it a true statement.

Hyphae release digestive enzymes that break down molecules in their food sources.



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9. Examine the following statements. If the statement is true, write true. If it is not, rewrite the italicised part to make it a true statement.

Parasitic fungi grow spores into host cells and absorb the cell's nutrients.



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10. What do all microbes need to grow?



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11. Name any three shapes of bacteria. Draw the shapes of bacteria.



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12. Different between extreme halophiles and thermophiles



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13. Different between staphylococcus and streptococcus



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14. Different between aerobes and anaerobes



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15. List two functions of pseudopodia.



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16. Sketch an Amoeba in the space below and label your sketch.



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17. Are protozoans heterotrophic or autotrophic? Define your answer.



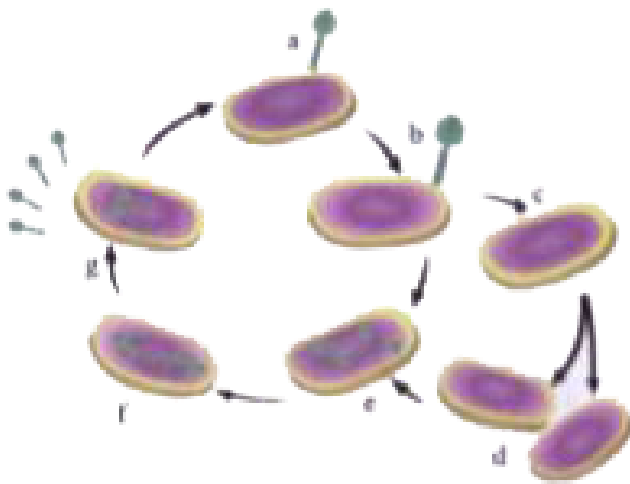
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18. Mention various types of pigments in red, brown, and green algae.



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19. Label the following condensed version of bacteriophage reproductive cycles using the following terms: Viral DNA, penetration, release, prophage, attachment, biosynthesis, and integration



(a) _____

(b) _____

(c) _____

(d) _____

(e) _____

(f) _____

(g) _____



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20. Give appropriate terms and one example for each of the following: Organisms which depend on ready-made food from other sources



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21. Give appropriate terms and one example for each of the following: Organisms which

contain chlorophyll and can prepare their own food



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22. Give appropriate terms and one example for each of the following: Organisms which obtain nourishment from decaying dead organisms



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23. Give appropriate terms and one example for each of the following: Organisms which draw their nourishment from another living organisms



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24. Who am I?

- (i) I reproduce by using other cell's materials.
- (ii) I am killed by a cell by the process of phagocytosis.

(iii) I release my nuclear material into the nuclear material of the other cell.

(iv) The cell then starts to reproduce my information as its own.

(v) The cell now builds copies of my information and releases it into the other cell.



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25. Write the appropriate term for the following: Genetic material of a virus _____



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26. Write the appropriate term for the following: Protein coat of a virus _____



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27. Write the appropriate term for the following: A virus that infects E. coli bacteria



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28. Write the appropriate term for the following: A cell in which a virus replicates



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Mandatory Exercise Exercise Set II

1. The following paragraph is related to nitrogen fixation. Complete the paragraph by selecting the correct word from those given in

the box. You may use a term only once.

Rhizobium, Klebsiella, root nodules,
atmospheric, Azotobacter

Certain bacteria are helpful in fixation of atmospheric nitrogen. Bacteria such as _____ and _____ are present in the soil and fix up the elemental nitrogen from the atmosphere. Species of _____ bacteria are present in _____ of leguminous plants and they increase the nitrogen content of the soil by fixing up _____ nitrogen.



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2. Define the fermentation



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3. Define the nitrogen fixation



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4. Assertion: The bacteria within the nodules can take up and reduce atmospheric nitrogen.

Reason: Legumes have root nodules where nitrogen-fixing bacteria live.

A. If both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. If both Assertion and Reason are true, but Reason is not the correct explanation of Assertion

C. If Assertion is true but Reason is false

D. If both Assertion and Reason are false

Answer: A



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5. Which micro-organisms are killed by antibiotics?

A. Viruses

B. Fungi

C. Bacteria

D. None

Answer: A



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6. _____ is the scientific name of the baker's yeast.

A. *Saccharomyces cerevisiae*

B. *Penicillium notatum*

C. *Aspergillus niger*

D. *Azotobacter*

Answer: A



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7. Penicillin controls many _____ diseases.

A. fungal

B. bacterial

C. viral

D. protozoan

Answer: B



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8. Circle the odd one out among the following:

Cilia, flagella, hyphae, pseudopodia



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9. Circle the odd one out among the following:

Fermentation, alcohol, oxygen, anaerobic



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10. Circle the odd one out among the following: Streptomycin, penicillin, erythromycin, gentamicin



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Consolidated Exercise Comprehension

1. Mouldy bread: A science experiment

I just bought a loaf of fresh-baked bread (without preservatives!) from the bakery. I placed a slice of bread in a ziploc bag, and left

it out on the kitchen counter. I placed a second slice of bread in a separate ziploc bag and placed it in the refrigerator. I placed a third slice of bread in a different ziploc bag and placed it in the freezer. I left the slices of bread in each of the three places for 2 weeks. I observed the slices of bread for mould growth every other day.

What is mould? (Is it a bacterium, a fungus, or a virus?)



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2. Mouldy bread: A science experiment

I just bought a loaf of fresh-baked bread (without preservatives!) from the bakery. I placed a slice of bread in a ziploc bag, and left it out on the kitchen counter. I placed a second slice of bread in a separate ziploc bag and placed it in the refrigerator. I placed a third slice of bread in a different ziploc bag and placed it in the freezer. I left the slices of bread in each of the three places for 2 weeks. I observed the slices of bread for mould growth every other day.

What is the only factor that was changed in the experiment?



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3. Mouldy bread: A science experiment

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third slice of bread in a different ziploc bag and placed it in the freezer. I left the slices of bread in each of the three places for 2 weeks. I observed the slices of bread for mould growth every other day.

Why do you think I placed the bread in ziploc bags and made sure they were sealed?



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4. Mouldy bread: A science experiment

I just bought a loaf of fresh-baked bread

(without preservatives!) from the bakery. I placed a slice of bread in a ziploc bag, and left it out on the kitchen counter. I placed a second slice of bread in a separate ziploc bag and placed it in the refrigerator. I placed a third slice of bread in a different ziploc bag and placed it in the freezer. I left the slices of bread in each of the three places for 2 weeks. I observed the slices of bread for mould growth every other day.

Which slice of bread would you expect to develop mould faster?



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5. Complete the crossword puzzle using the clues given below:

Across

5. Type of bacteria that consume nitrogen in the air and change it into a form that plants can use

10. Microbes that cause diseases

12. A cell that lacks a nucleus

13. Medicines used to kill bacteria and other micro-organisms

14. A solution containing a weakened or

inactive version of a virus

15. The use of bacteria and other micro-organisms to change pollutants in soil and water into harmless chemicals

Down

1. The cycle of infection in which more viruses are produced and the host cell is destroyed

2. Bacteria that remain inactive until environmental conditions are favourable

3. An organism that supports a parasite

4. A microscopic particle that invades a cell and often destroys it

6. One type of simple cell division that bacteria

use to reproduce, binary

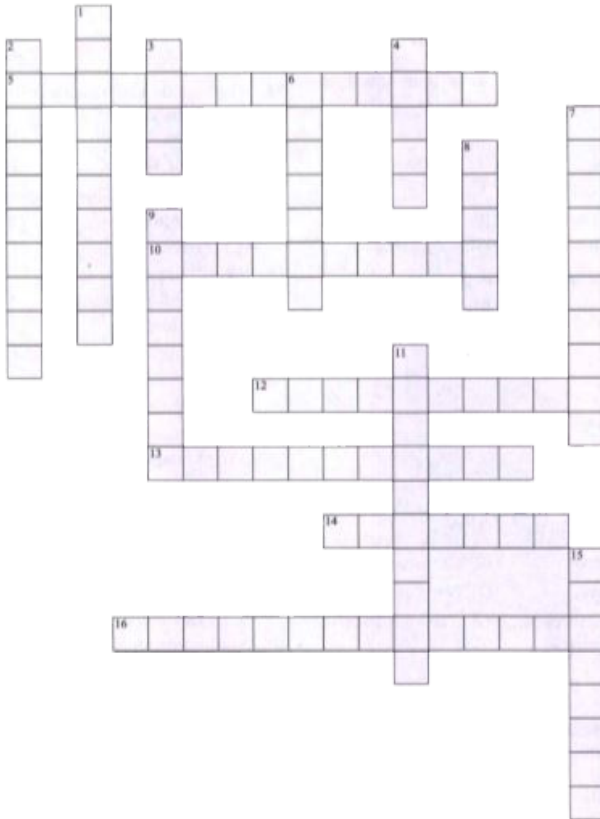
7. Organism that gets energy by breaking down the remains of dead organisms

8. Spherical-shaped bacteria

9. Long, spiral-shaped bacteria

11. Acid produced by bacteria by converting

milk sugar



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6. Unscramble the letters to find a word that is related to microbes.

TONIATIBCI

A substance that kills microbes or prevents them from growing. People use it to treat infections.



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7. Unscramble the letters to find a word that is related to microbes.

EHTARBIGPECOA

A virus that attacks bacteria



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8. Unscramble the letters to find a word that is related to microbes.

ROETELNC OMEPSIROCC An instrument that records images of viruses by shooting tiny atom particles at an object



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9. Unscramble the letters to find a word that is related to microbes.

MEEZNY

A protein in an animal's body that causes chemical reactions to happen



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10. Unscramble the letters to find a word that is related to microbes.

MLEFUGLAL

A locomotory organ of some bacteria



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11. Unscramble the letters to find a word that is related to microbes.

ZOORTAPO

Amoebae are members of this group of microbes



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12. Unscramble the letters to find a word that is related to microbes.

STAAPERI

An organism that grows and feeds on another organism (host)



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13. Unscramble the letters to find a word that is related to microbes.

GOTAEHNP

A microbe that causes disease



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Consolidated Exercise Mcqs

1. _____ acts as a biofertiliser in symbiotic association with legumes.

A. Rhizobium

B. Trichoderma

C. Azotobacter

D. Mycobacterium

Answer: A



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2. Lactobacillus usually

A. grows in milk

B. produces acids

C. is present in bread

D. causes disease

Answer: A::B::D



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3. Reproduction in bacteria takes place by

A. binary fission

B. conjugation

C. budding

D. regeneration

Answer: A::B::D



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4. Chlorella is

- A. multicellular algae
- B. used in sewage disposal
- C. used in space travel
- D. used for extracting agar

Answer: A::B::C::D



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5. If a bacterium stains red/pink in a Gram-staining technique, it is said to be

- A. Gram-positive
- B. Gram-negative
- C. Gram-neutral
- D. None of these

Answer: B



6. What is/are true about viruses?

- A. They can be crystallised and stored for several years.
- B. They occur as parasites in living cells.
- C. They are devoid of genetic material of their own.
- D. Their protein coat is known as capsid.

Answer: A::B::D



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7. Find out the correct match/test.

A. Plasmodium - protozoa

B. Saccharomyces - algae

C. Entamoeba histolytica - fungi

D. Clostridium - bacteria

Answer: A::D



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8. Yeast is used in preparation of

A. Acetic acid

B. Curd

C. Ethyl alcohol

D. Cheese

Answer: C



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9. The organic acid which was first produced through fermentation is

A. Propionic acid

B. Lactic acid

C. Citric acid

D. Oxalic acid

Answer: B



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10. Renin employed in cheese industry is .

A. Inhibitor

B. Alkaloid

C. Enzyme

D. Inhibitor

Answer: C



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11. Single cell proteins are

A. Micro-organisms

B. Enzymes

C. Antibiotics

D. Toxins

Answer: A



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12. Which one is wrongly matched?

A. Yeast-Ethanol

B. Streptomyces -Antibiotics

C. Coliforms - Vinegar

D. Methanogens - Gobar gas

Answer: C



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13. Cheeses are classified on the basis of

A. Flavour

B. Colour

C. Texture

D. All of these

Answer: A



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14. Citric acid is obtained from

A. *Aspergillus niger*

B. *Rhizobium*

C. *Penicillium*

D. Lactobacillus

Answer: A



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15. Antibiotic cephalosporin is got from

A. Bacteria

B. Alga

C. Fungus

D. Mycoplasma

Answer: C



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16. The antibiotic inhibiting cell wall formation in bacterial cell is

- A. Penicillin
- B. Ergotine
- C. Clavacin
- D. None

Answer: C



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17. Substrate for alcohol formation is :

A. Sucrose

B. Galactose

C. Maize

D. Bajra

Answer: A



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18. A peculiar odour that occurs in marshy areas and cowsheds is due to gas produced by

- A. Cyanobacteria
- B. Archaeobacteria
- C. Mycoplasma
- D. Slime Moulds

Answer: B



19. Secondary sewage treatment is mainly a

- A. Chemical process
- B. Mechanical process
- C. Biological process
- D. Physical process

Answer: C



20. Which of the following is mainly produced by the activity of anaerobic bacteria on sewage?

A. Laughing gas

B. Marsh gas

C. Mustard gas

D. Propane

Answer: B



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21. The alternate source of proteins for animal and human nutrition is

- A. Single cell protein
- B. Nonvegetarian meal
- C. Mushroom
- D. Pulses

Answer: A



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22. Biogas production is a

- A. Single step aerobic process
- B. Two step aerobic process
- C. Three step aerobic process
- D. Three step anaerobic process

Answer: D



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23. The term antibiotics was coined by

A. Fleming

B. Waksman

C. Funk

D. Jenner

Answer: B



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24. Immobilisation protects an enzyme against

A. High temperature

B. Low temperature

C. Amylase

D. Proteases

Answer: D



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25. Waksman got the Noble Prize for the discovery of

A. Penicillin

B. Neomycin

C. Chloromycetin

D. Streptomycin

Answer: D



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26. Pasteurization is heating at

A. $120^{\circ} C$ for 60 minutes

B. $70^{\circ} C$ for 60 minutes

C. $80^{\circ} C$ for 30 minutes

D. $60^{\circ} C$ for 30 minutes

Answer: D



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27. Streptomyces fradiae produces:

A. Aureomycin

B. Terramycin

C. Neomycin

D. Erythromycin

Answer: C



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28. During fermentation, bread becomes porous due to CO_2 released by

A. Protozoan

B. Bacteria

C. Yeast

D. Virus

Answer: C



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29. In cheese, microorganisms are required for

A. Ripening

B. Souring of milk

C. Souring and ripening

D. Development of resistance to spoilage

Answer: C



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30. Cheese and yoghurt are products of

A. Pasteurization

B. Fermentation

C. Dehydration

D. Distillation

Answer: B



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31. Curd, milk, cheese and butter are produced with the help of:

A. Yeast

B. Penicillium

C. Streptococcus

D. None

Answer: C



Olympiad And Ntse Level Exercises

1. Which among the following are present in bacterial cells?

(i) Mesosome

(ii) Ribosome

(iii) Plastid

(iv) Plasmid

(v) Mitochondria

A. (i) , (iv) and (v)

B. (ii),(iii) and (iv)

C. (i),(ii) and (iv)

D. (i),(ii),(iii),(iv) and (v)

Answer: C



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2. Statement A: In general, viruses that infect plants have single stranded RNA.

Statement B: Viruses that infect animals have

either single or double stranded RNA or double stranded DNA.

- A. Both statements are wrong.
- B. Both statements are correct.
- C. Statement A is correct, B is wrong.
- D. Statement B is correct, A is wrong.

Answer: B



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3. Consider the following statements about features of kingdoms

(a) In animalia, the mode of nutrition is autotrophic

(b) In monera, the nuclear membrane is present

(c) In protista, the cell type is prokaryotic

(d) In plantae, the cell wall is present.

Of the above statements

A. (i), (iii), (iv) are correct.

B. (iii) alone is correct.

C. (i), (ii), (iii) are correct.

D. (iv) alone is correct.

Answer: A



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4. Match the following.

Column I

- a. *Leishmania donovani*
- b. *Wuchereria bancrofti*
- c. *Trypanosoma gambiense*
- d. *Entamoeba histolytica*

Column II

- p. Malaria
- q. Amoebiasis
- r. Kala azar
- s. Sleeping sickness
- t. Filariasis

A. a-r,b-t,c-s,d-q

B. a-r,b-t,c-q,d-p

C. a-s,b-r,c-q,d-p

D. a-r,b-s,c-t,d-p

Answer: A



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5. Which of the following statements is true about viruses?

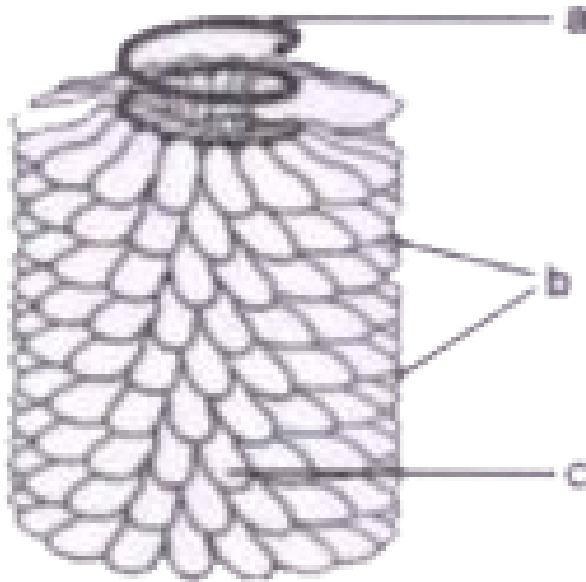
- A. Some viruses have cellular structure and are saprophytes.
- B. All viruses known to man are obligate parasites.
- C. Viruses can perform metabolic activities on their own.
- D. Viruses are filterable facultative parasites.

Answer: B



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6. The following picture shows tobacco mosaic virus. Which among the following is incorrect ?



A. a-capsid, b-spike, c-collar

B. a-RNA, b-capsomeres, c-capsid

C. a-tail, b-RNA, c-capsomeres

D. a-RNA, b-collor, c-capsid

Answer: B



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7. How many of the following fungi are saprophytic in nutrition?

Rhizopus, Albugo, Mucor, Puccinia, Ustilago,
Alternaria, Saccharomyces

A. Four

B. Three

C. Five

D. Six

Answer: B



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8. ___A___ showed that viruses could be crystallized and the crystals largely consist of ___B___.

A. A-Stanley, B-Lipid

B. A-Ivanovsky, B-Protein

C. A-Pasteur, B-Carbohydrate

D. A-Stanley, B-Proteins

Answer: D



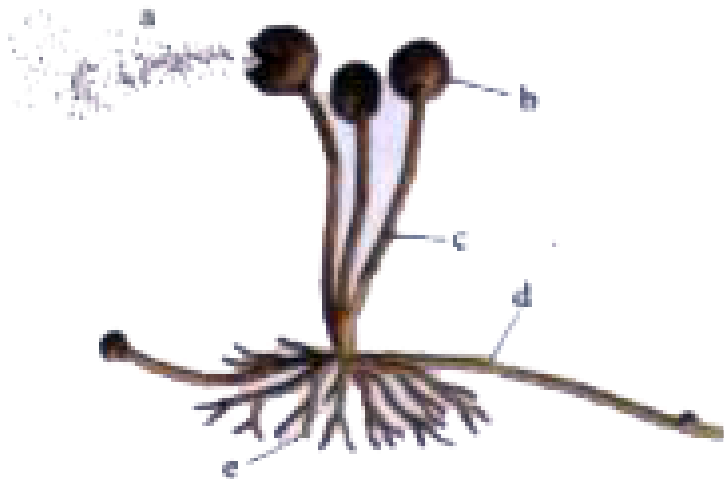
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Challenging Exercise

1. Explain the importance of nitrogen fixation to life on the earth.

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2. Label the parts a-e in the diagram of black bread mould depicted below:





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3. The very earliest bakers observed that dough left in the air would rise. Unknown to them, yeast from the air contaminated the bread, began to grow, and produced carbon dioxide. Carbon dioxide caused the bread to rise. Later, cooks began to save some soft dough (before much flour was added) from the previous loaf to use in the next loaf. The saved portion was called the mother. What is

in the mother, and why was it important to save in a cool place?



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