



## BIOLOGY

### NEET & AIIMS

#### MICROBES IN HUMAN WELFARE

##### Example

1. Which bacterium produces butyric acid?

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2. Write the name of four deadly diseases which are treated by antibiotics?

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3. Why a small part of activated sludge is pumped back into the aeration tank during sewage treatment?



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4. Biogas plant consists of concrete tank, \_\_\_\_\_ feet deep, in which biowastes are collected and slurry of dung is fed.



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5. What do you understand by the term organic farming?



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Try Yourself

### 1. State true or false

(a) Curd is more nutritious than milk. (b) Beverages like whisky, brandy and rum are produced without distillation. (c) *Acetobacter aceti* is a source of acetic acid.

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### 2. Fill in the blank spaces a, b, c, d and e in the following table.

	Type of microbe	Name	Commercial Product
(i)	Bacteria	<i>a</i>	Curd
(ii)	Fungus	<i>Trichoderma polysporum</i>	<i>b</i>
(iii)	<i>c</i>	<i>Monascus purpureus</i>	Statins
(iv)	Bacterium	<i>d</i>	Clot buster enzyme
(v)	Yeast	<i>e</i>	Bread

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3. Which of the following is or are included in secondary treatment of sewage?

(i) Anaerobic microbe

(ii) Aerobic microbe

(iii) Autotrophic microbe

(iv) Heterotrophic microbe

(v) Bacteria

(vi) Fungi



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4. Name the main component of biogas?



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5. Fill in the blanks

(a) \_\_\_\_\_ beetle with red and black markings is useful in controlling aphids.

(b) Species specific narrow spectrum insecticidal applications are shown by \_\_\_\_\_ .

(c) In paddy fields \_\_\_\_\_ serve as an important biofertilisers.



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## Exercise

1. Partially degraded concentrate of milk fat and casein is called

- A. Sour cream
- B. Yoghurt
- C. Cheese
- D. Bread

**Answer: C**



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2. Indian curd is prepared by inoculating cream and skimmed milk with

- A. *Lactobacillus acidophilus*

B. *Leuconostoc cremoris*

C. *Lactobacillus bulgaricus*

D. *Streptococcus lactis*

**Answer: A**



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3. which of the following product is not obtained from fermented soya sauce ?

A. Tempeh

B. Tofu

C. Sufu

D. Dosa

**Answer: D**



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4. Mark the correct option ( with respect to distilled alcoholic beverages ):

A. Wine

B. Brandy

C. Rum

D. Gin

**Answer: A**



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5. The nutrient medium for beer is

A. Barley malt

B. Fermented rice

C. Cashew-apple

D. Potato

**Answer: A**



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6. select the odd one with respect to the source of antibiotics :

- A. Bacteria
- B. Lichen
- C. Fungi
- D. Seeded plants

**Answer: D**



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7. Which of the following organic acids is produced by the fermentation of sugary syrups by *Aspergillus niger* and *mucor* species?

A. Gluconic acid

B. Lactic acid

C. Citric acid

D. Acetic acid

**Answer: C**

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**8. Organic acid used in preparation of vinegar is**

A. Acetic acid

B. Citric acid

C. Lactic acid

D. Gluconic acid

**Answer: A**

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9. Stains are competitive inhibitor of

- A. Streptokinase
- B. HMG COA reductase
- C. Pectinase
- D. Cellulase

**Answer: B**



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10. Mark the incorrect match:

- A. Antibiotics - Prolife w.r.t pathogen
- B. Caryota urens - Toddy
- C. Lipase - Candida

D. Amylase - Aspergillus

**Answer: A**



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11. In which of following steps large and small particles are removed from sewage through sequential filtration and sedimentation?

- A. Primary treatment
- B. Secondary treatment
- C. Biological treatment
- D. Tertiary treatment

**Answer: A**



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12. The technology of biogas production was developed in India through the efforts of

- A. IARI
- B. KVIC
- C. Both (1) & (2)
- D. ICAR

**Answer: C**



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13. Last step in biogas production is carried out by

- A. Methanobacterium
- B. Bacillus
- C. Cellulomonas
- D. Ruminococcus



**Answer: A**

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**14.** Mark the correct option (w.r.t. composition of biogas)

A. 50 – 70 %  $H_2$

B. 30 – 40 %  $CO_2$

C. 95 %  $CH_4$

D. 10 %  $CO$

**Answer: B**

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**15.** Biogas production is a

A. Three step microbial process

- B. Three step physical process
- C. Four step aerobic process
- D. Four step anaerobic process

**Answer: A**



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**16. Mark the odd one (w.r.t. NPV)**

- A. Narrow spectrum herbicide
- B. Species specific
- C. Bioinsecticide
- D. Nucleoprotein particles

**Answer: A**



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17. Ladybird is useful to get rid of

- A. Bollworms
- B. Aphids
- C. Mosquitoes
- D. Nematodes

**Answer: B**



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18. Which of following microbe is most active nitrogenj fixer in rice field in India?

- A. Rhizobium
- B. Rhodospirillum
- C. Frankia
- D. Aulosira

**Answer: D**



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**19.** Plants having mycorrhizal association show

- A. Resistance to root-borne pathogens
- B. Tolerance to salinity and drought
- C. Nitrogen fixation
- D. More than one option is correct

**Answer: D**



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**20.** Select the odd one w.r.t. biofertilisers

- A. Bacteria

B. Fungi

C. Cyanobacteria

D. Viruses

**Answer: D**



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## Assignment Section A

1. Which of the following microbe is made up of protein only?

A. Virus

B. Bacteria

C. Viroids

D. Prions

**Answer: D**



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2. The infectious agents made up of RNA only are

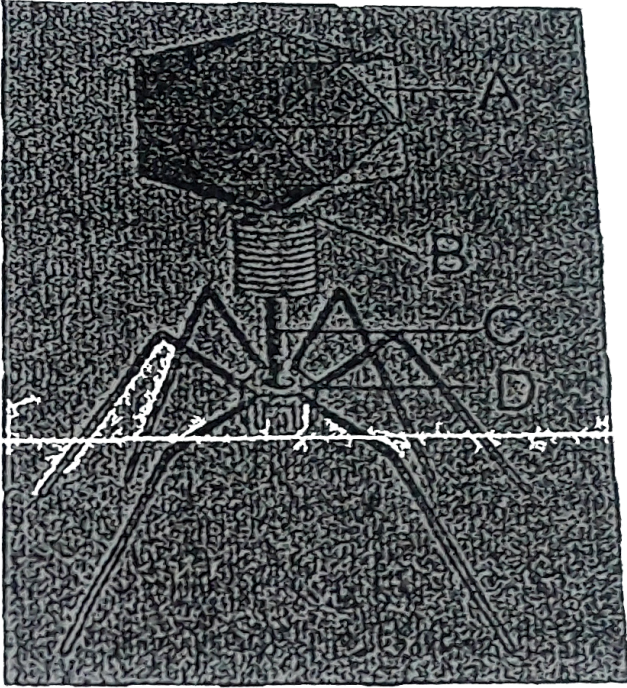
- A. Viroids
- B. Bacteria
- C. Fungi
- D. Virus

**Answer: A**



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3. Identify the part labelled as A, B, C and D



- A. *A*    *B*    *C*    *D*  
Head   Neck   Collar   Tail
- B. *A*        *B*    *C*    *D*  
Capsule   Tail   Collar   Pins
- C. *A*    *B*    *C*    *D*  
Head   Collar   Tail   Plate
- D. *A*    *B*    *C*    *D*  
Head   Tail   Collar   Prongs

Answer: C



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#### 4. Microbial colonies

- A. Can be grown on nutritive media
- B. Can be seen by naked eyes
- C. Are useful in study of microbes
- D. More than one option is correct

**Answer: D**



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#### 5. What is the beneficial role of LAB in our stomach?

- A. Causes souring of milk by decreasing nutritional quality
- B. Increases the amount of vitamin-D
- C. Checks disease causing microbes



D. It produces alkali which coagulate and partially digest the milk proteins

**Answer: C**



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**6.** The microbe used for making bread is

- A. *Saccharomyces cerevisiae*
- B. *Saccharomyces ellipsoidens*
- C. *Saccharomyces piformis*
- D. *Saccharomyces sake*

**Answer: A**



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7. Which traditional drink in some part of South India is made by fermenting sap of palms?

A. Tea

B. Toddy

C. Beer

D. Cashew apple

**Answer: B**



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8. Which of the following microbe is used for ripening of Swiss cheese?

A. *Penicillium roquefortii*

B. *P. camembertii*

C. *Propionibacterium sharmanii*

D. *Streptomyces griseus*

**Answer: C**



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**9.** Production of beverages at industrial scale requires growing microbes in very large containers known as

- A. Digesters
- B. Fermentors
- C. Dough
- D. Concrete tank

**Answer: B**



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**10.** Find the odd one w.r.t. distilled alcoholic beverages

- A. Rum
- B. Beer
- C. Brandy
- D. Whisky

**Answer: B**

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**11.** The chemicals which are "pro-life" with reference to human beings

- A. Are regarded as one of the most significant discovery of twenty first century
- B. Have rarely contributed to human welfare
- C. Are produced by some plants and all animals
- D. Can kill or retard the growth of disease-causing microbes

**Answer: D**



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12. Which of the the following microbe is the source of first antibiotic ?

A. Penicillium notatum

B. Staphylococci

C. Aspergillus niger

D. Bacillus brevis

**Answer: A**



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13. The first antibiotic was discovered accidently by \_\_A\_\_ while working on \_\_B\_\_ .

A. A-Waksman , B-Streptococcus

B. A-Fleming, B-Penicillium notatum

C. A-Waksman, B-Bacillus brevis

D. A-Fleming, B-Staphylococci

**Answer: D**



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**14.** Commercial extraction of penicillin was done by

A. Alexander Fleming

B. Ernest Chain

C. Howard Florey

D. More than one option is correct

**Answer: 4**



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15. Match the following list of bacteria and their commercially important products.

Bacterium	Product
(i) <i>Aspergillus niger</i>	(A) Lactic acid
(ii) <i>Acetobacter aceti</i>	(B) Butyric acid
(iii) <i>Clostridium butylicum</i>	(C) Acetic acid
(iv) <i>Lactobacillus</i>	(D) Citric acid

Choose the correct match.

A. a(i), b(ii), c(iii), d(iv)

B. a(ii), b(i), c(iv), d(iii)

C. a(ii), b(iv), c(iii), d(i)

D. a(iii), b(i), c(iv), d(ii)

**Answer: 2**



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16. \_\_\_\_\_ are used in detergent formulations and are helpful in removing oily stains from laundry.

- A. Ligases
- B. Proteases
- C. Lipases
- D. Pectinases

**Answer: 3**

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**17.** Select the microbe which is the source of 'clot buster' enzyme.

- A. Bacterium, Lactobacillus
- B. Fungi, Aspergillus niger
- C. Fungi, Penicillium notatum
- D. Bacterium, Streptococcus

**Answer: 4**

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18. An immunosuppressive agent used in organtransplant patients is

- A. Streptokinase
- B. Statins
- C. Cyclosporin-A
- D. Lipases

**Answer: 3**



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19. The product of *Monascus purpureus* has been commercialised as

- A. Immunosuppressive agent
- B. Blood-cholesterol lowering agent
- C. Clot buster

D. Bottled juices clarifying agents

**Answer: 2**



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20. \_\_\_\_\_ are produced by yeast and act by competitively inhibiting the enzyme responsible for synthesis of cholesterol.

A. Cyclosporin-A

B. Penicillin

C. Statins

D. Alcohol

**Answer: 3**



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21. Treatment of waste-water is done by the

- A. Photoautotrophic microbes, naturally present in sewage
- B. Chemoautotrophic microbes, naturally present in sewage
- C. Heterotrophic microbes naturally present in sewage
- D. Heterotrophic microbes inoculated in the sewage from outside only

**Answer: 3**



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22. In a sewage treatment plant, primary treatment is

- A. Physical process which involves sedimentation only
- B. Physical process which involves both filtration any sedimentation
- C. Biological process which involves formations of primary sludge and effluent

D. Biological process which involves both filtration and sedimentation

**Answer: 2**



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23. During primary treatment, all solids that settle forms \_\_A\_\_ and the supernatant forms \_\_B\_\_.

- A. A - Primary sludge, B - effluent
- B. A - Primary sludge, B - secondary effluent
- C. A - Activated sludge, B - clarified effluent
- D. A - Activated sludge, B - effluent

**Answer: 1**



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24. What are 'flocs', formed during secondary treatment of sewage?

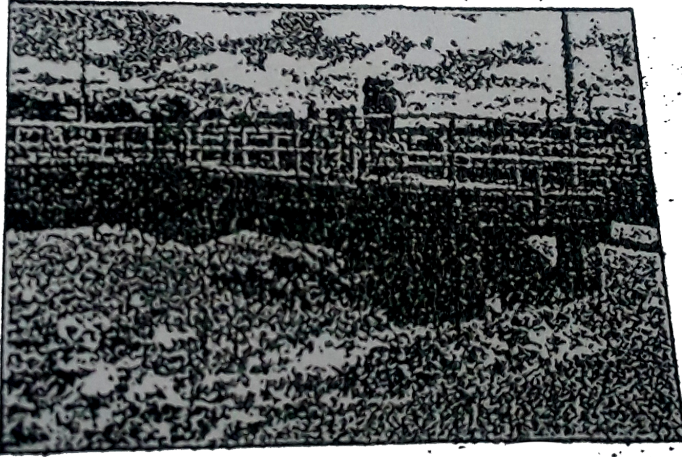
- A. Masses of anaerobic bacteria
- B. Masses of aerobic fungi only
- C. Masses of anaerobic bacteria and fungi
- D. Masses of aerobic bacteria associated with fungal filaments

**Answer: D**



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25. Identify the stage of sewage treatment shown below.



- A. Primary treatment
- B. Secondary treatment
- C. Tertiary treatment
- D. Filtration and sedimentation

**Answer: 2**



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26. What happens to activated sludge?

- A. It is generally released into natural water bodies like rivers and streams
- B. It is completely pumped back into aeration tank to serve as inoculum
- C. The major part of the sludge is pumped into large tanks called anaerobic sludge digesters
- D. It undergoes sequential filtration

**Answer: 3**



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27. What is the composition of the biogas?

- A. Methane, carbon dioxide, oxygen etc.

B. Methane, carbon dioxide, hydrogen, nitrogen dioxide etc.

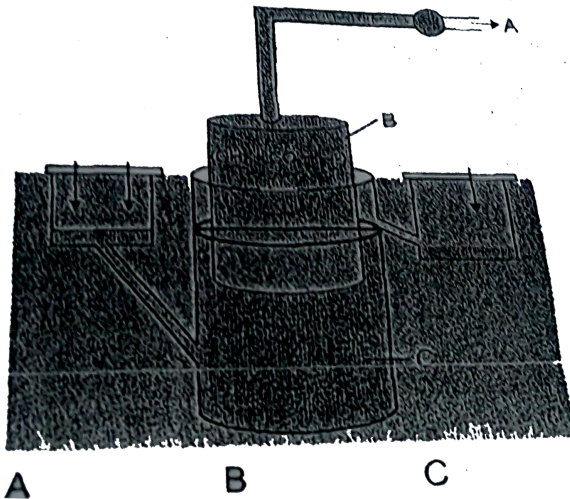
C. Methane, carbon dioxide, hydrogen etc.

D. Methane , carbon dioxide, sulphur dioxide etc.

Answer: C

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28. Identify the parts labelled A, B & C wr.t., biogas plant



A. *A*    *B*    *C*  
Gas    Sludge    Dung water

B. *A*    *B*    *C*  
Gas    Gas holder    Digester



C. *A*                      *B*                      *C*  
Gas holder   Sludge   Dung water

D. *A*                      *B*                      *C*  
Gas holder   Digester   Dung water

**Answer: 2**

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29. The bacterium responsible for biogas production are collectively called

- A. Methonogens
- B. Thermoacidophiles
- C. Halophiles
- D. Cyanobacterium

**Answer: 1**

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30. The technology of biogas production was developed in india mainly use to the efforts of

A. IPM

B. IARI and KVIC

C. IRRI

D. ICAR

**Answer: 2**



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31. The ladybird beetle and dragonflies are useful to get rid of \_\_\_ and \_\_\_ respectively.

A. Caterpillars and mosquitoes

B. Mosuitoes and fruit borer

C. Mosquitoes and aphids

D. Aphids and mosquitoes

**Answer: 4**



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**32.** The effective biocontrol agents of several plant pathogens are species of

- A. Aspergillus
- B. Baculoviruses
- C. Trichoderma
- D. Dragonflies

**Answer: 3**



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### 33. Biofertilisers

- A. Increase dependence on chemical fertilisers
- B. Are organisms that enrich the nutrient quality of soil
- C. Include potash, phosphatic and nitrogenous organic and chemical compounds
- D. Are used regularly in the fields to deplete soil nutrients

**Answer: 2**



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### 34. The main sources of biofertilisers are

- (a) Bacteria
- (b) Cyanobacteria
- (c) Fungi
- (d) protists

A. (a), (b), (c )

B. (a), (b), (d)

C. (b), (c ), (d)

D. (a), (c ), (d)

**Answer: 1**



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**35.** In paddy fields, \_\_\_\_\_ serves as an important biofertiliser.

A. Rhizobium

B. BGA

C. Glomus

D. Frankia

**Answer: 2**



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## Assignment Section B

1. Write the composition of biogas?



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2. the fermented food of soybean is

A. Tempeh

B. Tofu

C. Sufu

D. All of these

**Answer: 4**



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3. Dosa and idli are the fermented preparations of rice and black gram fermentation is done with

- A. leuconostoc
- B. Streptococcus
- C. Saccharomyces
- D. More than one option is correct

**Answer: 4**

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4. Read the following four statements (A -D) about certain mistakes in two of them :

(A) Dough, which is used for making foods such as dosa and idli is fermented by fungi and algae

(B) Toddy a traditional drink of southern India is made by fermenting sap from palms.

(C) Large holes in 'Swiss cheese' are due to production of large amount

of methane by *Propionibacterium sharmanii*

(D) In our stomach, lactic acid bacteria play very beneficial role in checking disease-causing microbes

Which of the two statements are having mistakes?

A. Statements (A) & (C)

B. Statements (A) & (B)

C. Statements (B) & (C)

D. Statements (C) & (D)

**Answer: 1**



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5. Fermented beverage with maximum alcohol content is

A. Beer

B. Brandy

C. Whisky



D. Gin

**Answer: 2**



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6. Brewer's yeast is used for \_\_\_A\_\_\_ of malted cereats and fruit to produce \_\_\_B\_\_\_ .

A. A - Distillation, B -  $CO_2$

B. A - Distillation, B - orgainc acid

C. A - Fermentation, B - CO

D. A - Fermentation, B - Alcohol

**Answer: 4**



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7. Identify the correct statements w.r.t. antibiotics

- (i) Fleming, Chain and Florey were awarded the Nobel prize in 1945
- (ii) Antibiotics have greatly improved our capacity to treat deadly diseases
- (iii) Penicillin was used to treat American soldiers wounded in World War I

- A. (i) and (ii)
- B. (i) and (ii)
- C. (ii) and (iii)
- D. All are correct.

**Answer: 1**



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8. A enzyme is used to remove clots from the blood vessels of patients who have undergone B leading to heart attack.

A. A - Streptokinase, B - Myocardial infarction

B. A - Lipases, B - Arteriosclerosis

C. A - Proteases, B - Myocardial infarction

D. A - Pectinases, B - Atherosclerosis

**Answer: 1**

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**9. Bottled juices are clarified by the use of**

A. Pectinases

B. Proteases

C. Lipases

D. Both (1) & (2)

**Answer: 4**

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10. *Trichoderma polysporum* is a source of

- A. Cyclosporin-A
- B. Streptokinase
- C. Statins
- D. Clot buster

**Answer: A**



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11. Select the incorrect match

- A. Citric acid - *Aspergillus flavus*
- B. Clot buster - *Streptococcus*
- C. Cyclosporin A - *Trichoderma*

D. Butyric acid - Clostridium butylicum

**Answer: 1**



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12. which fungal extract was extensively used in treating wounded American soldiers in World war II?

A. Streptomycin

B. Penicillin

C. Aflatoxin

D. Gluconic acid

**Answer: 2**



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13. The greater BOD of waste water

- A. Increase oxygen content of water
- B. Decreases oxygen content of water
- C. The decrease of temperature of water
- D. All of these

**Answer: B**



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14. ganga action plan for controlling pollution in ganga started in

- A. 1985
- B. 1981
- C. 1987
- D. 1989

**Answer: 1**



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**15.** All are correct w.r.t. BOD (Biochemical Oxygen Demand), except

- A. It refers to the amount of oxygen that would be consumed if all the organic matter in one liter of water were oxidised by bacteria
- B. The BOD test is a measure of the organic matter present in the water
- C. The greater the BOD of waste water, less is its polluting potential
- D. Waste water is treated till BOD is reduced significantly

**Answer: 3**



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**16.** The ministry of Environment and Forest has initiated Ganga action plan and Yamuna action plan

(i) To save these major rivers of our country from pollution

(ii) It is proposed to build a large number of sewage treatment plants

(iii) Under these plans, only treated sewage may be discharged in the river

A. (i) and (ii) are correct

B. (ii) and (iii) are correct

C. (i) and (iii) are correct

D. All are correct.

**Answer: 4**



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**17.** Secondary treatment of sewage



- A. Removes grit and large pieces of organic matter
- B. Involves shredding, churning, filtration and sedimentation
- C. Does not require aeration
- D. Involves microbial digestion of organic matter

**Answer: 4**

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**18.** Physical removal of large and small particle from the sewage through filtration and sedimentation is called

- A. Primary treatment
- B. Secondary treatment
- C. Tertiary treatment
- D. Biological treatment

**Answer: 1**

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19. Biogas contains

- A. 30 % – 40 % Methane
- B. 50 % – 70 %  $CO_2$
- C. 50 % – 70 % Methane
- D. 20 % Methane

Answer: 3

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20. the first step in biogas production is carried out with the help of

- A. Obligate aerobes
- B. Decomposers
- C. Methanogens

## D. Parasites

**Answer: 2**



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**21.** Identify the incorrect statement w.r.t. biogas plant

- A. It consists of a concrete tank, 10-15 feet deep in which bio-wastes are collected and a slurry of dung is fed
- B. A floating cover is placed over the slurry, which keeps on rising as the gas is consumed in the tank
- C. It has an outlet, which is connected to pipe to supply biogas to nearby houses
- D. The spent slurry is removed and may be used as fertiliser

**Answer: 2**



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22. Find the correct option (w.r.t. Bioherbicide)

- A. *Cactoblastis cactorum*
- B. *Helianthus annuus*
- C. *Phytophthora palmivora*
- D. More than one option is correct

Answer: 4



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23. Which of the following is included in biopesticide?

- A. Viruses and bacteria only
- B. Viruses, bacteria and fungi only
- C. Viruses, bacteria, fungi and protozoa

D. Viruses, bacteria, fungi and protozoa only

**Answer: 3**



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**24.** Baculoviruses are/have

A. Pathogens that attack insects and other arthropods

B. Members of genus Nucleopolyhedrovirus that are never used as biocontrol agents

C. Species-specific, broad spectrum insecticides

D. Few negative impacts on plants, mammals, birds, fishes or even on non-target insects

**Answer: 1**



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25. Identify the incorrect statement.

(i) *Bacillus thuringiensis* are available in sachets as dried spores which are mixed with kerosine and sprayed on to vulnerable plants

(ii) *B. thuringiensis* are used to control butterfly caterpillars, but leave other insects unharmed

(iii) The toxin of *B. thuringiensis* is released in the blood of larvae and the larvae get killed

(iv) By the development of methods of genetic engineering *B. thuringiensis* toxin genes have been introduced into plants.

A. (i) and (ii)

B. (ii) and (iii)

C. (i) and (iii)

D. (ii) and (iv)

**Answer: 3**



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26. Which of the following are natural insecticides?

(a) Rotenone

(b) Pyethrum

(c ) Nicotine

(d) Azadirachtin

A. (a), (b) and & (c ) only

B. (a), (c ) & (d) only

C. (a) & (b) only

D. (a), (b), (c ) & (d)

**Answer: 4**



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27. Biofertilisers include

- A. Blue-green algae, Rhizobium, other nitrogen-fixing bacteria and mycorrhiza
- B. Blue-green algae, Trichoderma, Rhizobium and other nitrogen-fixing bacteria
- C. Rhizobium, other nitrogen-fixing bacteria, NPV and mycorrhiza
- D. Blue-green algae, Rhizobium, Bt and mycorrhiza

**Answer: 1**



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**28.** which of the following is not a symbiotic nitrogen fixing bacterium ?

- A. Clostridium
- B. Rhizobium leguminosarum
- C. Frankia
- D. Mycobacterium



**Answer: 1**



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**29.** Which of the following is not the belief of an organic farmer?

- A. The more variety a landscape has, the more sustainable it is
- B. The insects that are sometimes called pests are not eradicated, but instead are kept at manageable levels by a complex system of checks and balances within a living and vibrant ecosystem
- C. For controlling plant diseases and pests, chemicals like insecticides and pesticides should be used extensively
- D. Eradication of the pests is undesirable because they act as food or hosts for beneficial predatory and parasitic insects

**Answer: 3**



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30. The symbiotic association of fungi with plants is known as \_\_\_ which is formed by many members of the fungal genus \_\_\_\_\_.

- A. Mycorrhiza, Glomus
- B. Mycorrhiza, Penicillium
- C. Lichen, Trebaxia
- D. Lichen, Rhizocarpon

**Answer: 1**



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31. Consider the following four statements (A - D) related to organic farming and select the correct option stating which ones are true (T) and which ones are false (F). The statements:

- (A) Produces food crops rich in lipids, vitamins and iron
- (B) Users biofertilisers which increases soil fertility

(C) There is more use of chemical fertilisers and pesticides

(D) Raising unpolluted crops through the use of bacteria, fungi and cyanobacteria

A. (A) (B) (C) (D)  
*T T F F*

B. (A) (B) (C) (D)  
*F T F T*

C. (A) (B) (C) (D)  
*T F T F*

D. (A) (B) (C) (D)  
*T F F F*

**Answer: 2**



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**32.** the concept of sustainable agriculture lies in

A. Minimizing biopesticides

B. A greater dependence on new crops

C. Least use of biofertilizers

D. Using spores of *Bacillus thuringiensis* for pest control

**Answer: 4**



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**33.** Which of the following statement for sewage is correct?

- A. Municipal waste-water, whose major component is human excreta
- B. Contains large amount of organic matter and non-pathogenic microbes
- C. Can be discharged directly into natural water bodies like rivers and streams
- D. It is generated in less quantities in cities and villages as compared to towns

**Answer: 1**



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34. Mark the mismatched pair :

- A. Dragonfly - Biocontrol agent
- B. Oscillatoria - Increase alkalinity of soil
- C. Anaerobic sludge digester - Biogas
- D. VAM - Biofertiliser

Answer: 2



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## Assignment Section C

1. Which of the following in sewage treatment removes suspended solids?

- A. Tertiary treatment
- B. Secondary treatment

C. Primary treatment

D. Sludge treatment

**Answer: 3**



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2. Which of the following is correctly matched for the product produced by them

A. *Acetobacter aceti* : Antibiotics

B. *Methanobacterium* : Lactic acid

C. *Penicillium notatum* : Acetic acid

D. *Saccharomyces cerevisiae* : Ethanol

**Answer: 4**



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### 3. Select the mismatch

- A. Frankia - Alnus
- B. Rhodospirillum - Mycorrhiza
- C. Anabaena - Nitrogen fixer
- D. Rhizobium - Alfalfa

Answer: 2

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4. Match Column - I with Column - II and select the correct option using the codes given below :

Column-I		Column-II
a. Citric acid	(i)	Trichoderma
b. Cyclosporin A	(ii)	Clostridium
c. Statins	(iii)	Aspergillus
d. Butyric acid	(iv)	Monascus

- A. 

<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>
(iii)	(i)	(ii)	(iv)

B.  $\begin{matrix} a & b & c & d \\ \text{(iii)} & \text{(i)} & \text{(iv)} & \text{(ii)} \end{matrix}$

C.  $\begin{matrix} a & b & c & d \\ \text{(i)} & \text{(iv)} & \text{(ii)} & \text{(iii)} \end{matrix}$

D.  $\begin{matrix} a & b & c & d \\ \text{(iii)} & \text{(iv)} & \text{(i)} & \text{(ii)} \end{matrix}$

**Answer: 2**



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5. Which of the following is wrongly matched in the given table ?

A. 

Microbe	Product	Application
<i>Clostridium butylicum</i>	Lipase	removal of oil stains

B.

Microbe	Product	Application
<i>Trichoderma polysporum</i>	Cyclosporin A	immunosuppressive drug

C. 

Microbe	Product	Application
<i>Monascus purpureus</i>	Statins	lowering of blood cholesterol

D. 

Microbe	Product	Application
<i>Streptococcus</i>	Streptokinase	removal of clot from blood vessel

**Answer: 1**



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6. Match the following list of microbes and their importance

(A)	<i>Saccharomyces cerevisiae</i>	(i)	Production of immunosuppressive agents
(B)	<i>Monascus purpureus</i>	(ii)	Ripening of swiss cheese
(C)	<i>Trichoderma polysporum</i>	(iii)	Commerical production of ethanol
(C)	<i>Propionibacterium sharmanii</i>	(iv)	Production of blood cholesterol lowering agents

A. a(iii), b(i), c(iv), d(ii)

B. a(iii), b(iv), c(i), d(ii)

C. a(iv), b(iii), c(ii), d(i)

D. a(iv), b(ii), c(i), d(ii)

Answer: 2



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7. What gases are produced in anaerobic sludge digesters

- A. Methane and  $CO_2$  only
- B. Methane, hydrogen sulphide and  $CO_2$
- C. Methane, hydrogen sulphide and  $O_2$
- D. Hydrogen sulphide and  $CO_2$

**Answer: 2**



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8. Besides paddy fields, cyanobacteria are also found inside vegetative part of:

- A. Cycas
- B. Equisetum
- C. Psilotum
- D. Pinus

**Answer: 1**



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**9. A good producer of citric acid is :**

- A. Pseudomonas
- B. Clostridium
- C. Saccharomyces
- D. Aspergillus

**Answer: 4**



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**10. During sewage treatment, biogases are produced which includes :**

- A. Methane, oxygen, hydrogen sulphide

- B. Hydrogen sulphide, methane, sulphur dioxide
- C. Hydrogen sulphide, nitrogen, methane
- D. Methane, hydrogen sulphide, carbon dioxide

**Answer: 4**



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**11. The domestic sewage in large cities**

- A. Has a high BOD as it containing both aerobic and anaerobic bacteria
- B. Is processed by aerobic and then anaerobic bacteria in the secondary treatment in Sewage Treatment Plants (STPs)
- C. When treated in STPs does not really require the aeration step as the sewage contains adequate oxygen
- D. Has very high amounts of suspended solids and dissolved salts

**Answer: 2**



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**12.** *Monascus purpureus* is a yeast used commercially in the production of

- A. Blood cholesterol lowering statins
- B. Ethanol
- C. Streptokinase for removing clots from the blood vessels
- D. Citric acid

**Answer: 1**



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**13.** In gobar gas, the maximum amount is that of

- A. Butane

B. Methane

C. Propane

D. Carbon dioxide

**Answer: 2**



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**14.** Yeast is used in the production of

A. Bread and beer

B. Cheese and butter

C. Citric acid and lactic acid

D. Lipase and pectinase

**Answer: 1**



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15. A nitrogen fixing microbe associated with Azolla in rice-fields is:-

- A. Frankia
- B. Tolypothrix
- C. Spirulina
- D. Anabaena

**Answer: 4**



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16. Measuring Biochemical Oxygen Demand (BOD) is a method used for:

- A. Measuring the activity of *Saccharomyces cerevisiae* in producing curd on a commercial scale
- B. Working out the efficiency of R.B.Cs. about their capacity to carry oxygen

C. Estimating the amount of organic matter in sewage water

D. Working out the efficiency of oil driven automobile engines

**Answer: 3**



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17. The most abundant prokaryotes helpful to humans in making curd and in production of antibiotics are ones categorised as:

A. Chemosynthetic autotrophs

B. Heterotrophic bacteria

C. Cyanobacteria

D. Archaeobacteria

**Answer: 2**



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18. Which one of the following is a wrong matching of a microbe and its industrial product, while the remaining three are correct:-

- A. *Aspergillus niger*- citric acid
- B. Yeast- Statins
- C. *Acetobacter acetia*- acetic acid
- D. *Clostridium butyricum*-lactic acid

Answer: 1



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19. Which one of the following is an example of carrying out biological control of pests/diseases using microbes

- A. Bt-cotton to increase cotton yield
- B. Lady bird beetle against aphids in mustard
- C. *Trichoderma* sp. against certain plant pathogens

D. Nucleopolyhedrovirus against white rust in Brassica

**Answer: 1**



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20. Which one of the following helps in absorption of phosphorus from soil by plants

or

Which one of the following microbes forms symbiotic association with plants and helps them in their nutrition

- A. Glomus
- B. Trichoderma
- C. Azotobacter
- D. Aspergillus

**Answer: 1**



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21. Organisms called Methanogens are most abundant in a

- A. Hot spring
- B. Sulphur rock
- C. Cattle yard
- D. Polluted stream

**Answer: 3**



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22. Secondary sewage treatment is mainly a

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

D. Chemical process

**Answer: 1**



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**23.** Which of the following is mainly produced by the activity of anaerobic bacteria on sewage

A. Marsh gas

B. Laughing gas

C. Propane

D. Mustard gas

**Answer: 1**



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24. Ethanol is commercially produced through a particular species of:-

- A. Aspergillus
- B. Saccharomyces
- C. Clostridium
- D. Trichoderma

**Answer: 2**



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25. The most common substrate used in distillation for the production of ethanol is

- A. Molasses
- B. Corn meal
- C. Soya meal
- D. Ground gram

**Answer: 1**



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**26.** Which one of the following is not a biofertilizer?

- A. Mycorrhiza
- B. Agrobacterium
- C. Rhizobium
- D. Nostoc

**Answer: 2**



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**27.** An organism used as a biofertilizer for raising soyabean crop is:-

- A. Nostoc

B. Azotobacter

C. Azospirillum

D. Rhizobium

**Answer: 4**



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**28.** Study the following statements regarding organic farming and select the correct ones

- (i) It utilises genetically modified crops like Bt cotton
- (ii) It uses only naturally produced inputs like compost and biofertilisers
- (iii) It does not use pesticides and urea
- (iv) It produces vegetables rich in vitamins and minerals.

A. (B) and (C ) only

B. (A) and (B) only

C. (B), (C ), and (D)

D. (C ) and (D) only

**Answer: 1**



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**29.** Select the correct statement from the following

- A. Activated sludge-sediment in settlement tanks of sewage treatment plant is a rich source of aerobic bacteria
- B. Biogas is produced by the activity of aerobic bacteria on animal waste
- C. Methanobacterium is an aerobic bacterium found in rumen of cattle
- D. Biogas, commonly called gobar gas, is pure methane

**Answer: 1**



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30. An example of endomycorrhiza is

- A. Nostoc
- B. Glomus
- C. Agaricus
- D. Rhizobium

**Answer: 2**



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31. A common biocontrol agent for the control of plant diseases is

- A. Trichoderma
- B. Baculovirus
- C. Bacillus thuringiensis

D. Glomus

**Answer: 1**



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**32.** Which one of the following is not used in organic farming ?

A. Snail

B. Glomus

C. Earthworm

D. Oscillatoria

**Answer: 1**



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**33.** Which of the following is not used as a biopesticide ?

- A. *Trichoderma harzianum*
- B. Nuclear Polyhedrosis Virus (NPV)
- C. *Xanthomonas campestris*
- D. *Bacillus thuringiensis*

**Answer: 3**

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**34.** Which proves to be effective biological control for nematodal pathogens of plants?

- A. *Paecilomyces lilacinus*
- B. *Pisolithus tinctorius*
- C. *Pseudomonas cepacia*
- D. *Gliocladium virens*

**Answer: 3**

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**35.** Modern detergents contain enzyme preparations of

- A. Thermophiles
- B. Acidophiles
- C. Alkaliphiles
- D. Thermoacidophiles

**Answer: 2**

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**36.** *Trichoderma harizianum* has proved to be a useful microorganism for

- A. Biological control of soil-borne plant pathogens
- B. Bioremediation of contaminated soils
- C. Reclamation of wastelands

D. Gene transfer in higher plants

**Answer: 1**



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**37. Probiotics are**

- A. Live microbial food supplement
- B. Safe antibiotics
- C. Cancer inducing microbes
- D. New kind of food allergens

**Answer: 1**



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**38. Which one of the following pairs is wrongly matched**

- A. Califorms - Vinegar
- B. Methanogens - Gobar gas
- C. Yeast - Ethanol
- D. Streptomyces - Antibiotic

**Answer: 1**

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**39.** *Bacillus thuringiensis* (Bt) strains have been used for designing novel

- A. Bio-metallurgical technique
- B. Bio-mineralization processes
- C. Bio-insecticidal plants
- D. Bio-fertilizers

**Answer: 3**

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40. A good producer of citric acid is :

- A. Pseudomonas
- B. Clostridium
- C. Saccharomyces
- D. Aspergillus

**Answer: 4**



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41. Which one of the following pairs is wrongly matched?

- A. Textile - amylase
- B. Detergents - lipase
- C. Alcohol - nitrogenase

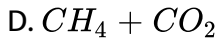
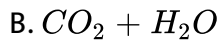
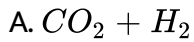
D. Fruit juice - pectinase

**Answer: 3**



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**42.** Gobar gas contains mainly



**Answer: 4**



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**43.** Which bacteria is utilized in Gobar gas plant



- A. Methanogens
- B. Nitrifying bacteria
- C. Ammonifying bacteria
- D. Denitrifying bacteria

**Answer: 1**

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**44.** During anaerobic digestion of organic waste, such as in the producing biogas, Which one of the following is left undegraded ?

- A. Lipids
- B. Lignin
- C. Hemi-cellulose
- D. Cellulose

**Answer: 2**

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45. A major component of gobar gas is

- A. Ammonia
- B. Methane
- C. Ethane
- D. Butane

**Answer: 2**

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46. Microbe used for biocontrol of pest butterfly caterpillars is

- A. *Trichoderma* sp.
- B. *Saccharomyces cerevisiae*
- C. *Bacillus thuringiensis*

D. Streptococcus sp.

**Answer: 3**



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47. Which one of the following is an example of carrying out biological control of pests/diseases using microbes

- A. Bt-cotton to increase cotton yield
- B. Lady bird beetle against aphids in mustard
- C. Trichoderma sp. against certain plant pathogens
- D. Nucleopolyhedrovirus against white rust in Brassica

**Answer: 1**



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48. One of the major difficulties in the biological control of insect/pest is that

- A. The method is less effective as compared with the use of insecticides
- B. The predator difficulty of introducing the predator to specific areas
- C. The predator develops a preference to other diets and may itself become a pest
- D. The predator does not always survive when transferred to a new environment

**Answer: 4**



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49. Cochineal insects have proved very useful for the control of

- A. Cactus

B. Cicchornia

C. Weeds

D. Parthenium

**Answer: 1**



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50. When a natural predator (living organism) is applied on the other pathogen organisms to control them, this process is called as

A. Artificial control

B. Confusion technique

C. Biological control

D. Genetic engineering

**Answer: 3**



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51. Farmers have reported have reported 50% higher yields of Rice by using biofertilizer

- A. Cyanobacteria
- B. Legume-Rhizobium symbiosis
- C. Mycorrhiza
- D. Azolla pinnata

**Answer: 4**



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52. Which one of the following helps in the absorption of phosphorus from soil by plants?

- A. Anabaena
- B. Glomus

C. Rhizobium

D. Frankia

**Answer: 2**



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**53.** Aquatic fern which is an excellent biofertilizer

A. Marsilea

B. Pteridium

C. Azolla

D. Salvinia

**Answer: 3**



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54. Due to which of the following organism, yield of rice is increased?

- A. Sesbania
- B. Bacillus popilliae
- C. Anabaena
- D. Bacillus subtilis

**Answer: 3**



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55. Which of the following species does not have the ability to fix atmospheric nitrogen?

- A. Azotobactor
- B. Anabaena
- C. Nostoc
- D. Spirogyra



**Answer: 4**



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**56.** The biofertilizers are

- A. Anabaena and Azolla
- B. Cow dung, manure and farmyard waste
- C. Quick growing crop ploughed under soil
- D. None of these

**Answer: 1**



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**57.** Which of the following is a symbiotic nitrogen fixer ?

- A. Azolla

B. Glomus

C. Azotobacter

D. Frankia

**Answer: 4**



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**58.** An alga which can be employed as food for humna being is

A. Ulothrix

B. Chlorella

C. Spirogyra

D. Polysiphonia

**Answer: 2**



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1. Assertion : Curd is more nutritious than milk .

Reason : LAB present in curd checks the growth of disease- causing microbes.

- A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)
- B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark (2).
- C. If Assertion is true statement but Reason is false, then mark (3).
- D. If both Assertion and Reason are false statements, then mark (4).

**Answer: 2**



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2. Assertion : After 24h. Toddy becomes unpalatable .

Reason : Toddy left for a few hours undergoes fermentation .

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark (2).

C. If Assertion is true statement but Reason is false, then mark (3).

D. If both Assertion and Reason are false statements, then mark (4).

**Answer: 1**



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3. Assertion : Newer Antibiotics are required to be produced Regularly .

Reason : Pathogens often develop resistance to existing antibiotics.

- A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)
- B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark (2).
- C. If Assertion is true statement but Reason is false, then mark (3).
- D. If both Assertion and Reason are false statements, then mark (4).

**Answer: 1**

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4. Assertion : Cyclosporin A is antifungal and immunosuppressive medicine

Reason : It stimulates the activation of T - cells and Prevents rejections.

- A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark (2).

C. If Assertion is true statement but Reason is false, then mark (3).

D. If both Assertion and Reason are false statements, then mark (4).

**Answer: 3**

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5. Assertion : Barley ,Sorghum , and millet are smother crops.

Reason : they factor the growth of some common weeds.

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark (2).

C. If Assertion is true statement but Reason is false, then mark (3).

D. If both Assertion and Reason are false statements, then mark (4).

**Answer: 3**



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**6.** Assertion: Cheese is one of the oldest food items in which microbes are used.

Reason: Different varieties of cheese are known by their characteristic texture, flavour and taste, the specificity coming from the microbes used.

- A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)
- B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark (2).
- C. If Assertion is true statement but Reason is false, then mark (3).
- D. If both Assertion and Reason are false statements, then mark (4).

**Answer: 2**



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7. A : Baculovirus are species specific.

R : It is very common in root ecosystem and effective against several plant pathogens.

- A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)
- B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark (2).
- C. If Assertion is true statement but Reason is false, then mark (3).
- D. If both Assertion and Reason are false statements, then mark (4).

**Answer: 3**



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**8. A :** Statins are product of fermentation activity of yeast.

**R :** Statins and mevalonate compete for same active site on enzyme involved in cholesterol synthesis.

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark (2).

C. If Assertion is true statement but Reason is false, then mark (3).

D. If both Assertion and Reason are false statements, then mark (4).

**Answer: 2**



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**9. A :** Wine and beer are produced by distillation of the fermented broth.

**R :** Different types of alcoholic drinks are obtained only by fermentation,

always followed by distillation process.

- A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)
- B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark (2).
- C. If Assertion is true statement but Reason is false, then mark (3).
- D. If both Assertion and Reason are false statements, then mark (4).

**Answer: 4**

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**10. A :** The chief component of biogas is  $CH_4$ .

**R :** Biogas plants are prepared on the foreign technology.

- A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark (2).

C. If Assertion is true statement but Reason is false, then mark (3).

D. If both Assertion and Reason are false statements, then mark (4).

**Answer: 3**



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