Microbes in Human Welfare

Question1

Match List-I with List-II relating to microbes and their products:

	List-I		List-II
A.	Streptococcus	I	Citric acid
B.	Trichoderma polysporum	II	Clot buster
C.	Monascus purpureus	III	Cyclosporin A
D.	Aspergillus niger	IV	Statins

Choose the correct answer from the options given below:

[NEET 2024 Re]

Options:

A.

A-II, B-III, C-IV, D-I

B.

A-I, B-II, C-III, D-IV

C.

A-I, B-III, C-II, D-IV

D.

A-I, B-IV, C-II, D-III

Answer: A

Solution:

• Streptokinase is produced by Streptococcus and is used as a clot buster for removing clots from the blood vessels of patients who have undergone myocardial infarction leading to heart attack.

• Cyclosporin A, that is used as an immuno-suppressive agent in organ-transplant patients, it is produced by the fungus Trichoderma polysporum

• Statins produced by Monascus purpureus have been commercialized as blood-cholesterol lowering agent.

• Citric acid is produced by Aspergillus niger

Question2

Identify the microorganism which is responsible for the production of an immunosuppressive molecule

cyclosporin A :
[NEET-2022]

Options:

A. Trichoderma polysporum

B. Clostridium butylicum

C. Aspergillus niger

D. Streptococcus cerevisiae

Answer: A

Solution:

Solution:

Bioactive molecule, cyclosporin A, that is used as an immunosuppressive agent in organ transplantpatients, is produced by the fungus, Trichoderma polysporum.

Question3

Match List-I with List-II

	List-I		List-II
(a)	Aspergillus niger	(i)	Acetic Acid
(b)	Acetobacter aceti	(ii)	Lactic Acid
(c)	Clostridium butylicum	(iii)	Citric Acid
(d)	Lactobacillus	(iv)	Butyric Acid

Choose the correct answer from the options given below
[NEET 2021]

Options:

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

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

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

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

Answer: A

Solution:

Aspergilus niger is involved in production of citric acid. Acetobacter acetic is involved in production of acetic acid.

Clostridium butylicum is involved in production of butyric acid whereas Lactobacillus is involved in the production of lactic acid.

So a(iii), b(i), c(iv), d(ii) is correct matching.

Question4

Match the following columns and select the correct option.

	Column-I		Column-II
(a)	Clostridium butylicum	(i)	Cyclosporin-A
(b)	Trichoderma polysporum	(ii)	Butyric Acid
(c)	Monascus purpureus	(iii)	Citric Acid
(d)	Aspergillus niger	(iv)	Blood cholesterol lowering agent

	(a)	(b)	(c)	(d)
(1)	(ii)	(i)	(iv)	(iii)
(2)	(i)	(ii)	(iv)	(iii)
(3)	(iv)	(iii)	(ii)	(i)
(4)	(iii)	(iv)	(ii)	(i)

[NEET-2020]

Options:

A. a

B. b

C. c

D. d

Answer: A

Solution:

	Column-I		Column-II
(a)	Clostridium butylicum	(ii)	Butyric acid
(b)	Trichoderma polysporum	(i)	Cyclosporin-A
(c)	Monascus purpureus	(iv)	Blood cholesterol lowering agent
(d)	Aspergillus niger	(iii)	Citric acid

Question5

Which of the following is put into Anaerobic sludge digester for further sewage treatment?
[NEET-2020]

Options:

A. Floating debris

B. Effluents of primary treatment

C. Activated sludge

D. Primary sludge

Answer: C

Solution:

Solution:

The sediment in settlement tank is called activated sludge.

A small part of the activated sludge is pumped back into aeration tank

Remaining major part of the sludge is pumped into large tank called anaerobic sludge digesters.

Question6

Match the following organisms with the products they produce (a) Lactobacillus

(a) Lactobacillus	(i) Cheese
(b) Saccharomyces cerevisiae	(ii) Curd
(c) Aspergillus niger	(iii) Citric Acid
(d) Acetobacter aceti	(iv) Bread
	(v) Acetic Acid

Select the correct option.
(a) (b) (c) (d)
[NEET 2019]

Options:

A. (ii) (iv) (iii) (v)

B. (iii) (iv) (v) (i)

C. (ii) (i) (iii) (v)

D. (ii) (iv) (v) (iii)

Answer: A

Solution:

Solution:

Microbes are used in production of several household and industrial products –

Lactobacillus – Production of curd

Saccharomyces cerevisiae – Bread making

Aspergillus niger – Citric acid production

Acetobacter aceti – Acetic acid

Question7

Which of the following is a commercial blood cholesterol lowering agent?
[NEET 2019]

Options:

A. Statin

B. Streptokinase

C. Lipases

D. Cyclosporin A

Answer: A

Solution:

• Statin is obtained from a yeast (Fungi) called Monascus purpureus

• It acts by competitively inhibiting the enzyme responsible for synthesis of cholesterol.

Question8

Which of the following statements about methanogens is not correct? [NEET OD 2019]

Options:

A. They can be used to produce biogas.

B. They are found in the rumen of cattle and their excreta

C. They grow aerobically and breakdown celluloserich food.

D. They produce methane gas.

Answer: C

Question9

Among the following pairs of microbes, which pair has both the microbes that can be used as biofertilizers? [NEET OD 2019]

Options:

A. Aspergillus and Rhizopus

B. Rhizobium and Rhizopus

C. Cyanobacteria and Rhizobium

D. Aspergillus and Cyanobacteria

Answer: C

Question10

A biocontrol agent to be a part of an integrated pest management should be [NEET OD 2019]

Options:

A. Species-specific and symbiotic

B. Free living and broad spectrum

C. Narrow spectrum and symbiotic

D. Species-specific and inactive on non-target organisms

Answer: D

Question11

Select the correct group of biocontrol agents.
[NEET 2019]

Options:

A. Trichoderma, Baculovirus, Bacillus thuringiensis

B. Oscillatoria, Rhizobium, Trichoderma

C. Nostoc, Azospirillium, Nucleopolyhedrovirus

D. Bacillus thuringiensis, Tobacco mosaic virus, Aphids

Answer: A

Solution:

Solution:

Fungs Trichoderma, Baculoviruses (NPV) and Bacillus thuringiensis are used as biocontrol agents.

Rhizobium, Nostoc, Azospirillum and Oscillatoria are used as biofertilisers, whereas TMV is a pathogen and aphids are pests that harm crop plants.

Question12

Which of the following can be used as a biocontrol agent in the treatment of plant disease?
[NEET 2019]

Options:

A. Chlorella

B. Anabaena

C. Lactobacillus

D. Trichoderma

Answer: D

Solution:

Fungus Trichoderma is a biological control agent being developed for use in the treatment of plant diseases.

Question13

Select the mismatch :
[NEET 2017]

Options:

A. Rhodospirillum - Mycorrhiza

B. Anabaena - Nitrogen fixer

C. Rhizobium - Alfalfa

D. Frankia - Alnus

Answer: A

Question14

Which of the following in sewage treatment removes suspended solids ?
[NEET 2017]

Options:

A. Secondary treatment

B. Primary treatment

C. Sludge treatment

D. Tertiary treatment

Answer: B

Question15

Which of the following is correctly matched for the product produced by them ?
[NEET 2017]

Options:

A. Methanobacterium : Lactic acid

B. Penicillium notatum : Acetic acid

C. Sacchromyces cerevisiae : Ethanol

D. Acetobacter aceti : Antibiotics

Answer: C

Question16

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	(iv) Monascus

[NEET 2016 P2]

Options:

A. ^{a}(iii) ^{b}(iv) ^{c}(i) ^{d}(ii)

B. (iii) (i) (ii) (iv)

C. (iii) (i) (iv) (ii)

D. (i) (iv) (ii) (iii)

Answer: C

Question17

Which of the following is wrongly matched in the given below?

	Microbe	Product	Application
(1)	Clostridium butylicum	Lipase	removal of oil stains
(2)	Trichoderma polysporum	Cyclosporin A	immunosuppressive drug
(3)	Monascus purpureus	Statins	lowering of blood cholesterol
(4)	Streptococcus	Streptokinase	removal of clot from blood vessel

[NEET 2016 P1]

Options:

A. (1)

B. (2)

C. (3)

D. (4)

Answer: A

Question18

Match the following list of microbes and their importance -

Column I	Column II
(a) Sacharomyces cerevisiae	(i) Production of immunosuppressive agent
(b) Monascus purpureus	(ii) Ripening of Swiss cheese
(c) Trichoderma polysporum	(iii) Commercial production of ethanol
(d) Propionibacterium sharmanii	(iv) Production of blood cholesterol lowering agents

[NEET 2015]

Options:

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

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

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

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

Answer: B

Question19

The guts of cow and buffalo possess:
[NEET 2015 C]

Options:

A. Chlorella spp.

B. Methanogens

C. Cyanobacteria

D. Fucus spp.

Answer: B

Question20

Which one of the following fungi contains hallucinogens?
[NEET 2014]

Options:

A. Morchella esculenta

B. Amanita muscaria

C. Neurospora sp.

D. Ustilago sp.

Answer: B

Solution:

Amanita muscaria is a fungus belonging to the class Basidiomycetes. Muscimol is the chemical produced by it is responsible for its hallucinogenic properties. It acts as an agonist selective to GABA receptors. It can also cause selective hypnotic properties. Ibotenic acid is the chemical that acts as the precursor to muscimol, which undergoes decarboxylation to produce the latter. It affects various parts of the brain such as the hippocampus, cerebellum, and cerebral cortex. The chemical has the ability to produce euphoria, an elated state of mind, and a body.

Considering other given options:

Morchella esculenta: It is the fungus belonging to the family Ascomycetes. It is the most widely used species of edible mushroom. Ancient Chinese has used these fungi to treat conditions such as indigestion and shortness of breath.
Neurospora sp: It is an ascomycetes fungi. The name arises from the appearance of its spores which resembles the axons present in a nerve fiber. It is a common model organism in biology. Due to its high ability for reproduction, its ease of culture, and also the requirement of a very minimal media for its development.Ustilago sp: It is a parasitic fungus, found predominantly infecting the grasses. It is used as an edible item in some parts of the world.

Thus the most appropriate answer is B that is the fungi producing hallucinogenic chemical is Amanita muscaria.

Question21

An alga which can be employed as food for human beings: [NEET 2014]

Options:

A. Ulothrix

B. Chlorella

C. Spirogyra

D. Polysiphonia

Answer: B

Solution:

Solution:
Chlorella is rich in proteins and are used as food supplements even by space travellers.

Question22

What gases are produced in anaerobic sludge digesters? [NEET 2014]

Options:

A. Methane and CO_2

B. Methane, Hydrogen Sulphide and CO_2

C. Methane, Hydrogen Sulphide and O_2

D. Hydrogen Sulphide and CO_2

Answer: B

Solution:

In anaerobic sludge digesters, bacteria produce a mixture of gases like CH_4 H_2S and CO_2.

Question23

A good producer of citric acid is (NEET 2013)

Options:

A. Clostridium

B. Saccharomyces

C. Aspergillus

D. Pseudomonas.

Answer: C

Solution:

Solution:
(c) : Aspergillus niger produces citric acid, Clostridium butylicum produces butyric acid, Saccharomyces is used for commercial production of ethanol, Pseudomonas produces alkaline proteases.

Question24

Microbe used for biocontrol of pest butterfly caterpillars is (KN NEET 2013)

Options:

A. Saccharomyces cerevisiae

B. Bacillus thuringiensis

C. Streptococcus sp.

D. Trichoderma sp.

Answer: B

Solution:

(b) : Biopesticides are those biological agents that are used for control of weeds, insects and pathogens. The microorganisms used as biopesticides are viruses, bacteria, protozoa, fungi and mites. Some of the biopesticides are being used at a commercial scale. Most important example is the soil bacterium, Bacillus thuringiensis (Bt). Spores of this bacterium produce the insecticidal cry protein. Therefore, spores of this bacterium kill larvae of insects which eat them.

Question25

Monascus purpureus is a yeast used commercially in the production of (2012)

Options:

A. ethanol

B. streptokinase for removing clots from the blood vessels

C. citric acid

D. blood cholesterol lowering statins.

Answer: D

Solution:

Solution:
(d) : Statins are produced by the yeast Monascus purpureus which have been commercialised as bloodcholesterol lowering agents inhibiting the enzyme responsible for synthesis of cholesterol.

Question26

A patient brought to a hospital with myocardial infarction is normally immediately given (2012)

Options:

A. penicillin

B. streptokinase

C. cyclosporin-A

D. statins.

Answer: B

Solution:

Solution:
(b) : Streptokinase (Tissue Plasminogen Activator or TPA) is an enzyme obtained from the culture of some haemolytic bacterium Streptococcus which is modified genetically to function as clot buster. Therefore, it helps in clearing blood clots inside the blood vessels through dissolution of intravascular fibrin during myocardial infarction.

Question27

A nitrogen-fixing microbe associated yith Azolla in rice fields is (2012)

Options:

A. Spirulina

B. Anabaena

C. Frankia

D. Tolypothrix.

Answer: B

Solution:

Solution:
(b) : Azolla plays a very important role in rice production. Azolla and its nitrogen-fixing partner, Anabaena, have been used as green manure to fertilise rice paddies and increase production. With the help of Azolla, rice can be grown year after year, several crops a year, with little or no decline in productivity; hence no rotation of crops is necessary.

Question28

Which one of the following is an example of carrying out biological control of pests/diseases using microbes? (2012)

Options:

A. Trichoderma sp. against certain plant pathogens.

B. Nucleopolyhedrovirus against white rust in Brassica.

C. Bt-cotton to increase cotton yield.

D. Lady bird beetle against aphids in mustard.

Answer: A

Solution:

Solution:
(a) : A biological control being developed for use in the treatment of plant disease is the fungus Trichoderma. Trichoderma species are free living fungi that are very common in the root ecosystems. They are effective biocontrol agents of several plant pathogens.

Question29

In gobar gas, the maximum amount is that of (Mains 2012)

Options:

A. butane

B. methane

C. propane

D. carbon dioxide.

Answer: B

Solution:

Solution:
(b) : Biogas or gobar gas is a methane rich fuel gas produced by anaerobic breakdown or digestion of biomass with the help of methanogenic bacteria. It is made up of methane (50 − 70%), carbon dioxide (30 − 40%) with traces of nitrogen, hydrogen sulphide and hydrogen.

Question30

Read the following four statements (A-D).
(A) Colostrum is recommended for the new born because it is rich in antigens.
(B) Chikungunya is caused by a Gram negative bacterium.
(C) Tissue culture has proved useful in obtaining virus-free plants.
(D) Beer is manufactured by distillation of fermented grape juice.
How many of the above statements are wrong?
(Mains 2012)

Options:

A. Two

B. Three

C. Four

D. One

Answer: B

Solution:

(b) : Chikungunya is caused by Chikungunya virus. Colostrum is the first breast milk of mother which contains antibodies (especially IgA) which protect the infant by the age of three months. Beer is manufactured by fermentation of barley malt by yeast species.

Question31

The domestic sewage in large cities (Mains 2012)

Options:

A. has a high BOD as it contains 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 amount of suspended solids and dissolved salts.

Answer: B

Solution:

Solution:
(b) : Sewage water can be purified by passing it through sewage treatment plants with the action of heterotrophic microorganisms. There are three stages of this treatment - primary, secondary and tertiary. Primary treatment removes floating and suspended solids from sewage through two processes of filtration and sedimentation. First floating matter is removed through sequential filtration. The filtrate is kept in large open settling tanks where grit settles down. The sediment is called primary sludge while the supernatant is called effluent. The primary sludge traps a lot of microbes and debris. In secondary treatment, the primary effluent is taken to aeration tanks. A large number of aerobic heterotrophic microbes grow in the aeration tank. They form flocs. Flocs are masses of bacteria held together by slime and fungal filaments to form mesh like structures. The microbes digest a lot of organic matter, converting it into microbial biomass and releasing a lot of minerals. As the BOD of the waste matter is reduced to $10-15\%$ of raw sewage, it is passed into settling tank. Thus secondary treatment is more or less biological. The sediment of settling tank is called activated sludge. The remaining is passed into a large tank called anaerobic sludge digester. It is designed for continuous operation. The aerobic microbes present in the sludge get killed. Anaerobic microbes digest the organic mass as well as aerobic microbes of the sludge. They are of two types, nonmethanogenic. and methanogenic. Methanogenic bacteria produce a mixture of gases containing methane, H_2S and CO_2.

Question32

Consider the following four statements (A - D) and select the option which includes all the correct ones only.
(A) Single cell Spirulina can produce large quantities of food rich in protein, minerals, vitamins, etc.
(B) Body weight-wise the microorganism Methylophilus methylotrophus may be able to produce several times more proteins than the cows per day.
(C) Common button mushrooms are a very rich source of vitamin C .
(D) A rice variety has been developed, which is very rich in calcium.
(Mains 2012)

Options:

A. Statements (C) and (D)

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

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

D. Statement (A) and (B)

Answer: D

Solution:

Solution:
Spirulina belongs to cyanobacterium that can be consumed by human beings and other animals. In dried form, it contains about 60% (51–71%) protein which includes all essential amino acids. Other nutrients that are found in rich quantities in Spirulina are vitamin b- thiamine and riboflavin, dietary minerals- iron and manganese. Methylophilus methylotrophus belongs to the group Methylotrophs which includes both Gram-negative and Gram-positive genera. Methylophilus methylotrophus, a bacterium can produce 25 tons of proteins. Button mushrooms provide 22 kilo calories of food energy and are an excellent source for Vitamins B, riboflavin and niacin as well as dietary minerals and phosphorous. Thus, the correct answer is option D.

Question33

The most common substrate used in distilleries for the production of ethanol is
(2011)

Options:

A. corn meal

B. soya meal

C. ground gram

D. molasses

Answer: D

Solution:

Solution:
Molasses is a biscous hyproduct of the processing of sugarcane , grapes or sugarbeets in sugar. It is the most common substrate used in distilleries for the production of ethanol. It can be used as the base material for fermentation into rum. It Australia, molasses is fermented to produce ethanol for use as an alternative fuel in motor vehicles

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Question34

Which one of the following is not a biofertiliser? (2011)

Options:

A. Agrobacterium

B. Rhizobium

C. Nostoc

D. Mycorrhiza

Answer: A

Solution:

Solution:
(a) : Biofertilizers are organisms that enrich the nutrient quality of the soil. The main sources of biofertilizers are bacteria, fungi and cyanobacteria. Rhizobium bacteria is found in the nodules on the roots of leguminous plants by symbiotic association. These bacteria fix atmospheric nitrogen into organic forms, which is used by the plants as nutrient. Fungi are also known to form symbiotic associations with plants called mycorrhiza. Cyanobacteria are autotrophic microbes widely distributed in an aquatic and terrestrial environments. Many of which can fix atmospheric nitrogen, e.g., Anabaena, Nostoc, Oscillatoria etc. But Agrobacterium tumefaciens is a pathogen of several dicot plants. It causes gall tumor in the plants.

Question35

Secondary sewage treatment is mainly a (2011)

Options:

A. physical process

B. mechanical process

C. chemical process

D. biological process.

Answer: D

Solution:

Sewage pollution can be prevented by treating sewage before passing into water course in sewage or effluent treatment plant.
The sewage treatment involves -Primary treatment, secondary treatment and tertiary treatment. Primary treatment consists of shredding, churning, floatation, screening and sedimentation. In Secondary treatment the organic matter is decomposed by microorganisms and through sewage fungus by passing through water hyacinth pond, trickling filter method or activated sludge method. Aeration helps in oxidation of sludge. Tertiary treatment is a physico-chemical treatment for removing turbidity and dissolved substances.
So, the correct answer is 'Biological process'

Question36

Which of the following is mainly produced by the activity of anaerobic bacteria on sewage?
(2011)

Options:

A. Laughing gas

B. Propane

C. Mustard gas

D. Marsh gas

Answer: D

Solution:

Solution:
(d) : Marsh gas or methane gas is mainly produced by the activities of anaerobic bacteria on sewage. Sewage contains large amounts of organic matter and microbes, many of which are pathogenic. These microbes (bacteria and fungi) are digested during secondary treatment process of sewage by anaerobic bacteria. During digestion, bacteria produce a mixture of gases such as methane, hydrogen sulphide and carbon dioxide. These gases are called biogas and can be easily used as a source of energy as it is inflammable.

Question37

An organism used as a biofertilizer for raising soyabean crop is
(2011)

Options:

A. Azotobacter

B. Azospirillum

C. Rhizobium

D. Nostoc.

Answer: C

Solution:

Solution:
(c) : Rhizobium is used as a biofertilizer for raising crop. Rhizobium japonicum forms symbiotic association in the roots of the leguminous plant, soyabean.

Question38

Ethanol is commercially produced through a particular species of (2011)

Options:

A. Saccharomyces

B. Clostridium

C. Trichoderma

D. Aspergillus.

Answer: A

Solution:

Solution:
(a) : Ethanol is commercially produced through a particular species of yeast Saccharomyces (Saccharomyces cerevisiae).

Question39

Continuous addition of sugars in 'fed batch' fermentation is done to (2011)

Options:

A. produce methane

B. obtain antibiotics

C. purify enzymes

D. degrade sewage.

Answer: C

Solution:

Solution:
A fed batch is a biotechnological batch process which is based on feeding of growth limiting nutrient substrate to a culture continuous addition of sugars in fed batch fermentation is done to purify enzymes.

Question40

Organisms called methanogens are most abundant in a
(2011)

Options:

A. sulphur rock

B. cattle yard

C. polluted stream

D. hot spring.

Answer: B

Solution:

Solution:
(b) : Methanogens are any of various archaebacteria that produce methane; they include genera such as Methanobacillus and Methanothrix. Methanogens are obligate anaerobes found in oxygendeficient environments, such as marshes, swamps, sludge and the digestive systems of ruminants. They are also utilised in gobar gas plants.

Question41

Read the following statement having two blanks (A and B)
A drug used for __A__ patients is obtained from a species of the organism __B__
The one correct option for the two blanks is

A	B
(a) heart	Penicillium
(b) organ-transplant	Trichoderma
(c) swine flu	Monascus
(d) AIDS	Pseudomonas.

(Mains 2011)

Options:

A. (a)

B. (b)

C. (c)

D. (d)

Answer: B

Solution:

(b) : Cyclosporin A used as an immunosuppressive agent in organ-transplant patients, is produced by the fungus Trichoderma polysporum.

Question42

Consider the following statements (A-D) about organic farming.
(A) Utilizes genetically modified crops like Bt cotton
(B) Uses only naturally produced inputs like compost
(C) Does not use pesticides and urea
(D) Produces vegetables rich in vitamins and minerals
Which of the above statements are correct?
(Mains 2011)

Options:

A. B, Cand D

B. C and D only

C. B and C only

D. A and B only

Answer: C

Solution:

Solution:
(c) : Organic farming is the form of agriculture that relies on techniques such as crop rotation, green manure, compost and biological pest control to maintain soil productivity and control pest on a farm. Organic farming excludes or strictly limited the use of manufactured fertilizers, pesticides (which include herbicides, insecticides and fungicides), plant growth regulators such as hormones, food additives and genetically modified organisms.

Question43

Which one of the following is a wrong matching of a microbe and its industrial product, while the remaining three are correct?
(Mains 2011)

Options:

A. Yeast - statins

B. Acetobacter aceti-acetic acid

C. Clostridium butylicum - lactic acid

D. Aspergillus niger - citric acid

Answer: C

Solution:

Solution:
(c) : Microbes are used for commercial and industrial production of certain chemicals like organic acids, alcohols and enzymes. Examples of acid producers are Aspergillus niger (a fungus) of citric acid, Acetobacter aceti (a bacterium) of acetic acid; Clostridium butylicum (a bacterium) of butyric acid and Lactobacillus (a bacterium) of lactic acid.

Question44

Select the correct statement from the following. (2010)

Options:

A. Biogas is produced by the activity of aerobic bacteria on animal waste

B. Methanobacterium is an aerobic bacterium found in rumen of cattle

C. Biogas, commonly called gobar gas, is pure methane

D. Activated sludge-sediment in settlement tanks of sewage treatment plant is a rich source of aerobic bacteria

Answer: D

Solution:

Solution:
Methanobacterium are anaerobic organisms.
Biogas refers to a mixture of different gases produced by the breakdown of organic matter in the absence of oxygen.
Activated sludge-sediment in settlement tanks of sewage treatment plant is a rich source of aerobic bacteria.
Biogas can be produced by anaerobic digestion with anaerobic bacteria.
Thus, the correct answer is option (D), 'Activated sludge-sediment in settlement tanks of sewage treatment plant is a rich source of aerobic bacteria'.

Question45

A common biocontrol agent for the control of plant diseases is (2010)

Options:

A. baculovirus

B. Bacillus thuringiensis

C. Glomus

D. Trichoderma

Answer: D

Solution:

Solution:
(d) : The natural method of pest and pathogen control involving use of viruses, bacteria and other insects (which are their natural predators and pests) is called biocontrol or biological control. For example, free living fungus Trichoderma exerts biocontrol over several plant pathogens for the control of plant diseases. Baculoviruses (mostly of genus Nucleopolyhedrovirus) are also used as biocontrol agents but they are used for the control of insects and arthropods. Bacillus thuringiensis is a soil bacterium which is used as biopesticide. Glomus species are the most common fungal partners of mycorrhiza residing in the roots of higher plants.

Question46

The common nitrogen-fixer in paddy fields is (2010)

Options:

A. Rhizobium

B. Azospirillum

C. Oscillatoria

D. Frankia.

Answer: B

Solution:

Solution:
(b) : Azospirillum is an anaerobic nitrogen fixing bacteria which forms loose association with roots of some plants. Inoculation of paddy fields with these bacteria helps in increasing yield and saving of nitrogen fertilizers.

Question47

Which one of the following is not used in organic farming? (2010)

Options:

A. Glomus

B. Earthworm

C. Oscillatoria

D. Snail

Answer: D

Solution:

Solution:
(d) : Organic farming is a method of farming system which primarily aimed to keep the soil alive and in good health by use of organic wastes and other biological material alongwith beneficial microbes (biofertilizers) to release nutrients to crops for increased sustainable production in an ecofriendly, pollution free environment.
Basic components of organic farming are green manures, farm yard manure, vermicompost, crop rotation, biopesticides and biofertilizers. Glomus being a mycorrhizal component, earthworm being a vermicompost and Oscillatoria being a nitrogen fixing blue green algae can be used in organic farming. Snail cannot be a component of organic farming.

Question48

An example of endomycorrhiza is (Mains 2010)

Options:

A. Nostoc

B. Glomus

C. Agaricus

D. Rhizobium

Answer: B

Solution:

Solution:
(b) : The genus Glomus form endomycorrhiza, a symbiotic associations with plants. The fungal symbiont in these associations absorbs phosphorus from soil and passes it to the plant. Plants having such associations show other benefits also, such as resistance to root-borne pathogens, tolerance to salinity and drought, and an overall increase in plant growth and development.
Nostoc is a blue green algae, Agaricus is a basidiomycetes, Rhizobium is a eubacteria.

Question49

Which one of the following pairs is wrongly matched? (2009)

Options:

A. Alcohol - Nitrogenase

B. Fruit juice - Pectinase

C. Textile - Amylase

D. Detergents - Lipase

Answer: A

Solution:

Solution:
(a) : Yeast species are used in alcoholic fermentation due to the presence of zymase enzyme. It was known that the yeast extract contained an enzyme zymase, which is nondialyzable and a coenzyme which is dialyzable. It is now well known that the zymase is a complex mixture of many enzymes and that several coezymes are necessary for their function. The activity of this enzyme was lost because the main enzyme was separated from its coezyme during dialyzation, Thus, it was established later that extracellular enzyme zymase, secreted by yeast cells, carry out the process of fermentation.

Question50

Which of the following is not used as a biopesticide? (2009)

Options:

A. Trichoderma harzianum

B. Nucleopolyhedrovirus (NPV)

C. Xanthomonas campestris

D. Bacillus thuringiensis

Answer: C

Solution:

Solution:
Biopesticides are certain types of pesticides made up of living microorganism.
Bacillus thuringiensis (or Bt) is biopesticide that can block the gut of insects and kill them. Trichoderma harzianum: This is a bio-pesticide useful for the management of fungal pathogens such as Fusarium species and Phytophthora species as well as nematodes.
The nuclear polyhedrosis virus (NPV) which belongs to the family Baculoviruses is a virus affecting insects, predominantly moths and butterflies. It has been used as a pesticide for crops infested by insects susceptible to contraction.
Xanthomonas campestris is bacterial species that causes a variety of plant diseases. It is a plant pathogen.
Therefore, the correct answer is option C.

Question51

Trichoderma harzianum has proved a useful microorganism for (2009)

Options:

A. gene transfer in higher plants

B. biological control of soil-borne plant pathogens

C. bioremediation of contaminated soils

D. reclamation of wastelands.

Answer: B

Solution:

Solution:
Trichoderma harzianum is an effective biocontrol agent against several fungal soil-borne plant pathogens. They have an inhibitory effect on the growth of mycelium of Phytium. They suppress the growth of fungi in order to allow the plant to grow favorably. However, possible adverse effects of T. harzianum on plant growth promoting microorganisms, such as arbuscular mycorrhiza (AM) fungi, might be a drawback in the use of this biocontrol agent in plant protection.
So, the correct answer is 'Biological control of soil-borne plant pathogens'

Question52

Nitrogen fixation in root nodules of Alnus is brought about by (2008)

Options:

A. Frankia

B. Azorhizobium

C. Bradyrhizobium

D. Clostridium.

Answer: A

Solution:

Solution:
(a) : The most common symbiotic association of legume and bacteria on roots is as nodules, which are small outgrowth on the roots. The microbe Frankia is symbiont in root nodules of several non-legume plants like Casurina and Alnus. Both Rhizobium and Frankia are free living in soil but as symbiont can fix atmospheric nitrogen.

Question53

Which one of the following proved effective for biological control of nematodal diseases in plants? (2008)

Options:

A. Gliocladium virens

B. Paecilomyces lilacinus

C. Pisolithus tinctorius

D. Pseudomonas cepacia

Answer: B

Solution:

Solution:
(b) : Paecilomyces lilacinus proved effective for biological control of nematodal diseases in plant.

Question54

Probiotics are
(2007)

Options:

A. cancer inducing microbes

B. new kind of food allergens

C. live microbial food supplement

D. safe antibiotics.

Answer: C

Solution:

Solution:
(c) : Probiotics are dietary supplements containing potentially beneficial bacteria or yeast, with lactic acid bacteria (LAB) as the most common microbes used. LAB have been used in the food industry for many years, because they are able to convert sugars (including lactose) and other carbohydrates into lactic acid. They not only provides the characteristic sour taste of fermented dairy foods such as yogurt, but acts as a preservative, by lowering the pH and creating fewer opportunities for spoilage organisms to grow.

Question55

Which one of the following pairs is wrongly matched?
(2007)

Options:

A. Yeast - Ethanol

B. Streptomycetes - Antibiotic

C. Coliforms - Vinegar

D. Methanogens - Gobar gas

Answer: C

Solution:

Solution:
43. (c) : Coliform bacteria are a commonly used bacterial indicator of sanitary quality of foods and water. It is not involved in the production of vinegar.

Question56

Dough kept overnight in warm weather becomes soft and spongy because of
(2004)

Options:

A. absorption of carbon dioxide from atmosphere

B. fermentation

C. cohesion

D. osmosis

Answer: B

Solution:

Solution:
Dough kept overnight in warm weather becomes soft and spongy because of fermentation. It is a metabolic process that converts sugar into acids, gasses and or alcohol. It occurs in yeast and bacteria, but also in oxygen-starved muscle cells, as in case of lactic acid fermentation so, fermentation occured in dough causes conversion of sugars to acids or alcohols and CO_2 which makes the dough soft and spongy.

Question57

Which one of the following pairs is not correctly matched?
(2004)

Options:

A. Streptomyces Antibiotic

B. Serratia- Drug addiction

C. Spirulina- single cell protein

D. Rhizobium- Biofertilizer

Answer: B

Solution:

Solution:
(b) : Serratia marcescens is considered a harmful human pathogen which has been known to cause urinary tract infections, wound infections and pneumonia. Serratia bacteria also have many antibiotic resistance properties which may become important if the incidence of Serratia infections dramatically increases.

Question58

The most thoroughly studied of the known bacteria-plant interactions is the
(2004)

Options:

A. cyanobacterial symbiosis with some aquatic ferns

B. gall formation on certain angiosperms by Agrobacterium

C. nodulation of Sesbania stems by nitrogen fixing bacteria

D. plant growth stimulation by phosphatesolubilising bacteria.

Answer: B

Solution:

Solution:
(b) : Agrobacterium tumefaciens is the causative agent of crown gall, an important disease of many commercial crops. This disease has come to be recognized in recent years as being caused by a DNA plasmid (Ti plasmid) carried by bacterium and transferred to the plant cells.

Question59

A major component of gobar gas is
(2004)

Options:

A. ammonia

B. methane

C. ethane

D. butane.

Answer: B

Solution:

Solution:
Methane forms a major part of gobar-gas. Ammonia is toxic. Ethane and butane are not major components of gobar gas.

Question60

During anaerobic digestion of organic waste, such as in producing biogas, which one of the following is left undegraded? (2003)

Options:

A. Lipids

B. Lignin

C. Hemi-cellulose

D. Cellulose

Answer: B

Solution:

Solution:
(b) : Lignin is a complex polymer of phenylpropane units, which are cross-linked to each other with a variety of different chemical bonds. This complexity has thus far proven as resistant to microbial degradation.

Question61

Which bacteria is utilized in gobar gas plant? (2003)

Options:

A. Methanogens

B. Nitrifying bacteria

C. Ammonifying bacteria

D. Denitrifying bacteria

Answer: A

Solution:

Solution:
(a) Methanobacillus (methanogen) occurs in marshes and also in dung. It produces CH_4 gas under anaerobic condition and is utilized in gobar gas plant

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Question62

During the formation of bread it becomes porous due to release of CO_2 by the action of
(2002)

Options:

A. yeast

B. bacteria

C. virus

D. protozoans

Answer: A

Solution:

Solution:
(a) : Saccharomyces converts starch or sugars to pyruvic acid through EMP pathway. Then this pyruvic acid is converted to acetaldehyde and finally to ethyl alcohol in the absence of oxygen. This entire process is called fermentation.
$C_6H_{12}O_6 \rightarrow 2CH_2COCOOH \rightarrow 2C_2H_5OH + 2CO_2$
This released carbon dioxide makes the dough to rise and gives spongy nature to bread.

Question63

Which of the following is the pair of biofertilizers?
(2001)

Options:

A. Azolla and BGA

B. Nostoc and legume

C. Rhizobium and grasses

D. Salmonella and E.coli

Answer: A

Solution:

Biofertilizers are the suspension of microorganism which mainly increases the growth of the plants. These secrete the growth promoting substances. The microorganisms in bio-fertilizers restore the soil's natural nutrient cycle and build soil organic matter. Bio-fertilizers such as Rhizobium, Azotobacter, Azospirilium and blue-green algae (BGA) are used. Anabaena in association with water fern Azolla contributes nitrogen up to 60 kg/ha/season and also enriches soils with organic matter.
So, the correct answer is option A.

Question64

Spoilage of oil can be detected by which fatty acid (2001)

Options:

A. oleic acid

B. linolenic acid

C. linoleic acid

D. erucic acid.

Answer: D

Solution:

Solution:
(d) : Erucic acid is an unsaturated fatty acid belonging to the oleic acid series, occurring as glycerides in rape seed oil and other vegetable oils. It is the cis -isomer, the trans-isomer being brassidic acid. Erucic acid is used as a binder for oil paints. It is useful in manufacture of emulsions to coat photographic films and papers. Oleic acid is found in various animal and vegetable sources. It is widely used in industries including textile, chemical, medicine, leather, stationary, paper making, etc. Linolenic acids is used in making soaps, emulsifiers and quick-drying oils, in beauty products. It helps in acne reduction, moisture retention, etc. Linoleic aicd is an important fatty acid especially for growth and development of infants. Commercially it is used in margarine, animal feeds, soaps and drugs.

Question65

Which aquatic fern is used to increase the yield in paddy crop? (2000)

Options:

A. Azolla

B. Salvinia

C. Marsilea

D. Isoetes

Answer: A

Solution:

Solution:
Azolla or water fern is a species of aquatic ferns of the family Salviniaceae and resembles mosses. It is involved in symbiotic nitrogen fixation. The nitrogen fixing capability of Azolla has made it an ecologically important bio fertiliser in the paddy fields to increase the yield. So, the correct answer is option A.

Question66

Which of the following is used to manufacture ethanol from starch? (2000)

Options:

A. Penicillin

B. Saccharomyces

C. Azotobactor

D. Lactobacillus

Answer: B

Solution:

Solution:
The biological process of conversion of starch into ethanol is a two-step process. The first step involves saccharification, where starch is converted into sugar using an amylolytic microorganism or enzymes such as glucoamylase and -amylase. The second step is fermentation, where sugar is converted into ethanol using Saccharomyces cerevisiae.
Therefore, the correct answer is option B.

Question67

Which of the following fern is an excellent biofertilizer? (1999)

Options:

A. Marsilia

B. Pteridium

C. Azolla

D. Salvinia

Answer: C

Solution:

Solution:
Azolla a dichotomously branched free floating aquatic fern is naturally available mostly on moist soils, ditches marshy ponds and is widely distributed in tropical belt of India. The fern is capable of fixing atmospheric nitrogen in the soil in form of NH_4^+ and becomes available as a soluble nitrogen for the wet land rice crop, which is the major cereal for the people of the North East. The remarkable feature of Azolla is that its symbiotic relationship with Cyanobacterium (Anabaena azollae), which remained on the dorsal leaf cavity of Azolla. The fern provides protein substances to Anabaena (BGA). The BGA then absorbed the atmospheric nitrogen and decomposes it through enzymic activity and converted into soluble ammonia.

Question68

Which of the following is non-symbiotic biofertilizer? (1998)

Options:

A. Anabaena

B. Rhizobium

C. VAM

D. Azotobacter

Answer: D

Solution:

Solution:
(d) : Biofertilizers are organisms which bring about nutrient enrichment of the soil. Azotobacter is a free living, aerobic, nitrogen fixing bacteria. Anabena is a nitrogen fixing cyanobacteria that occurs in both free living and symbiotc associations with Azolla, Cycas roots, etc. Rhizobium lives symbiotically in root nodules of legumes and nonlegumes. Vesicular-arbuscular mycorrhiza (VAM) is an example of endomycorrhiza in which fungal hyphae penetrate the cortical cells of grasses to form vesicles.

Question69

Yeast (Saccharomyces cerevisiae) is used in the industrial production of (1998)

Options:

A. tetracyline

B. ethanol

C. butanol

D. citric acid.

Answer: B

Solution:

Yeast contains an enzyme zymase which catalyse the fermentation of sugar to form ethyl alcohol (ethanol) and CO_2 .

Question70

Farmers have reported over 50% higher yields of rice by using which of the following biofertilizer?
(1998)

Options:

A. Cyanobacteria

B. legume-Rhizobium symbiosis

C. Mycorrhiza

D. Azolla pinnata

Answer: D

Solution:

Solution:
Farmers have reported over 50% higher yields of rice, by using Azolla pinnata as biofertilizer. Azolla is a free-floating water fern that floats in water and fixes atmospheric nitrogen in association with nitrogen fixing blue green alga Anabaena azollae. Azolla fronds consist of sporophyte with a floating rhizome and small overlapping bi-lobed leaves and roots. Rice growing areas in South East Asia and other third World countries have recently been evincing increased interest in the use of the symbiotic N_2 fixing water fern Azolla either as an alternate nitrogen source or as a supplement to commercial nitrogen fertilizers. Azolla is used as biofertilizer for wetland rice and it is known to contribute 40-60 kg N/ha per rice crop.
So, the correct answer is option D.

Question71

Which of the following microorganisms is used for production of citric acid in industries?
(1998)

Options:

A. Aspergillus niger

B. Rhizopus nigricans

C. Lactobacillus bulgaris

D. Penicillium citrinum

Answer: A

Solution:

Solution:
(a) : Citric acid is obtained through the fermentation carried out by Aspergillus niger on sugary syrups. Citric acid is employed in dyeing, engraving, medicines, inks, flavouring and preservation of food and candies.

Question72

Biological control component is central to advanced agricultural production. Which of the following is used as a third generation pesticide?
(1998)

Options:

A. Insect repellants

B. Organophosphate and carbamates

C. Pathogens

D. Pheromones

Answer: D

Solution:

Solution:
(d) : Pheromones are volatile chemicals produced by a given species to communicate with other individuals of the same species to change their behaviour. The synthetic versions of lepidopteran pheromones can be used as pesticides. Sometimes the relative amount of several pheromone chemicals in a pesticide product determine which specific pests are controlled when the pesticide product releases pheromone into the air where males are looking for females, the males become confused and cannot easily locate the females. As a result, many of the females do not mate and lay eggs and there are many fewer offspring than usual. These insect pheromones are third generation pesticides. Other third generation pesticides are insect growth regulators, chitin synthesis inhibitors and juvenile hormones.

Question73

The biofertilizers are
(1997)

Options:

A. Anabaena and Azolla

B. cow dung, manure and farmyard waste

C. quick growing crop ploughed under soil

D. none of these.

Answer: A

Solution:

Solution:
Biofertilizers are organisms which bring about nutrient enrichment of the soil. Azotobacter is a free living, aerobic, nitrogen fixing bacteria. Anabena is a nitrogen fixing cyanobacteria that occurs in both free living and symbiotc associations with Azolla, Cycas roots, etc. Rhizobium lives symbiotically in root nodules of legumes and nonlegumes. Vesicular-arbuscular mycorrhiza (VAM) is an example of endomycorrhiza in which fungal hyphae penetrate the cortical cells of grasses to form vesicles.

Question74

Gobar gas contains mainly
(1997)

Options:

A. $CO_2 + H_2$

B. $CO_2 + H_2O$

C. CH_4 only

D. $CH_4 + CO_2$.

Answer: D

Solution:

Solution:
Biogas or gobar gas is a methane rich fuel gas produced by anaerobic breakdown or digestion of biomass with the help of methanogenic bacteria. It is made up of methane (50 − 70%), carbon dioxide (30 − 40%) with traces of nitrogen, hydrogen sulphide and hydrogen.

Question75

Cochineal insects have proved very useful for
(1996)

Options:

A. Cactus prevention

B. Eicchornia prevention

C. weeds control

D. Parthenium contol.

Answer: A

Solution:

Solution:
(a) : Extensive growth of Opuntia (Cactus) in Australia was checked through introduction of its natural herbivore, cochineal insect (Cactoblastis cactorum).

Question76

When a natural predator (living being) is applied on the other pathogen organism to control them, this process is called
(1996)

Options:

A. artificial control

B. confusion technique

C. biological control

D. genetic engineering.

Answer: C

Solution:

Solution:
(c) : The control of insect pests by the introduction, encouragment and artificial increase of biological agencies like predaceous and parasitic insects, other animals and diseases is termed as biological control. It is basically a natural control in which man plays significant role of making the biological agencies more effective. Of these agencies, insect enemies play important role in nature for managing the phytophagous insect pests and keep a balance e . g. lady bugs or praying mantis, frog, toads, lizard and birds are employed by man to eat up the insect pests like aphids. It is a self perpetuating method.

Question77

The citric acid is produced by
(1995)

Options:

A. Candida utilis

B. Azotobacter suboxydans

C. Aspergillus niger

D. Streptococcus lactis.

Answer: C

Solution:

Solution:
(a) : Citric acid is obtained through the fermentation carried out by Aspergillus niger on sugary syrups. Citric acid is employed in dyeing, engraving, medicines, inks, flavouring and preservation of food and candies.

Question78

The rotenone is (1995)

Options:

A. a natural herbicide

B. a natural insecticide

C. an insect hormone

D. a bioherbicide.

Answer: B

Solution:

Solution:
(b) : Natural insecticides are those which are obtained from microorganisms and plants. The first natural insecticide used by man is azadirachtin obtained from Azadirachta indica.
Rotenone is another natural insecticide which is obtained from the roots of Derris and Lonchocarpers. It is harmless to warm blooded animals.

Question79

The organism, used for alcohol fermentation, is (1995)

Options:

A. Aspergillus

B. Saccharomyces

C. Pseudomonas

D. Penicillium.

Answer: B

Solution:

Solution:
Alcohol fermentation is also called ethanol fermentation. It is a biological process in which sugar (sucrose, fructose, glucose) is converted into cellular energy, producing ethanol and carbon dioxide. It is done by the anaerobic (in absence of oxygen) respiration of some organisms, i.e. yeast species. The most commonly used organism for this purpose is **Saccharomyces** species. This process is mostly used in the alcohol industries. The alcohol fermentation occurs in the cytosol of yeast cells. Yeast cells consume sugar and produce ethanol and carbon dioxide as a waste product. So, the correct option is B.

Question80

One of the major difficulties in the biological control of insect pest is that
(1995)

Options:

A. the method is less effective as compared with the use of insecticides

B. the practical 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: D

Solution:

Solution:
(d) : Insect enemies play important role in nature for managing the phytophagous insect pests and keep a balance. It is just possible that predators of a particular plant pest are unable to get established and multiply in a particular environment. In such cases, the predators are reared in the laboratory and let off at a particular time when the pests are about to threaten the crops. And then this practice become expensive.

Question81

Biological control of agricultural pests, unlike chemical control, is
(1994)

Options:

A. self perpetuating

B. polluting

C. very expensive

D. toxic.

Answer: A

Solution:

Solution:
The control of insect pests by the introduction, encouragement and artificial increase of biological agencies like predaceous and parasitic insects, other animals and diseases is termed as biological control. It is basically a natural control in which man plays significant role of making the biological agencies more effective. It is a self perpetuating method as the organisms which act as biocontrol agent are able to grow and reproduce unlike chemical control agents.

Question82

In cheese manufacture, the microorganisms are important for (1994)

Options:

A. the ripening only

B. the souring of milk only

C. the development of resistance to spoilage only

D. both the souring and the ripening processes.

Answer: D

Solution:

Solution:
(d) : Cheese is a protein rich nutritive preparation obtained after fermentation and curding of milk. Cheese contains proteins (20 − 35%), fats (20 − 30%) minerals, vitamins and water. Milk is first curdled (soured) with the help of a lactic acid bacterium. Curd is gently heated to separate cheese from liquid called whey. Curd is placed in cloth-lined porous containers for draining out whey. The left out solidified material is called cottage cheese. For preservation and ripening, blocks of cottage cheese are salted and placed in brine solution. Salt solution is drained out. Cheese blocks are wiped and placed in sterilised rooms for ripening with the help of microorganisms.

Question83

Which of the following species does not have the ability to fix atmospheric nitrogen? (1994)

Options:

A. Azotobactor

B. Anabaena

C. Nostoc

D. Spirogyra

Answer: D

Solution:

Solution:
(d) : Members of Kingdom Monera - bacteria and cyanobacteria (blue green algae) have the ability to fix nitrogen. Azotobacter is a N_2 -fixing bacteria. Anabaena and Nostoc are heterocystous blue-green algae. The heterocysts are the sites of N_2 -fixation. Spirogyra is one of the commonest green algae. It has no function in nitrogen fixation.

Question84

Which one of the following statements is correct? (1994)

Options:

A. Legumes fix nitrogen only through the specialized bacteria that live in their roots.

B. Legumes fix nitrogen independently of the specialized bacteria that live in their roots.

C. Legumes fix nitrogen only through specialized bacteria that live in their leaves.

D. Legumes are incapable of fixing nitrogen.

Answer: A

Solution:

(a) : The nitrogen-fixing ability of leguminous plants is not a property of the plants as such but results from infection of their roots by bacteria in the soil, infection leading to the formation of nodules. These organisms are Gram-negative motile rods that are classified in the genus Rhizobium.
