DPP - Daily Practice Problems

Chapter-wise Sheets

Date : | Start Time : | End Time :

BIOLOGY CB32

SYLLABUS : Microbes in human welfare

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. Select the correct statement from the following.
(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

2. Which one thing is not true about antibiotics?
(a) The term "antibiotic" was coined by Selman Waksman in 1942
(b) First antibiotic was discovered by Alexander Flemming
(c) Each antibiotic is effective only against one particular kind of germ
(d) Some persons can be allergic to a particular antibiotic

3. *Monascus purpureus* is a yeast used commercially in the production of :
(a) ethanol
(b) streptokinase for removing clots from the blood vessels.
(c) citric acid
(d) blood cholesterol lowering statins

4. A common biocontrol agent for the control of plant diseases is
(a) Baculovirus (b) *Bacillus thuringiensis*
(c) *Glomus* (d) *Trichoderma*

5. Continuous addition of sugars in 'fed batch' fermentation is done to:
(a) produce methane (b) obtain antibiotics
(c) purify enzymes (d) degrade sewage

RESPONSE GRID	1. ⓐⓑⓒⓓ	2. ⓐⓑⓒⓓ	3. ⓐⓑⓒⓓ	4. ⓐⓑⓒⓓ	5. ⓐⓑⓒⓓ

Space for Rough Work

6. Streptomycin is obtained from
(a) *Streptomyces griseus*
(b) S. *aureofaciens*
(c) S. *venezuelae*
(d) S. *ramosus*

7. For biogas production besides dung an extensive use of which weed is recommended in our country–
(a) *Mangifera indica*
(b) *Hydrilla*
(c) *Eicchornia crassipes*
(d) *Solanum*

8. Chloramphenicol and erythromycin (broad spectrum antibiotics) are produced by
(a) *Streptomyces* (b) *Nitrobacter*
(c) *Rhizobium* (d) *Penicillium*

9. Which one of the microorganism is used for production of citric acid in industries ?
(a) *Lactobacillus bulgaricus*
(b) *Penicillium citrinum*
(c) *Aspergillus niger*
(d) *Rhizopus nigricans*

10. A genetically engineered bacteria used for clearing oil spills is :
(a) *Escherichia coli*
(b) *Bacillus subtilis*
(c) *Agrobacterium tumifacien*s
(d) *Pseudomonas putida*

11. Human insulin is being commercially produced from a transgenic species of
(a) *Escherichia* (b) *Mycobacterium*
(c) *Rhizobium* (d) *Saccharomyces*

12. Which one of the following is not used in organic farming?
(a) *Glomus* (b) Earthworm
(c) *Oscillatoria* (d) Snail

13. What is mode of bacterial resistance against antibiotics ?
(a) Development of thick mucilaginous layer
(b) Alteration of cell membrane
(c) Mutation in bacteria
(d) All the above

14. Which one of the following is a wrong matching of a microbe and its industrial product, while the remaining three are correct ?
(a) Yeast - statins
(b) *Acetobacter aceti* - acetic acid
(c) *Clostridium butylicum* - lactic acid
(d) *Aspergillus niger* - citric acid

15. During anaerobic digestion of organic waste, such as in producing biogas, which one of the following is left undegraded ?
(a) Lipids (b) Lignin
(c) Hemi-cellulose (d) Cellulose

16. Rennin used in cheese industry is –
(a) Antibiotic (b) Enzyme
(c) Alkaloid (d) Inhibitor

17. Vitamin B_{12} is formed during fermentation of
(a) *Ashloya gossipii*
(b) *Rhizopus stalonifer*
(c) *Propionibacteria*
(d) *Saccharomyces cerevisiae*

18. The term "antibiotic" was coined by –
(a) Edward Jenner (b) Louis Pasteur
(c) Selman Waksman (d) Alexander Flemming

19. Which one of the following micro-organisms is used for production of citric acid in industries?
(a) *Penicillium citrinum*
(b) *Aspergillus niger*
(c) *Rhizopus nigricans*
(d) *Lactobacillus bulgaris*

20. Streptokinase which is used as a 'clot buster' obtained from
(a) *Streptococcus* (b) *Staphylococcus*
(c) *Lactobacillus* (d) *Saccharomyces*

RESPONSE GRID					
	6. (a)(b)(c)(d)	**7.** (a)(b)(c)(d)	**8.** (a)(b)(c)(d)	**9.** (a)(b)(c)(d)	**10.** (a)(b)(c)(d)
	11. (a)(b)(c)(d)	**12.** (a)(b)(c)(d)	**13.** (a)(b)(c)(d)	**14.** (a)(b)(c)(d)	**15.** (a)(b)(c)(d)
	16. (a)(b)(c)(d)	**17.** (a)(b)(c)(d)	**18.** (a)(b)(c)(d)	**19.** (a)(b)(c)(d)	**20.** (a)(b)(c)(d)

Space for Rough Work

21. Baculoviruses are excellent candidates for
(a) species-specific narrow spectrum pesticidal applications.
(b) species-specific broad spectrum pesticidal applications.
(c) species-specific narrow spectrum insecticidal applications.
(d) species-specific broad spectrum insecticidal applications.

22. Farmers have reported over 50% higher yields of rice by using the biofertilizer
(a) *Azolla pinnata*
(b) *Cyanobacteria*
(c) *Legume-Rhizobium* symbiosis
(d) Mycorrhiza

23. Microbes are present in
(a) soil (b) thermal vents
(c) polluted water (d) all of these

24. Which of the following microbes is a proteinacious infectious agent?
(a) Fungi (b) Prions
(c) Bacteria (d) Protozoa

25. Probiotics are
(a) cancer inducing microbes
(b) new kind of food allergens
(c) live microbial food supplement
(d) safe antibiotics

26. *Saccharomyces cerevisiae* is a yeast commercially used in
(a) citric acid
(b) ethanol
(c) baking
(d) streptokinase for removing clots from blood vessels

27. The masses of bacteria held together by slime and fungal filaments to form mesh like structures are called as
(a) primary sludge (b) flocs
(c) activated sludge (d) anaerobic sludge

28. The purpose of biological treatment of waste water is to
(a) reduce BOD
(b) increase BOD
(c) reduce sedimentation
(d) increase sedimentation

29. These bacteria grow anaerobically on cellulosic material, produce large amount of methane along with CO_2 and H_2, and are collectively called as methanogen. Examples of such bacteria are
(a) *Methanobacterium*
(b) *Methanobrevibacter*
(c) *Methanococcus*
(d) All of these

30. Biogas is produced by
(a) aerobic breakdown of biomass
(b) anaerobic breakdown of biomass
(c) with the help of methanogenic bacteria
(d) both (b) and (c)

31. Match Column-I with Column-II and select the correct answer from the codes given below.

	Column-I		Column-II
A.	*Trichoderma*	(I)	Nitrification
B.	*Streptomyces*	(II)	Biocontrol agent
C.	*Nitrosomonas*	(III)	Lactic acid
D.	*Lactobacillus*	(IV)	Source of antibiotic

(a) A-(II), B-(III), C-(IV), D-(I)
(b) A-(II), B-(IV), C-(I), D-(III)
(c) A-(III), B-(I), C-(II), D-(IV)
(d) A-(IV), B-(II), C-(I), D-(III)

32. Organic farming does not include
(a) green manures (b) chemical fertilizers
(c) farmyard manures (d) compost

33. The symbiotic association between fungi and roots of higher plants is referred to as
(a) lichen (b) Mycorrhiza
(c) biofertilizer (d) biocontrol agent

34. Which of the following options includes biofertilizers?
(a) Cowdung manure and farmyard waste
(b) A quick growing crop ploughed back into the field
(c) Nostoc, Oscillatoria
(d) All of these

RESPONSE GRID

21. ⓐⓑⓒⓓ	22. ⓐⓑⓒⓓ	23. ⓐⓑⓒⓓ	24. ⓐⓑⓒⓓ	25. ⓐⓑⓒⓓ
26. ⓐⓑⓒⓓ	27. ⓐⓑⓒⓓ	28. ⓐⓑⓒⓓ	29. ⓐⓑⓒⓓ	30. ⓐⓑⓒⓓ
31. ⓐⓑⓒⓓ	32. ⓐⓑⓒⓓ	33. ⓐⓑⓒⓓ	34. ⓐⓑⓒⓓ	

Space for Rough Work

35. Yeast *Saccharomyces cervisiae* is used in the industrial production of
(a) butanol (b) citric acid
(c) tetracycline (d) ethanol

36. In cheese manufacture, the micro-organisms are used for
(a) the souring of milk only
(b) the ripening only
(c) development of resistance to spoilage
(d) Both (a) and (b)

37. Brewer's yeast lack
(a) diastase and amylase (b) amylase only
(c) diastase only (d) maltose

38. Baggasse is related to the manufacture of
(a) cinchonidine (b) cellulose materials
(c) resin (d) cane sugar

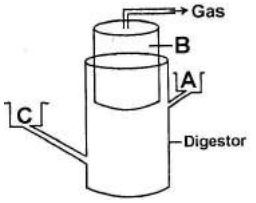
39. Which of the following bacteria is used for the production of butanol and acetone from starch ?
(a) *Lactobacillus bulgaricus*
(b) *Clostridium acetobutylicum*
(c) *Streptococcum thermophilus*
(d) Both (a) and (c)

40. Which bacterium helps in the production of 'Swiss cheese'?
(a) *Propionibacterium sharmanii*
(b) *Trichoderma polysporum*
(c) *Saccharomyces cerevisiae*
(d) *Aspergillus niger*

41. Statins, a bioactive molecule, inhibiting the enzyme responsible for synthesis of
(a) carbohydrate (b) protein
(c) vitamins (d) cholestrol

42. Gallic acid is obtained from
(a) *Pseudomonas species*
(b) *Penicillium purpurogenum*
(c) *Aspergillus niger*
(d) *Streptomyces species*

43. The diagram below shows a typical biogas plant. With few structure labelled as A, B and C. Identify A, B and C.



(a) A – Sludge, B – Methane, Oxygen, C – Dung, water
(b) A – Sludge, B – Methane, Carbon dioxide, C– Dung, water
(c) A – Sludge, B – Ethylin, Carbon dioxide, C – Dung, water
(d) A – Sludge, B – Methane, Carbon dioxide, C – Sewage

44. Match column-I with column-II and choose the correct option

	Column-I		Column-II
A.	Statins	I.	Yeast
B.	Ethanol	II.	Blood-cholesterol lowering agent
C.	Dung	III.	Insect-resistant plant
D.	Bt-cotton	IV.	Biogas

(a) A-II; B-I; C-IV; D-III
(b) A-III; B-IV; C-I; D-II
(c) A-I; B-II; C-III; D-IV
(d) A-IV; B- II; C-I; D-III

45. Which one of the following statement regarding BOD is true?
(a) The greater the BOD of waste water, more is its polluting potential.
(b) The greater the BOD of waste water, less is its polluting potential.
(c) The lesser the BOD of waste water, more is its polluting potential.
(d) The lesser the BOD of waste water, less is its polluting potential.

RESPONSE GRID					
	35. ⓐⓑⓒⓓ	**36.** ⓐⓑⓒⓓ	**37.** ⓐⓑⓒⓓ	**38.** ⓐⓑⓒⓓ	**39.** ⓐⓑⓒⓓ
	40. ⓐⓑⓒⓓ	**41.** ⓐⓑⓒⓓ	**42.** ⓐⓑⓒⓓ	**43.** ⓐⓑⓒⓓ	**44.** ⓐⓑⓒⓓ
	45. ⓐⓑⓒⓓ				

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 32 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	45	Qualifying Score	60
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

HINTS & SOLUTIONS

DPP /CB32

1. (d) Activated sludge is a process for treating sewage and industrial wastewaters using air and a biological floc composed of bacteria and protozoans. During the process, the primary effluent is taken to aeration tank that contain large number of aerobic heterotrophic microbes. They form flocs that digest a lot of organic matter. As the biological oxygen demand of waste water is reduced, it is passed into settling tank to undergo sedimentation. The sediment of the settling tank is called activated sludge that is a rich source of aerobic bacteria. Hence, the statement (d) is correct.
Biogas is produced by anaerobic breakdown of biomass with the help of methanogenic bacteria. It is made up of methane, carbon dioxide with traces of nitrogen, hydrogen sulphide and hydrogen.
Methanobacterium is an anaerobic bacterium that is found in rumen of cattle and is helpful in the breakdown of cellulose.

2. (c) 'Each antibiotic is effective only against one particular kind of germ' is not correct.

3. (d) *Monascus purpureus* is a yeast used in the production of statins which are used in lowering blood cholestrol.

4. (d) A common biocontrol agent for control of plant diseases is *Trichoderma*. *Trichoderma* is a tree living fungus that exerts biocontrol over several plant pathogens for the control of plant diseases. It is the natural method of pest and pathogen control.

5. (c) A fed batch is a biotechnological batch process which is based on feeding of a growth limiting nutrient substrate to culture. It is done for purifying enzymes.

6. (a) 2100 antibiotics have been reported so far from actinomycetes alone. Of these maximum antibiotics have been reported from streptomyces alone. Waksman isolated streptomycin from *Streptomyces griseus*.

7. (c) **8. (a)**

9. (c) *Aspergillus niger* is used for production of citric acid in industries.

10. (d)

11. (a) Human insulin is being commercially produced from a transgenic species of *Escherichia coli*. *E. coli* is a bacterium that is commonly found in the lower intestine of warm blooded animals. The bacteria can also be grown easily and its genetics are comparatively simple and easily manipulated, making it one of the best studied prokaryotic model organisms, and an important species in biotechnology.

12. (d) Organic farming involves use of organic wastes and other biological material along with beneficial microbes to release nutrients to crop to increase the soil fertility in an ecofriendly, and pollution free environment. *Glomus*, earthworm and *Oscillatoria* can be used in organic farming while snail cannot.

13. (d)

14. (c) *Clostridium butylicum* industrially produces butyric acid.

15. (b) **16. (b)** **17. (c)** **18. (c)**

19. (b) **20. (a)** **21. (c)**

22. (a) Farmers have reported over 50% higher yields of rice by using the biofertilizer *Azolla pinnata*.

23. (d) Microbes are omnipresent, found in soil, water, air, ice, iside bodies of human beings, animals and plants. Some are found in hot springs (upto 80°–100°C) and even in geysers (thermal vents).

24. (b) Prions are highly resistant glycoportein particles which function as infectious agents. Prions can also act as catalyst converting nomal protein into prion state. Prions are not affected by proteases, nucleases, temperature upto 800°C, UV radiations and formaldehyde.

25. (c) Probiotics are live microgranisms (bacteria in most cases) that are similar to beheficial micriorganisms found in the human gut. They are also called "friendly bacteria" or " good bacteria". Probiotic microorganisms consist mostly of strains of *Lactobacillius*, *Bifidobcterium* and *Streptococcus*. Probiotics are taken as food supplement and energy drinks (e.g. Yakult).

26. (c)

27. (b) Flocs are masses of bacteria held together by slime and fungal filaments to form mesh like structures.

28. (a) Secondary treatment of sewage (or biological treatment) depletes 90-95% of the BOD and many pathogens are removed. Reduction of BOD by 90% is achieved through mineralization of small fraction of organic matter and conversion of large proportion to removable solids.

29. (d) Methanogens are microorganisms that produce methane as a metabolic byproduct in anoxic condition. They include *Methanobcterium*, *Methanobrevibacter* and *Methanococcus*.

30. (d) **31. (b)**

32. (b) Organic farming includes serval methods to enhance soil fertility. In such farming, methods of biological origin are used e.g., biopesticides biofertilizers, IPM (Integrated Pest Management) green manure, bioherbicides etc. Chemical fertilizers are not used in organic farming.

33. (b)

34. (c) *Oscillatoria* and *Nostoc* are nitrogen fixing cyanobacteria. They add orgnaic matter as well as extra nitrogen to the soil. Cyanobacteria are very important and low-cost biofertilizers.

35. (d) Commercial ethanol or ethyl alcohol is produced by yeast *Saccharomyces cerevisiae*.

36. (d) Lactic acid bacteria help in souring milk. Ripening of cheese is done by bacteria (*Propionibacterium shermanii*) or moulds (*Penicillium roqueforti*).

37. (a) Brewer's yeast lack sufficient diastase and amylase therefore if complex carbohydrates have to be acted upon by them, 1% malt or inoculation with fungus like *Rhizopus* is done to degrade sugars.

38. (b) Baggasse is crushed sugarcane from which sugar has been extracted. It is used for fuel in sugar refineries and in making of fibre board.

39. (b) The bacteria *Clostridium acetobutylicum* is used to produce butanol and acetone from starch. This bacteria was first used by Chaim Weizmann in 1920.

40. (a) **41. (d)**

42. (c) *Aspergillus niger* is related with production of gallic acid.

43. (b) The label A represents sludge, label B represents methane and carbon dioxide, and the label C represents dung and water.

44. (a)

45. (a) BOD is the method of determining the amount of oxygen required by microorganisms to decompose the waste present in the water supply. It is a measure of organic matter present in the water. If the quantity of organic wastes in the water supply is high then the number of decomposing bacteria present in the water will also be high. As a result, BOD value will increase.