

NEET MINERAL NUTRITION — METABOLISM OF NITROGEN: NITROGEN CYCLE AND BIOLOGICAL NITROGEN FIXATION — PYQS

Max. Marks: 88

Questions: 22

Section A (MCQ) — 22 questions

Q.1 Which one of the following produces nitrogen fixing nodules on the roots of *Alnus*?

[NEET (UG) 2022]

- (1) *Rhizobium* (2) *Frankia*
(3) *Rhodospirillum* (4) *Beijerinckia*

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Q.2 Which of the following pair represents free living nitrogen fixing aerobic bacteria?

[NEET (UG) 2022 (Phase 2)]

- (1) *Pseudomonas* and *Thiobacillus*
(2) *Rhizobium* and *Frankia*
(3) *Azotobacter* and *Beijerinckia*
(4) *Anabaena* and *Rhodospirillum*

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Q.3 Which of the following protects nitrogenase inside the root nodule of a leguminous plant?

[NEET (UG) 2022 (Phase 2)]

- (1) Glutamate dehydrogenase
(2) Catalase
(3) leg haemoglobin
(4) Transaminase

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Q.4 Match **Column - I** with **Column - II**.

Column-I		Column-II	
a.	<i>Nitrococcus</i>	i.	Denitrification
b.	<i>Rhizobium</i>	ii.	Conversion of ammonia to nitrite
c.	<i>Thiobacillus</i>	iii.	Conversion of nitrite to nitrate
d.	<i>Nitrobacter</i>	iv.	Conversion of atmospheric nitrogen to ammonia

Choose the correct answer from options given below.

[NEET (UG) 2021]

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

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Q.5 The product(s) of reaction catalyzed by nitrogenase in root nodules of leguminous plants is/are

[NEET (UG) 2020]

- (1) Ammonia alone
(2) Nitrate alone
(3) Ammonia and oxygen
(4) Ammonia and hydrogen

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Q.6 *Thiobacillus* is a group of bacteria helpful in carrying out :

[NEET (UG) 2019]

- (1) Nitrification
(2) Denitrification
(3) Nitrogen fixation
(4) Chemoautotrophic fixation

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Q.7 During biological nitrogen fixation, inactivation of nitrogenase by oxygen poisoning is prevented by

[AIPMT 2015]

- (1) carotene (2) cytochrome
(3) leghaemoglobin (4) xanthophyll.

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Q.8 The first stable product of fixation of atmospheric nitrogen in leguminous plants is

[NEET 2013]

- (1) NO_3^- (2) glutamate
(3) NO_2^- (4) ammonia.

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Q.9 Which two distinct microbial processes are responsible for the release of fixed nitrogen as dinitrogen gas (N_2) to the atmosphere ?

[NEET 2013 (Karnataka)]

- (1) Anaerobic ammonium oxidation, and denitrification
- (2) Aerobic nitrate oxidation, and nitrite reduction
- (3) Enteric fermentation in cattle, and nitrogen fixation by *Rhizobium* in root nodules of legumes
- (4) Decomposition of organic nitrogen, and conversion of dinitrogen to ammonium compounds

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Q.10 Which two distinct microbial processes are responsible for the release of fixed nitrogen as dinitrogen gas (N_2) to the atmosphere?

[NEET 2013 (Karnataka)]

- (1) Aerobic nitrate oxidation and nitrate reduction
- (2) Decomposition of organic nitrogen and conversion of dinitrogen to ammonium compounds
- (3) Enteric fermentation in cattle and nitrogen fixation by *Rhizobium* in root nodules of legumes
- (4) Anaerobic ammonium oxidation and denitrification

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Q.11 For its action, nitrogenase requires

[AIPMT 2012 (Mains)]

- (1) high input of energy
- (2) light
- (3) Mn^{2+}
- (4) super oxygen radicals

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Q.12 Nitrifying bacteria

[AIPMT 2011 (Prelims)]

- (1) oxidize ammonia to nitrates
- (2) convert free nitrogen to nitrogen compounds
- (3) convert proteins into ammonia
- (4) reduce nitrates to free nitrogen

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Q.13 The function of leghaemoglobin in the root nodules of legumes is

[AIPMT 2011 (Prelims)]

- (1) inhibition of nitrogenase activity
- (2) oxygen removal
- (3) nodule differentiation
- (4) expression of *nif* gene

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Q.14 Leguminous plants are able to fix atmospheric nitrogen through the process of symbiotic nitrogen fixation. Which one of the following statements is not correct during this process of nitrogen fixation?

[AIPMT 2010 (Mains)]

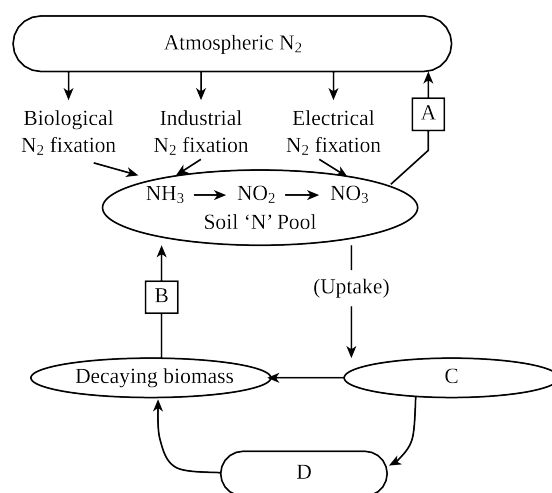
- (1) Leghaemoglobin scavenges oxygen and is pinkish in colour.
- (2) Nodules act as sites for nitrogen fixation.
- (3) The enzyme nitrogenase catalyses the conversion of atmospheric N_2 to NH_3 .
- (4) Nitrogenase is insensitive to oxygen.

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Q.15 Study the cycle shown below and select the option which gives correct words for all the four blanks A, B, C and D.

[AIPMT 2010 (Mains)]



(1)	A	B	C	D
	Nitrification	Ammonification	Animals	Plants
(2)	A	B	C	D
	Denitrification	Ammonification	Plants	Animals
(3)	A	B	C	D
	Nitrification	Denitrification	Animals	Plants
(4)	A	B	C	D
	Denitrification	Nitrification	Plants	Animals

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Q.16 One of the free-living, anaerobic nitrogen-fixer is

[AIPMT 2010 (Prelims)]

- (1) *Beijerinckia*
- (2) *Rhodospirillum*
- (3) *Rhizobium*
- (4) *Azotobacter*

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Q.17 Roots of which plant contain a red pigment which has affinity for oxygen?

[AIPMT 2001]

- (1) Carrot
- (2) Soybean
- (3) Mustard
- (4) Radish

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Q.18 Nitrogen fixation in root nodules of *Alnus* is brought about by: [AIPMT 2008]

- (1) *Bradyrhizobium* (2) *Frankia*
(3) *Clostridium* (4) *Azorhizobium*

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full solution



Q.19 Which of the following is a flowering plant with nodules containing filamentous nitrogen-fixing micro-organism? [AIPMT 2007]

- (1) *Crotalaria juncea* (2) *Cycas revoluta*
(3) *Cicer arietinum* (4) *Casuarina equisetifolia*

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Q.20 All of the following statements concerning the actinomycetous filamentous soil bacterium *Frankia* are correct except that *Frankia* [AIPMT 2005]

- (1) can induce root nodules on many plant species
(2) can fix nitrogen in the free-living state
(3) forms specialized vesicles in which the nitrogenase is protected from oxygen by a chemical barrier involving triterpene hopanoids
(4) like *Rhizobium*, it usually infects its host plant through root hair deformation and stimulates cell proliferation in the host's cortex.

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Q.21 If by radiation all nitrogenase enzymes are inactivated, then there will be no [AIPMT 2004]

- (1) fixation of nitrogen in legumes
(2) fixation of atmospheric nitrogen
(3) conversion from nitrate to nitrite in legumes
(4) conversion from ammonium to nitrate in soil.

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Q.22 Enzyme first used for nitrogen fixation

[AIPMT 2001]

- (1) nitrogenase (2) nitroreductase
(3) transferase (4) transaminase

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ANSWER KEY

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	2	3	3	2	4	2	3	4	1	4	1
Ques.	12	13	14	15	16	17	18	19	20	21	22
Ans.	1	2	4	2	2	2	2	4	2	1	1