

NEET BIOMOLECULES (BIOLOGY) — ENZYMES: PROPERTIES, MECHANISM OF ACTION AND FACTORS AFFECTING ACTIVITY — PYQS

Max. Marks: 76

Questions: 19

Section A (MCQ) — 19 questions

Q.1 Inhibition of Succinic dehydrogenase enzyme by malonate is a classical example of:

[NEET (UG) 2024]

- (1) Cofactor inhibition
- (2) Feedback inhibition
- (3) Competitive inhibition
- (4) Enzyme activation

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Q.2 Regarding catalytic cycle of an enzyme action, select the correct sequential steps :

- A. Substrate enzyme complex formation.
- B. Free enzyme ready to bind with another substrate.
- C. Release of products.
- D. Chemical bonds of the substrate broken.
- E. Substrate binding to active site.

Choose the correct answer from the options given below :

[NEET (UG) 2024]

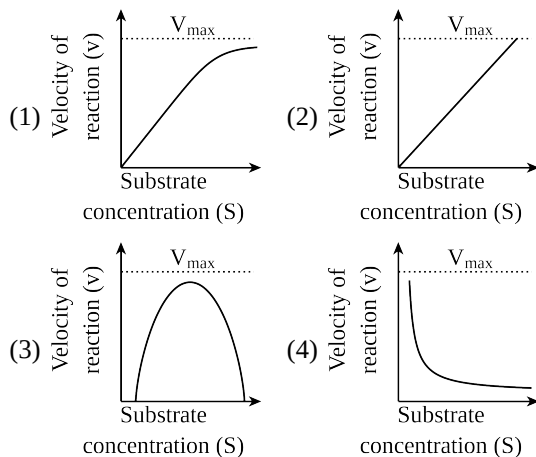
- | | |
|-------------------|-------------------|
| (1) E, A, D, C, B | (2) A, E, B, D, C |
| (3) B, A, C, D, E | (4) E, D, C, B, A |

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Q.3 Which of the following graphs depicts the effect of substrate concentration on velocity of enzyme catalysed reaction?

[RE-NEET (UG) 2024]



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Q.4 Malonate inhibits the growth of pathogenic bacteria by inhibiting the activity of [NEET (UG) 2023]

- (1) Amylase
- (2) Lipase
- (3) Dinitrogenase
- (4) Succinic dehydrogenase

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Q.5 Given below are two statements:

Statement-I: Low temperature preserves the enzyme in a temporarily inactive state whereas high temperature destroys enzymatic activity because proteins are denatured by heat.

Statement-II: When the inhibitor closely resembles the substrate in its molecular structure and inhibits the activity of the enzyme, it is known as competitive inhibitor.

In the light of the above statements, choose the correct answer from the options given below:

[NEET (UG) 2023]

- (1) Both Statement-I and Statement-II are false.
- (2) Statement-I is true but Statement-II is false.
- (3) Statement-I is false but Statement-II is true.
- (4) Both Statement-I and Statement-II are true.

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Q.6 A non-proteinaceous enzyme is

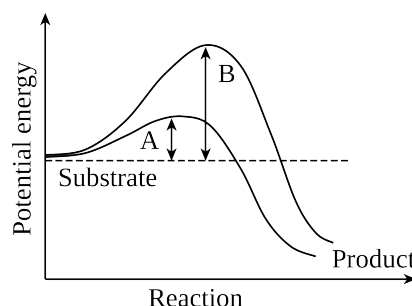
[NEET 2016 (Phase 2)]

- | | |
|--------------|------------------------|
| (1) lysozyme | (2) ribozyme |
| (3) ligase | (4) deoxyribonuclease. |

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Q.7 Which of the following describes the given graph correctly? [NEET 2016 (Phase 2)]



- (1) Endothermic reaction with energy A in presence of enzyme and B in absence of enzyme.
- (2) Exothermic reaction with energy A in presence of enzyme and B in absence of enzyme.
- (3) Endothermic reaction with energy A in absence of enzyme and B in presence of enzyme.
- (4) Exothermic reaction with energy A in absence of enzyme and B in presence of enzyme.

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Q.8 Which one of the following statements is incorrect?

[AIPMT 2015 (Cancelled)]

- (1) The competitive inhibitor does not affect the rate of breakdown of the enzyme-substrate complex.
- (2) The presence of the competitive inhibitor decreases the K_m of the enzyme for the substrate.
- (3) A competitive inhibitor reacts reversibly with the enzyme to form an enzyme-inhibitor complex.
- (4) In competitive inhibition, the inhibitor molecule is not chemically changed by the enzyme.

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Q.9 Select the option which is not correct with respect to enzyme action.

[AIPMT 2014]

- (1) Substrate binds with enzyme at its active site.
- (2) Addition of a lot of succinate does not reverse the inhibition of succinic dehydrogenase by malonate.
- (3) A non-competitive inhibitor binds the enzyme at a site distinct from that which binds the substrate.
- (4) Malonate is a competitive inhibitor of succinic dehydrogenase.

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Q.10 Transition state structure of the substrate formed during an enzymatic reaction is

[NEET 2013]

- (1) transient and unstable
- (2) permanent and stable
- (3) transient but stable
- (4) permanent but unstable.

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Q.11 Which of the following statements about enzymes is wrong?

[NEET 2013 (Karnataka)]

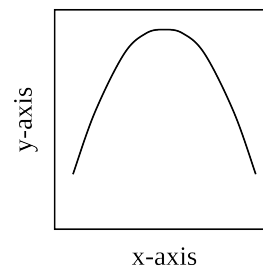
- (1) Enzymes are denatured at high temperatures.
- (2) Enzymes are mostly proteins but some are lipids also.
- (3) Enzymes are highly specific.
- (4) Enzymes require optimum pH and temperature for maximum activity.

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Q.12 The curve given below shows enzymatic activity in relation to three conditions (pH, temperature and substrate concentration). What do the two axes (x and y) represent?

[AIPMT 2011 (Prelims)]



- | (1) | <table border="1" style="display: inline-table;"> <tr> <th style="padding: 2px 5px;">x-axis</th> <th style="padding: 2px 5px;">y-axis</th> </tr> <tr> <td style="padding: 2px 5px;">enzymatic activity</td> <td style="padding: 2px 5px;">pH</td> </tr> </table> | x-axis | y-axis | enzymatic activity | pH |
|-------------------------|---|--------|--------|-------------------------|--------------------|
| x-axis | y-axis | | | | |
| enzymatic activity | pH | | | | |
| (2) | <table border="1" style="display: inline-table;"> <tr> <th style="padding: 2px 5px;">x-axis</th> <th style="padding: 2px 5px;">y-axis</th> </tr> <tr> <td style="padding: 2px 5px;">temperature</td> <td style="padding: 2px 5px;">enzyme activity</td> </tr> </table> | x-axis | y-axis | temperature | enzyme activity |
| x-axis | y-axis | | | | |
| temperature | enzyme activity | | | | |
| (3) | <table border="1" style="display: inline-table;"> <tr> <th style="padding: 2px 5px;">x-axis</th> <th style="padding: 2px 5px;">y-axis</th> </tr> <tr> <td style="padding: 2px 5px;">substrate concentration</td> <td style="padding: 2px 5px;">enzymatic activity</td> </tr> </table> | x-axis | y-axis | substrate concentration | enzymatic activity |
| x-axis | y-axis | | | | |
| substrate concentration | enzymatic activity | | | | |
| (4) | <table border="1" style="display: inline-table;"> <tr> <th style="padding: 2px 5px;">x-axis</th> <th style="padding: 2px 5px;">y-axis</th> </tr> <tr> <td style="padding: 2px 5px;">enzymatic activity</td> <td style="padding: 2px 5px;">temperature</td> </tr> </table> | x-axis | y-axis | enzymatic activity | temperature |
| x-axis | y-axis | | | | |
| enzymatic activity | temperature | | | | |

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Q.13 Three of the following statements about enzymes are correct and one is wrong. Which one is wrong?

[AIPMT 2010 (Mains)]

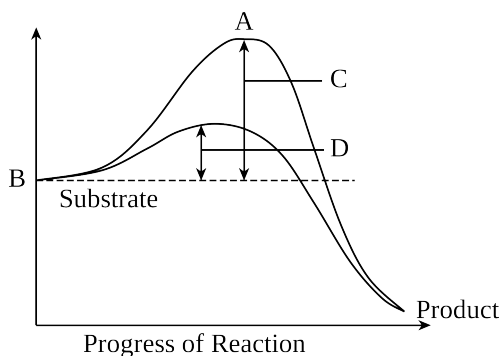
- (1) Enzymes require optimum pH for maximal activity.
- (2) Enzymes are denatured at high temperature but in certain exceptional organisms they are effective even at temperatures 80°–90°C.
- (3) Enzymes are highly specific.
- (4) Most enzymes are proteins but some are lipids.

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Q.14 The figure given below shows the conversion of a substrate into product by an enzyme. In which one of the four options (1 – 4) the components of reaction labelled as A, B, C and D are identified correctly?

[AIPMT 2010 (Mains)]



Q.18 Role of enzyme in reactions is to/as [AIPMT 2000]

- (1) decrease activation energy
- (2) increase activation energy
- (3) inorganic catalyst
- (4) none of the above.

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Q.19 Which factor is responsible for inhibition of enzymatic process during feedback? [AIPMT 2000]

- (1) Substrate
- (2) Enzymes
- (3) End product
- (4) Temperature

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(1)	A Potential energy	B Transition state	C Activation energy	D Activation energy without enzyme
(2)	A Transition state	B Potential energy	C Activation energy without enzyme	D Activation energy with enzyme
(3)	A Potential energy	B Transition state	C Activation energy with enzyme	D Activation energy without enzyme
(4)	A Activation energy with enzyme	B Transition state	C Activation energy without enzyme	D Activation energy with enzyme

ANSWER KEY

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

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Q.15 A competitive inhibitor of succinic dehydrogenase is [AIPMT 2008]

- (1) α -ketoglutarate
- (2) malate
- (3) malonate
- (4) oxaloacetate

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Q.16 The catalytic efficiency of two different enzymes can be compared by the [AIPMT 2005]

- (1) formation of the product
- (2) pH of optimum value
- (3) K_m value
- (4) molecular size of the enzyme.

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Q.17 Which one of the following statements regarding enzyme inhibition is correct? [AIPMT 2005]

- (1) Competitive inhibition is seen when a substrate competes with an enzyme for binding to an inhibitor protein.
- (2) Competitive inhibition is seen when the substrate and the inhibitor compete for the active site on the enzyme.
- (3) Non-competitive inhibition of an enzyme can be overcome by adding large amount of substrate.
- (4) Non-competitive inhibitors often bind to the enzyme irreversibly.

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