

2022 年度 編入学試験 生物 【理工学部 生命科学科】

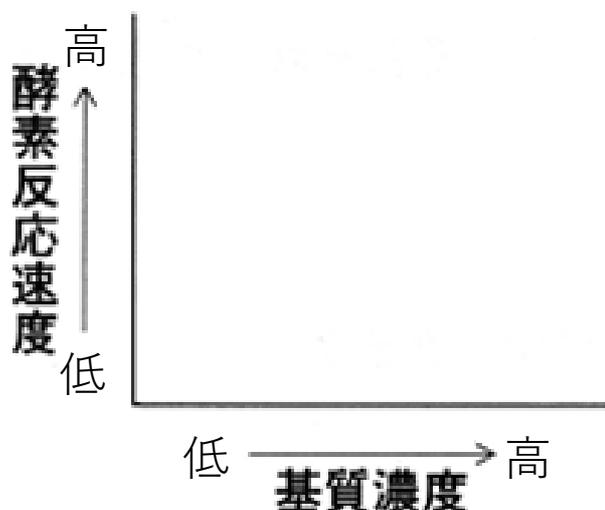
受 験 番 号	氏 名
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問 6 下線部④について、反応を触媒する酵素、および酵素反応に必要な補酵素を記載しなさい。

酵素 () 補酵素 ()

問 7 下線部④について、一定量の酵素に対して基質濃度と酵素の反応速度との関係をあらわす一般的なグラフを完成しなさい。



Ⅱ それぞれの文を読み、問 1～7 に答えなさい。 (29 点)

- (1) アミノ酸は、ひとつの分子内に酸性の (A) 基と塩基性の (B) 基をもつ。
①アミノ酸の水溶液に電極を浸して直流電流を流すと、水溶液の pH に応じてアミノ酸は陽極あるいは陰極に移動する。しかし、特定の pH の水溶液中では、アミノ酸の移動は見られない。このときの pH の値をそのアミノ酸の等電点といい、水に対するアミノ酸の溶解度が最も低くなる。
アミノ酸分子は互いに縮合し、このとき (C) がとれて (D) 結合を形成する。タンパク質は多数のアミノ酸分子が (D) 結合を介して連なった鎖状の高分子化合物であり、分子内や分子間の相互作用によって高次構造を形成する。タンパク質を加熱したり、酸や塩基の溶液に加えると、この高次構造が変化する。これをタンパク質の (E) という。

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問 1 文中の A～E に入る最も適切な語句を記載しなさい。

A () B ()
C () D ()
E ()

問 2 下線部①について、pH7.0 の水溶液中でリシンは陽極、陰極のいずれの方向に移動するか記載しなさい。

移動方向 ()

(2) DNA の遺伝情報とは、すなわち塩基配列である。DNA の二重らせん構造を構成するそれぞれの鎖は、(F) と呼ばれる構造上の単位の繰返しでできている。DNA の (F) は、(G)、リン酸および^②塩基という 3 つの部分で構成されている。

①DNA の塩基配列は、いったん伝令 RNA (mRNA) の塩基配列として読み取られる。mRNA は (F) の単位がいくつもつながり合ってきた 1 本鎖である。ただし mRNA の (F) は、(H)、リン酸および^③塩基という 3 つの部分で構成されている。mRNA は核から (I) に移動すると、^④mRNA の塩基配列がさらにタンパク質のアミノ酸配列として読み取られる。

問 3 文中の F～I に入る最も適切な語句を記載しなさい。
(文中の G と H に入る語句は、どちらも糖の一種である。)

F () G ()
H () I ()

問 4 下線部②と③について、DNA と mRNA の塩基はそれぞれ 4 種類存在する。それらを記載しなさい。

DNA の塩基 () () () ()
mRNA の塩基 () () () ()

問 5 下線部(a)および(b)は、DNA から mRNA を経てタンパク質がつくられる過程の一部であるが、それぞれ何と呼ばれているか。最も適切な語句を記載しなさい。

(a) () (b) ()

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Ⅳ 人体の構造と機能との関係について、現状の知見を基に、興味をもっていることを 200 字程度で説明しなさい。興味ある人体構造を、タイトルとして選定することが好ましい。

(10 点)

興味ある人体構造 ()
