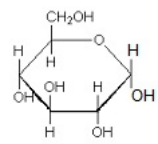


Multiple Choice Answers

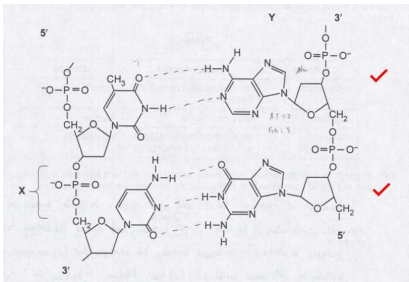
Q22: C
Q23: B
Q24: A
Q25: D

Multiple Choice Answers

Q25: A

3(a)	any three from: different sequence of, (DNA) nucleotides / bases ; R RNA nucleotides code for / result in, different, polypeptides / proteins ; A result in different sequences of amino acids A LCT, codes for / AW, lactase / enzyme, <u>and</u>, MCM6, codes for a different protein / involved in regulation have different numbers of, introns / exons ; different, lengths / number of nucleotides / number of bases ; <i>context is DNA</i> AVP ; e.g. one may be continually expressed, the other switched on and off MCM6 associated with different regulatory sequences
3(b)	statement showing relationship between transcribed strand and primary transcript ; e.g. (transcribed strand is the) DNA (strand) / template (strand), used to form the primary transcript primary transcript is RNA (molecule first) formed from transcription of transcribed strand primary transcript is a complementary copy of the transcribed strand (but uracil replaces thymine) statement showing relationship between primary transcript and mRNA ; e.g. primary transcript undergoes, gene / RNA, splicing, to form mRNA primary transcript undergoes modification to produce mRNA mRNA formed by removal of introns from primary transcript mRNA formed only from exons of primary transcript <i>one mark for a response that has correct ideas but does not show a direct relationship</i>
3(c)	base substitution / substitution (mutation) ; I missense
3(d)	 <i>all correct for one mark – if deciding to leave out the H, then this must be for <u>all</u> C1 to C5 hydrogens – leaving out only the C5 H is zero marks</i>

3(e)(i)	any two from: <i>idea of</i> can, detect increase in / distinguish between, the intensity of colour (as products form) ; can obtain quantitative results (for coloured product of ONPG) ; A can provide numerical, values / readings / results / measurements R if stated that the results are wavelengths <i>ref. to</i> not subjective / AW ; <i>idea of</i> not by-eye judgments / difficulty in describing different colour shades can obtain <u>accurate results / readings / values</u> ; A <i>idea of</i> greater accuracy in obtaining results <i>vague references to accuracy should be considered for ideas linked to 'not subjective'</i> can construct numerical graphs of results to compare curves of each (lactase) concentration ; AW AVP ; e.g. more sensitive to small colour changes at the beginning of the experiment not able to see initial reaction proceeding by eye <i>ref. to</i> use of a (prepared) calibration, curve / graph (to compare rates / product concentrations)
3(e)(ii)	any four from: <i>accept activity for percentage of maximum activity</i> 1 immobilised (overall) greater, productivity / yield / hydrolysis (of lactose in milk) ; I activity 2 (process / immobilised) more tolerant to, temperature / pH, <u>fluctuations / changes</u> ; AW A <i>idea that</i> can be used in <u>processes</u>, covering a wide range of, temperature / pH 3 detail immobilised vs free lactase from Fig. 3.2 ; e.g. (at temperatures) above optimum / higher than 38 / 39 °C, (immobilised) has a higher activity AW above optimum / higher than 38 / 39 °C, (partial / extent of) denaturation (for immobilised) is less at each temperature AW A higher than 40 °C <i>if accompanying context is correct</i> R if optimum stated as 35 °C 4 data from Fig. 3.2 to support ; <i>any one comparison (units only for temperature required)</i> 5 detail immobilised vs free lactase from Fig. 3.3 ; e.g. higher activity at all pHs except pH 6.5 and pH 7.0 higher activity, below pH 6.5 / above pH 7.0 free not active at pH 5.5 but immobilised active, at all pHs / for a wider pH range 6 data From Fig. 3.3 to support ; 7 AVP ; e.g. can use a lower temperature / cheaper, for same quantity of product 8 more, heat stable / thermostable / stable at high temperatures I longer shelf-life R thermostatic better in <u>alkaline</u> pHs

4(a)(i)	repeating , units / sub-units / molecules / nucleotides (used to make a, polymer / polynucleotide / strand (of DNA)) ;
4(a)(ii)	any one from: (pentose / sugar is) ribose (not deoxyribose) ; C2 on the, pentose / sugar, is -OH not -H ;
4(a)(iii)	respiration ;
4(b)(i)	two hydrogen bonds drawn correctly between A and T ; three hydrogen bonds drawn correctly between C and G ; <i>for positioning of H bonds on C-G, A from either H on amine group on C to link with oxygen on G</i>  <i>if no marks gained but A-T has two lines and C-G has three lines between bases award 1 mark</i>
4(b)(ii)	phosphodiester ;

3(a)(i)	<i>if DNA or thymine stated within response, allow <u>only</u> H-bond mark (ecf)</i> any two from: (paired section) contains, complementary nucleotides / complementary bases / base pairs ; adenine-uracil <u>and</u> guanine/cytosine ; A A/U and G/C (paired by) hydrogen / H, bonds ; I strong (bonds) ecf from mp1 R if another bond also named I phosphodiester bonds between, adjacent / AW, nucleotides
3(a)(ii)	any two from: (enzyme / Drosha / Dicer) active site is specific (to site on dsRNA) ; <i>can apply in context of specific shaped active site or active site specific to a particular location</i> detail of different active sites of Drosha and Dicer ; site to be cleaved / AW, (only), fits into / can bind with / is complementary to (the specific) active site forms enzyme-substrate complex at a particular site Drosha and Dicer require different, conditions / cell locations, to function ; AVP ; e.g. <i>suggestion that</i> Dicer too large to enter nucleus Drosha exposed to degradation in cytoplasm

3(b)	any two from: mRNA is single-stranded <u>and</u> siRNA is double-stranded ; A polynucleotide / chain, for strand siRNA has paired and unpaired nucleotides or mRNA has, only unpaired nucleotides / no base pairing ; mRNA codes for a, sequence of amino acids / protein ; ora for siRNA mRNA has a longer sequence of nucleotides ; A mRNA, is longer / has more nucleotides AVP ; e.g. <i>ref. to</i> siRNA antiparallel / mRNA only 5' to 3' mRNA has no H bonds
3(c)(i)	any one from: RISC must, align with / attach to / form H bonds with, (target) mRNA ; (passenger strand needs to be, separated / released) to allow guide strand to, be exposed / bind to mRNA ; AW ora e.g. (otherwise) guide strand cannot bind to mRNA passenger strand prevents guide strand binding guide strand has complementary sequence to target sequence of mRNA ; ora passenger strand does not

3(c)(ii)	<i>allow protein for polypeptide</i> <i>points need the correct context of cleaved mRNA</i> any three from: <i>no protein formed</i> 1 <i>idea that</i> mRNA may be degraded in cell before attaching to ribosome ; 2 mRNA may not (be able to) attach to ribosome so no, polypeptide formed / translation ; 3 cleaved mRNA results in loss of start, sequence / codon ; <i>abnormal polypeptide formed</i> 4 polypeptide chain is not released from ribosome ; A cleaved mRNA results in loss of stop codon 5 polypeptide chain degraded within cytoplasm / AW ; 6 cleaved mRNA results in short(er) (polypeptide) chain being produced ; 7 polypeptide does not, fold up / form correct tertiary structure / form correct 3D shape ; I tertiary structure changes 8,9 AVP ; e.g. (results in) different R-group interactions / change in number of bonds that can form active site / site of activity, changed / lost
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