

Question number	Answer	Marks	Guidance
Application 1 (a)	Non-polar macromolecules containing carbon hydrogen and oxygen – most common form are triglycerides, glycerol with three fatty acids attached.		
1 (b)	The membranes		
1 (c)	Shows up the phospholipid bilayer structure of the membrane.		
2	<i>Fatty acids</i> are long chain carboxylic acids – they all have long chain of carbon atoms with hydrogen atoms attached, with a –COOH group on one end. <i>Monounsaturated fatty acids</i> have a single double bond in the carbon chain. <i>Polyunsaturated fatty acids</i> have several double bonds between carbon atoms. Saturated fatty acids have no double bonds between the carbon atoms of the hydrocarbon chain (daigrams useful in all of these).		
3 (a)	The people eating the Mediterranean diets, whether with extra nuts or extra olive oil, had a significantly reduced risk of dying from a heart attack, stroke or cardiovascular disease over the time of the study. The longer the study continued the stronger the effect – after five years around 6.5% people on low fat diet died, compared to 4.5% on the Mediterranean diets. <i>Any other sensible points</i>		
3 (b)	How many people dropped out, balance of men and women in each study, level of compliance with the diet, is the same effect seen with people who are not recognised as at risk of heart disease, <i>any other sensible suggestions</i>		
3 (c)	Look for evidence of students looking at several different sources, the use of relevant and up-to-date research, and clarity of explanations and writing for the audience.		
Extension 1 (a)	Protein released from the cardiac muscle cells when they are damaged during a heart attack.		

	<p>Proteins are macromolecules made up of long chains of amino acids. They have various levels of structure primary the order of amino acids, secondary the folding of the amino acid chain into helices or pleated sheets (based on hydrogen bonding), tertiary and quaternary structure the 3-D structure of the single helix/sheet or several chains joined (based on hydrogen bonding, ionic bonding, and disulfide bonds). If more of the heart muscle is damaged, the higher the levels of cardiac troponins are in the blood, so they act as indicators of both the occurrence and the severity of a heart attack. Don't appear for several hours after the event.</p>		
1 (b)	<p>Enzyme – protein which catalyses a reaction, in this case between creatine and phosphocreatine, an energy store in the muscle. Enzymes are specific to a reaction or type of reaction because of the shape of the active site in the 3-D structure of the protein. Creatine kinase is released by damaged muscles e.g., in a heart attack but also severe bruising and other conditions so it is not a specific marker for heart attack but it can be indicative with other symptoms.</p>		
1 (c)	<p>Myoglobin is a conjugated protein – a protein attached to a non-protein prosthetic group, in the case of myoglobin this is iron. Molecule with a high affinity for oxygen found in muscle tissue. Released rapidly from the damaged heart muscle after a heart attack – useful for early diagnosis.</p>		
1 (d)	<p>Peptides are chains of amino acids. There is a peptide hormone produced by the heart muscle that reduces blood volume and so the blood pressure. Studies suggest that raised levels of these peptides suggest a poor outcome for a patient with a heart attack.</p>		
2	<p>Should have section showing biochemistry of carbohydrates and importance as energy supply</p> <p>Similar section on poster for lipids</p> <p>Cytology of adipose tissue and fat cells, adaptations, numbers</p> <p>Any other interesting material included should be credited – for example discussion of</p>		

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	amounts of food needed and exercise  Clear links to biochemistry and cell biology required.		
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