Name of the Student:_____
Max. Marks : 26 Marks **Time : 26 Minutes**

Q1.

(a) The action of endopeptidases and exopeptidases can increase the rate of protein digestion. Describe how.

_____

_____

_____

_____

_____

_____

(2)

(b) As humans age, there is a decrease in body protein.

Give the name of **one** body protein that could have resulted in:

reduced muscle power _____

reduced immunity _____

(2)

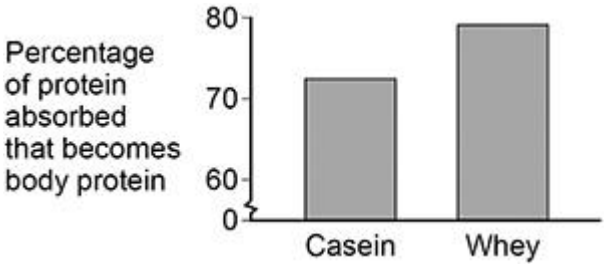
Scientists investigated the effect of two types of dietary protein on the ability of old men to produce body proteins.

The table below shows information about the two types of dietary protein investigated.

Physiological factor	**Name of dietary protein**	
	Casein	**Whey**
Rate of absorption of dietary protein / mmol dm^{-3} amino acids in blood plasma h^{-1}	3.05	4.33
Stimulation of protein synthesis	Higher rate	Lower rate
Breakdown of body proteins	No effect	Inhibitory effect

Downloaded from www.merit-minds.com

The figure below shows the percentage of protein absorbed that becomes body protein in old men following a meal of casein or whey.



A statistical test confirmed that the difference between the results shown in the figure above was significant.

(c) Suggest which type of dietary protein would be better for old men to eat to cause a **net** gain of body proteins. Use the information provided to explain your answer.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

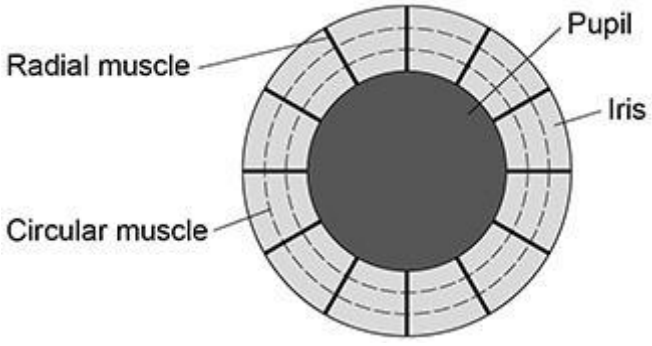
(3)

(Total 7 marks)

Q2.

The iris in the human eye is a muscular structure. The iris changes the size of the pupil.

The diagram below shows the muscles in the iris.



Downloaded from www.merit-minds.com

(a) Suggest and explain how the interaction between the muscles labelled in the diagram above could cause the pupil to constrict (narrow).

(2)

(b) The fovea of the eye of an eagle has a high density of cones. An eagle focuses the image of its prey onto the fovea.

Explain how the fovea enables an eagle to see its prey in detail.

Do **not** refer to colour vision in your answer.

(3)

(c) The retina of the human eye has an area of approximately 1.094×10^3 mm^2

The circular fovea in a human eye has a diameter of $3 \times 10^3 \mu m$

Calculate the area of the fovea as a percentage of the area of the retina.

The area of a circle is πr^2. Use $\pi = 3.14$ in your calculation.

Show your working.

Downloaded from www.merit-minds.com

Answer _____ %

(2)

(d) The retina of an owl has a high density of rod cells.

Explain how this enables an owl to hunt its prey at night.

Do **not** refer to rhodopsin in your answer.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

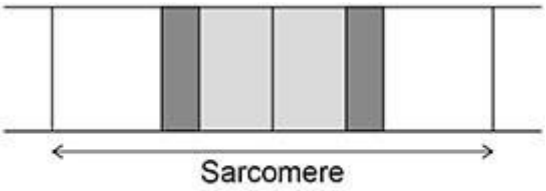
_____

(3)

(Total 10 marks)

Q3.

The diagram below shows the banding pattern of a single sarcomere.



(a) Explain the banding pattern shown in the diagram above.

_____

_____

_____

_____

_____

Downloaded from www.merit-minds.com

(3)

Creatinine is produced in muscle tissues. Creatinine diffuses into the blood. The kidneys then excrete creatinine.

A calibration curve can be used to determine the concentration of creatinine in urine. One method of producing a calibration curve needs:

- creatinine solution of known concentration
- distilled water
- creatinine-detecting solution
- a colorimeter.

Creatinine-detecting solution reacts with creatinine to produce an orange colour.

(b) Use the information provided to describe how you could produce a calibration curve for creatinine.

Do **not** include details on the use of glassware in your answer.

(4)

(c) Describe how you would determine the concentration of creatinine in a urine sample using your calibration curve.

Downloaded from www.merit-minds.com

_____

_____

_____

_____

_____

(2)

(Total 9 marks)

Downloaded from www.merit-minds.com