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1. Using too much fertiliser can cause environmental damage.

(a) (i) Describe what effect the fertiliser has on tiny organisms called algae in rivers.

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(1)

(ii) Suggest why this effect causes some plants in rivers to die.

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(1)

(b) When plants and algae die they sink to the bottom of the rivers.
Explain why this results in the removal of oxygen from the water.

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(2)

(c) Name this effect that fertilisers have on rivers.

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(1)

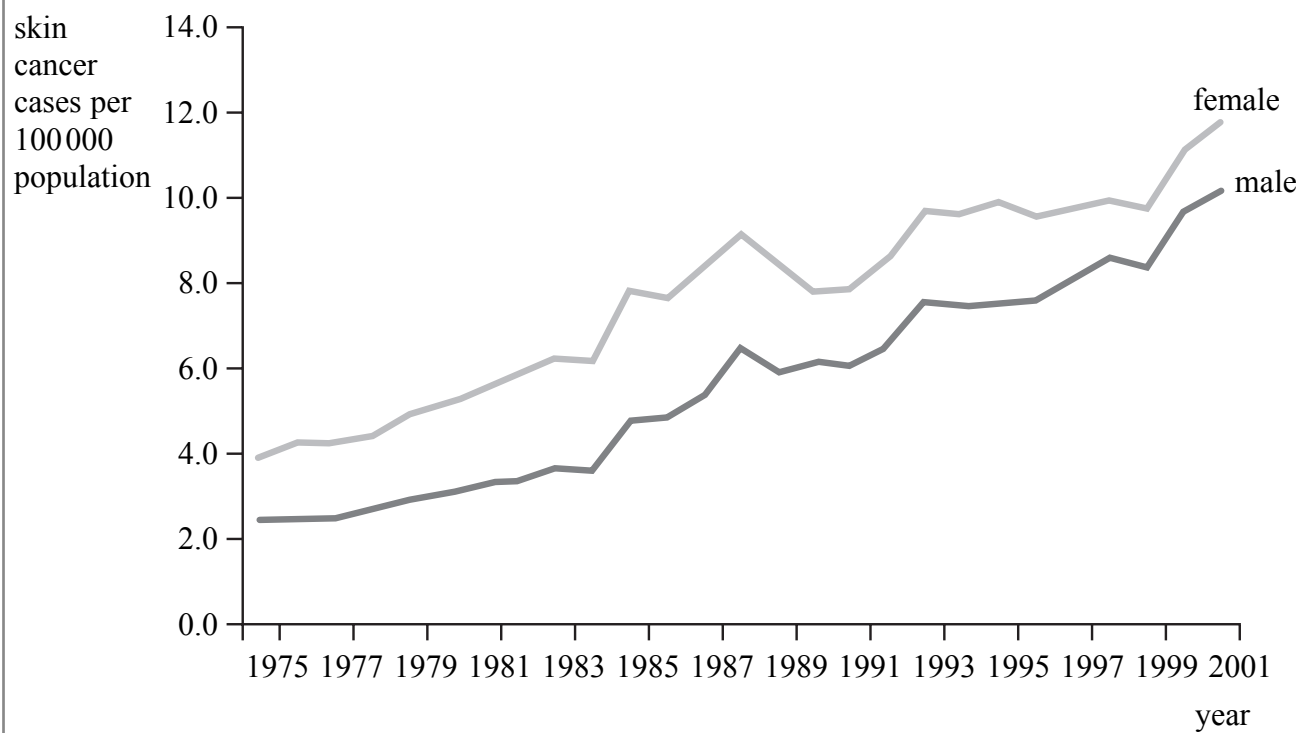
Q1

(Total 5 marks)



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2. The graph shows changes in the number of cases of skin cancer in males and females from 1975 to 2001.



(a) Describe the changes in the pattern shown in the number of cases of skin cancer from 1975 to 2001.

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(2)

(b) Skin cancer is a living indicator of the impact of human activity on the environment. Explain what is meant by a **living indicator**.

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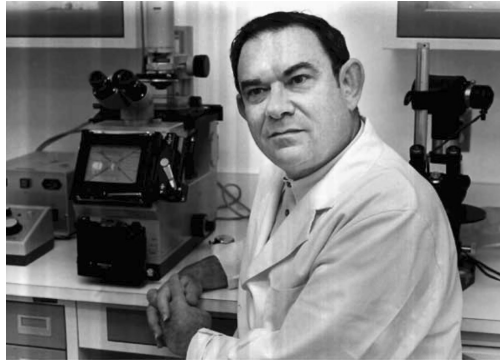
(2)

(Total 4 marks)

Q2



3. Leonard Hayflick researched human cell division. One part of his research is now called the Hayflick limit.



Source: www.nature.com

Leonard Hayflick at work

(a) Describe what happens to a normal human cell when it reaches the Hayflick limit.

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(1)

(b) Cancer cells and stem cells do not have a Hayflick limit.

(i) Explain why this makes cancer cells so dangerous.

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(2)

(ii) Stem cells can be taken from embryos that are a few days old.
Suggest **two** reasons why some scientists think that these cells could be very useful to humans.

1
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2
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(2)

(c) Suggest **one** reason why some people are worried about using embryos for stem cell research.

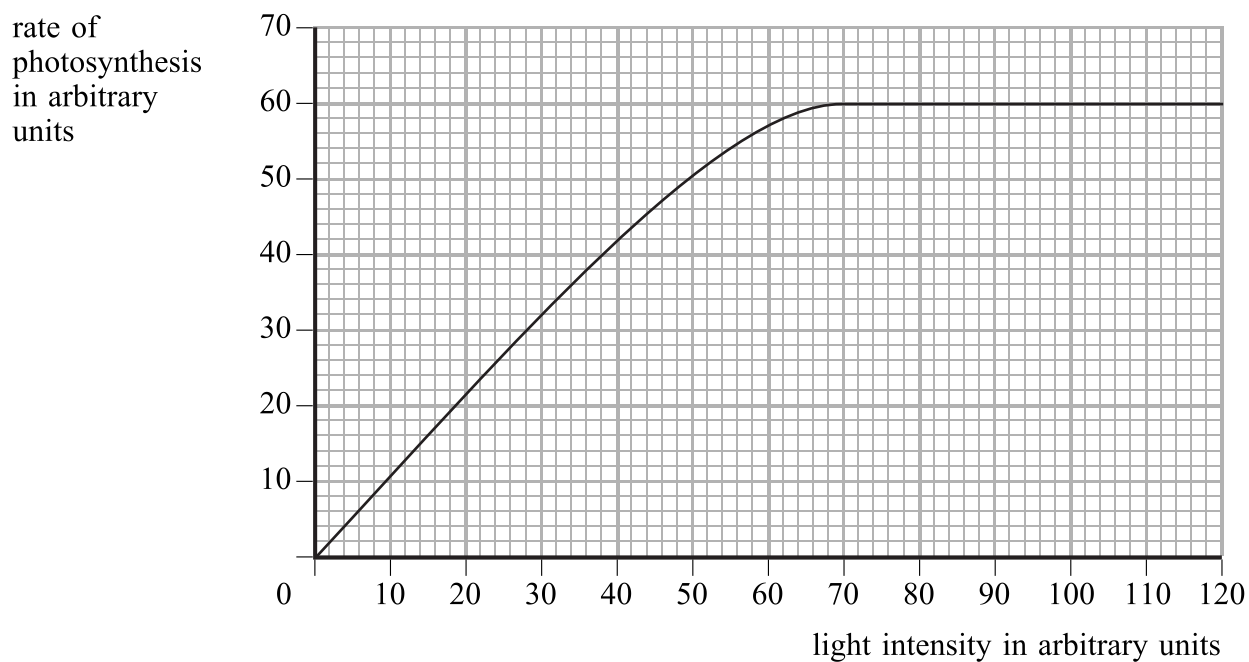
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(1)

(Total 6 marks)

Q3



4. A farmer thinks he can increase the yield of tomatoes by increasing the light intensity in his greenhouses.
The graph shows the effect of increasing light intensity on the rate of photosynthesis.



- (a) Using information from the graph, describe the effect of increasing light intensity on the rate of photosynthesis.

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(2)

- (b) An advisor suggests to the farmer that another limiting factor could be preventing further increases in photosynthesis.
Name one limiting factor and describe how its effect could be reduced.

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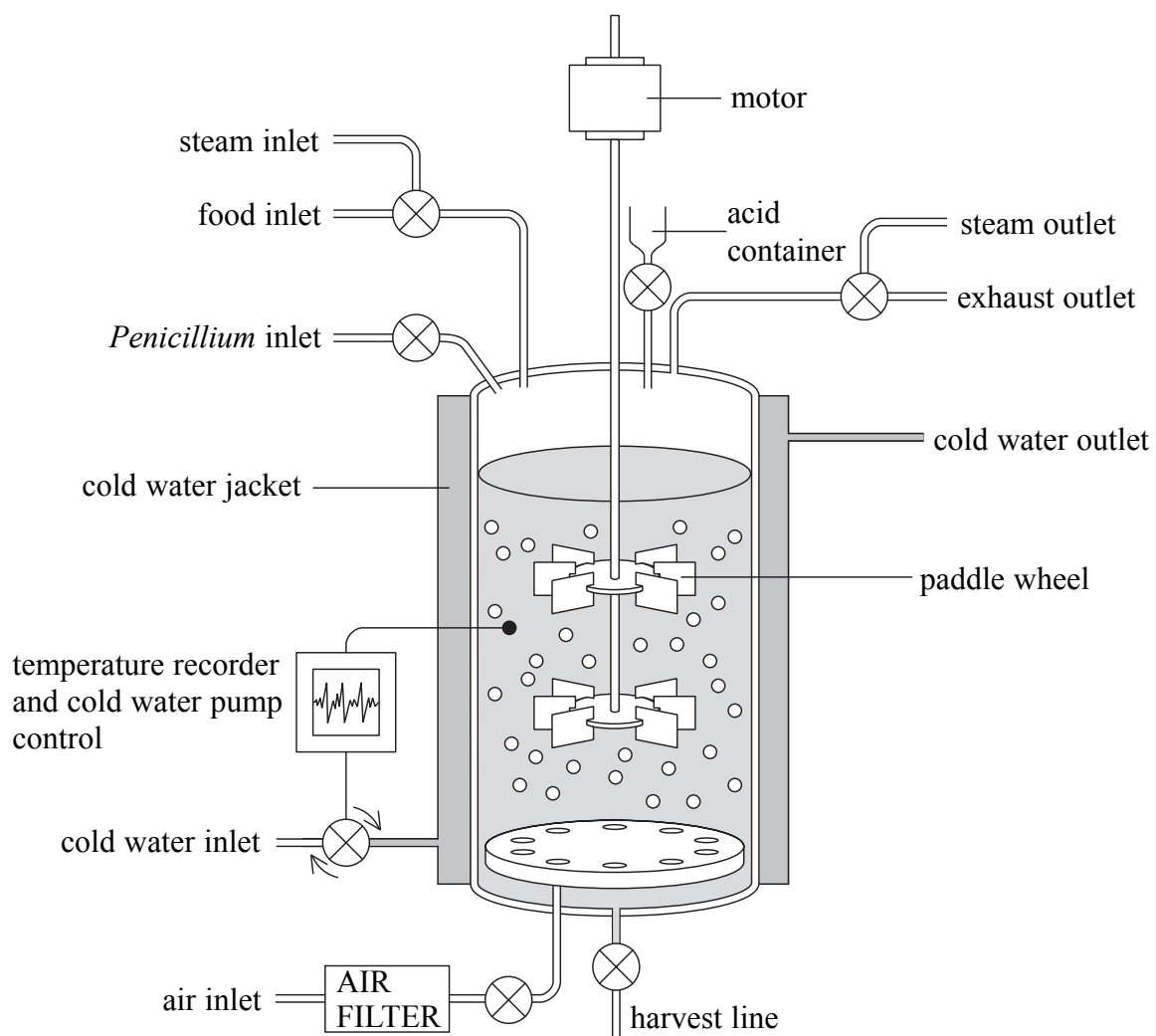
(2)

Q4

(Total 4 marks)



5. Penicillin is an antibiotic that is needed in large quantities. To make penicillin, the fungus *Penicillium* is grown in a fermenter. The antibiotic can then be extracted. The diagram shows a fermenter.



(a) (i) Describe how the temperature in the fermenter is kept at a constant 30°C.

..... (1)

(ii) Explain why the pH inside the fermenter is kept at 6.5.

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..... (2)



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(b) The conditions inside the fermenter must be aseptic.

(i) State what is meant by **aseptic** conditions.

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(2)

(ii) Explain how aseptic conditions are maintained in the fermenter.

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(2)

(Total 7 marks)

Q5

6. Athletes can get cramp during exercise.

Explain why the body needs extra oxygen to recover from cramp.

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(Total 4 marks)

Q6

TOTAL FOR PAPER: 30 MARKS

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