

Name	Subject Class	Class	Candidate Number
	2BIX01		



ANGLO-CHINESE JUNIOR COLLEGE
Preliminary Examination 2016

BIOLOGY

HIGHER 1

Paper 2

8875/02
22 AUGUST 2016
2 hours

Additional Material: Writing Paper

READ THESE INSTRUCTIONS FIRST

Write your name, index number and class on this answer booklet.
Write in dark blue or black pen.
You may use a soft pencil for any diagrams, graphs or rough working.

Section A

Answer **all** questions.

Section B

Answer any **one** question.

At the end of the examination, circle the number of the Section B question you have answered in the grid opposite.
Fasten all your work securely together.

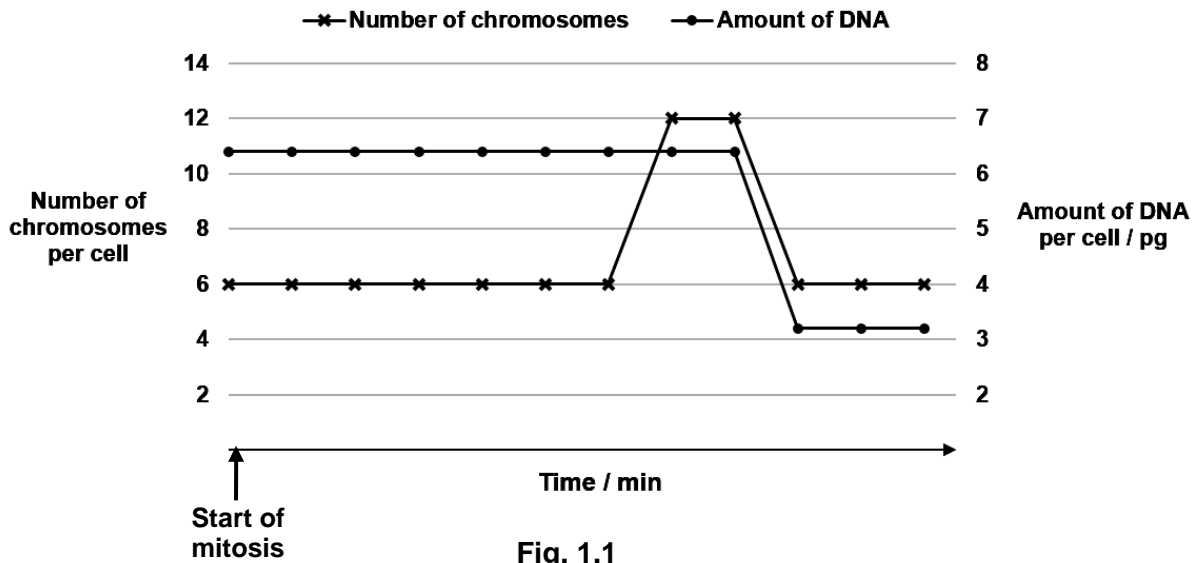
The number of marks is given in brackets [] at the end of each question or part question.

For Examiner's Use	
Section A	
1	
2	
3	
Section B	
4 or 5	
Total	60

This question paper consists of 9 printed pages.

[Turn over

- 1 The mitotic cell cycle in the somatic cells of a diploid organism can be followed by measuring the number of chromosomes as well as the amount of DNA material per cell over a period of time. Fig. 1.1 shows the results of the analyses, beginning with the start of mitosis.



- (a) (i) Indicate, using an arrow in Fig. 1.1, the point where anaphase begins. [1]

- (ii) Explain your answer provided in (a)(i).

[3]

- (iii) Explain how the results of the analyses might be different if a cell undergoing the meiotic cell cycle is measured instead.

[3]

Fig 1.2 shows the karyotype of a different diploid organism, where the chromosomes are arranged in matching pairs.

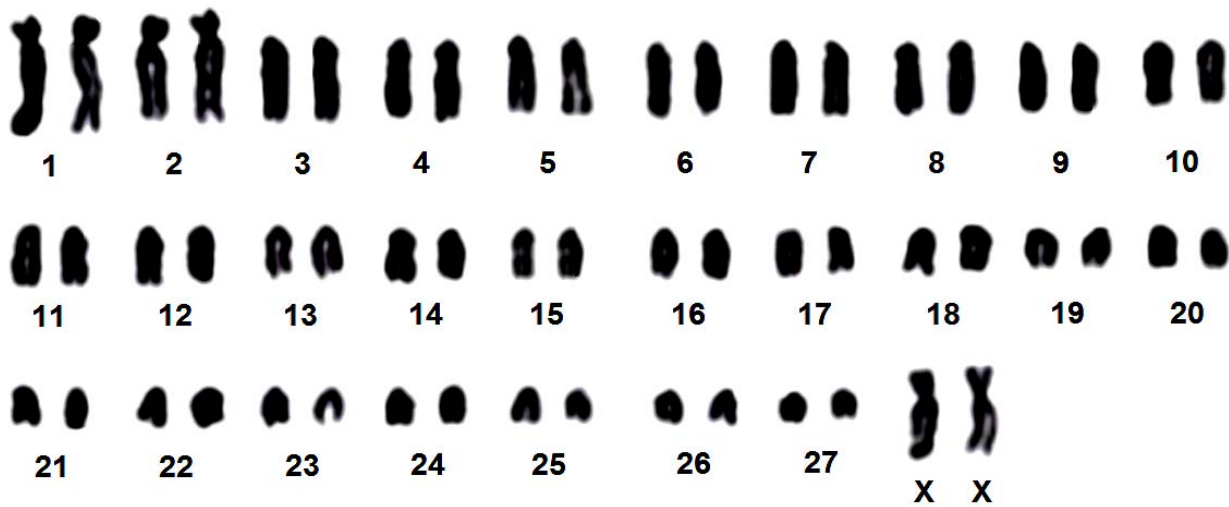


Fig. 1.2

(b) (i) Describe how the appearance of DNA in early interphase will differ from those in Fig. 1.2.

[2]

(ii) Outline the processes that will account for these differences described in (b)(i).

[4]

[Total: 13m]

- 2 Fig. 2.1 shows an electron micrograph of a chloroplast in a plant cell.

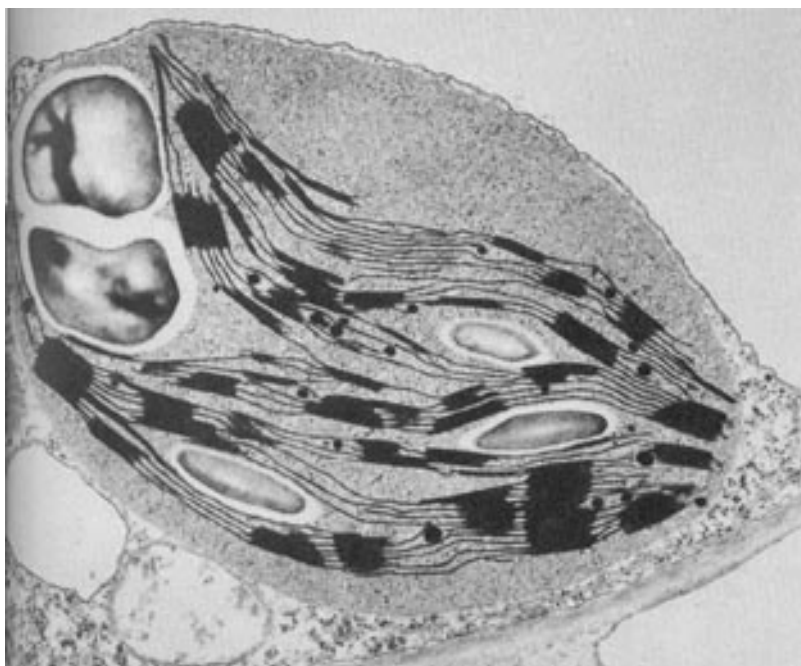


Fig. 2.1

- (a) (i)** Indicate clearly on Fig. 2.1 where photophosphorylation occurs. [1]

- (ii)** Describe one way on which the structure indicated in (a)(i) is adapted for photophosphorylation.

[2]

Fig. 2.2 shows how a seed undergoes germination to form a seedling.



Fig. 2.2

- (b)(i)** In some pea plants, the respiratory quotient (RQ) has been found to be around three to four at the start of germination. Suggest a reason to explain the high RQ obtained at the early stages of germination.

[3]

- (ii)** Following root growth, leaves will develop and this is necessary for the seedling to harvest energy from the sun. Light intensity plays a role in determining the rate of photosynthesis. Explain the effect of light on the rate of photosynthesis at low light intensity.

[4]

- (iii) Both the Calvin and Krebs cycles occur in a plant simultaneously. Contrast the two processes.

[3]

[Total: 13m]

- 3 (a) Fig. 3.1 below shows a plasmid and the features found on it. *Nde* I is the position of the restriction site on the plasmid.

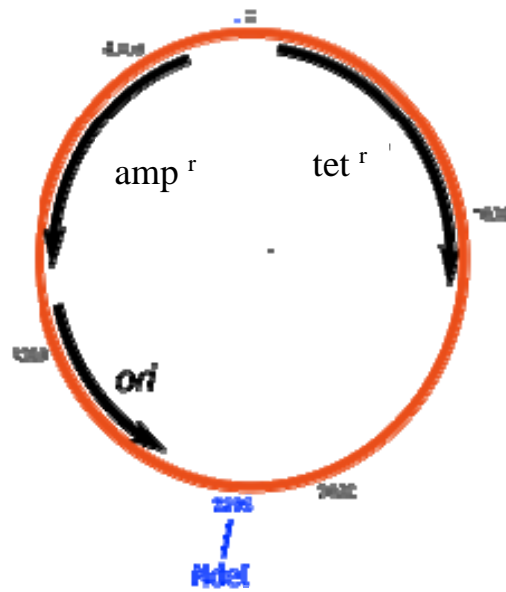


Fig. 3.1

- (i) Explain the natural function of restriction enzymes.

[2]

- (ii) With reference to Fig. 3.1 explain if this plasmid can be used as a vector to clone genes of interest in bacteria.

[4]

- (iii) Explain the limitation in the use of this plasmid for the purpose of gene cloning in bacteria.

[4]

- (b) Explain the goals of genetic modification of organism.

[1]

- (c) The GM Atlantic salmon is modified to carry a growth hormone gene from the Pacific Chinook salmon with an active promoter from the Oceanic Pout. The result is an active growing GM Atlantic salmon all year round, greatly reducing the time it takes for the salmon to reach market size. The GM Atlantic salmon is made sterile so that it cannot interbreed with other fish in the wild.

Suggest reasons why the genetically modified salmon is prevented from interbreeding with other fishes in the wild?

[3]

[Total: 14m]

Section BAnswer **EITHER 9 OR 10**.

Write your answers in the lined pages provided.

Your answers should be illustrated by large, clearly labelled diagrams, where appropriate.

Your answers must be in continuous prose, where appropriate.

Your answers must be set out in sections **(a)**, **(b)** etc., as indicated in the question.

EITHER

- 9** (a) Using the induced-fit hypothesis, explain the mode of action of enzymes. [6]
- (b) With reference to haemoglobin, explain the significance of bonds in maintaining the protein's structure and function. [8]
- (c) Compare competitive and non-competitive inhibition of enzyme action. [6]

[Total: 20m]

OR

- 10** (a) Describe the fluid mosaic model of membrane structure and how this model explains the movement of substances across the cells. [6]
- (b) Outline the roles of lipids in membranes. [8]
- (c) Describe the functions of membranes in cells. . [6]

[Total: 20m]