

# INTERNATIONAL BACCALAUREATE

BIOLOGY

Higher Level

Wednesday 8 May 1991 (afternoon)

Cand. ref. no.				

Paper 2

1 hour

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## INSTRUCTIONS

*This paper contains TWO questions and you should attempt them both. Write your answers in the spaces provided in this question book.*

**QUESTION 1**

Physiological methods are used to enable us to measure the rate of production of urine in the kidneys of human beings. The rate is measured for one subject, under different conditions. The results are shown in the table below, expressed in millilitres of urine formed per hour. Time 0 indicates the time where the subject drinks a litre of water. Negative times are those before drinking the water and positive times those after drinking the water.

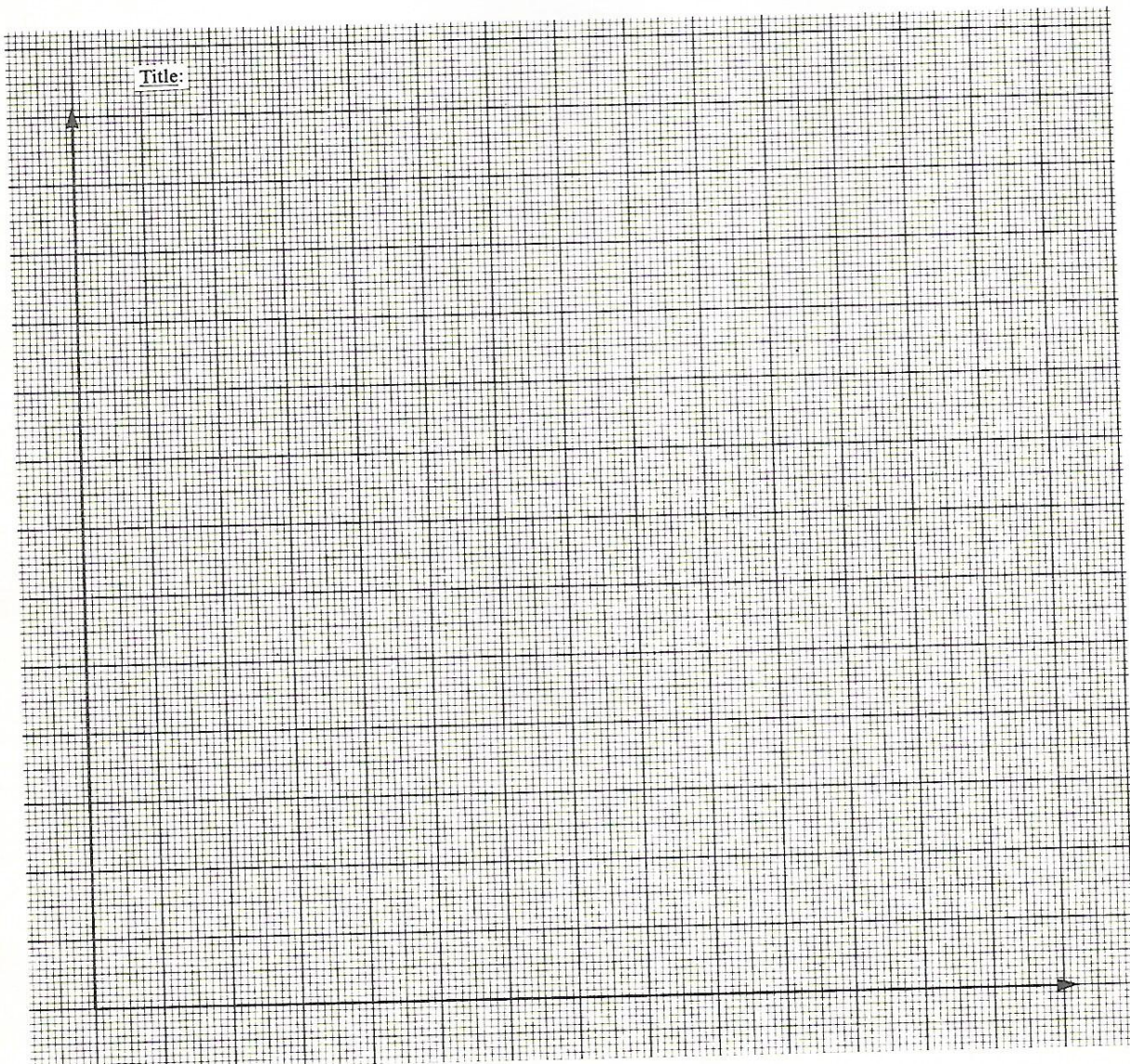
Urine	Time in minutes									
	-60	-30	0	+30	+45	+60	+75	+90	+120	+180
ml hr <sup>-1</sup>	45	50	45	45	200	300	450	350	150	45

(a) Draw a graph of the results on the graph paper below.

[2 marks]

Label your axes and complete the title.

[1 mark]



(b) Describe the effect of taking a drink on the speed of production of urine after 15, 100 and 180 minutes. [3 marks]

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The table below shows the total amounts of the different urine constituents in the glomerular filtrate (I) and in urine from the bladder (II), produced in 24 hours.

Constituents	I	II	III	IV
Water	170 dm <sup>3</sup>	1.5 dm <sup>3</sup>		
Glucose	170 g	0 g		
Urea	51 g	30 g		
Mineral salts	1489 g	20 g		

(c) Complete column III of the table, showing the amounts reabsorbed by the kidney tubules in 24 hours, for each of the four constituents. [1 mark]

Complete column IV of the table, showing the percentages reabsorbed by the kidney tubules, for each of the four constituents. [1 mark]

(d) The work of the tubules needs lots of chemical energy. What is this energy? [1 mark]

Which organelles make it? [1 mark]

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QUESTION 2

The two chromosome diagrams shown below come from the same Angiosperm, the Royal Lily (*Lilium regale*). Diagram A comes from the tip of the root and Diagram B comes from an anther.

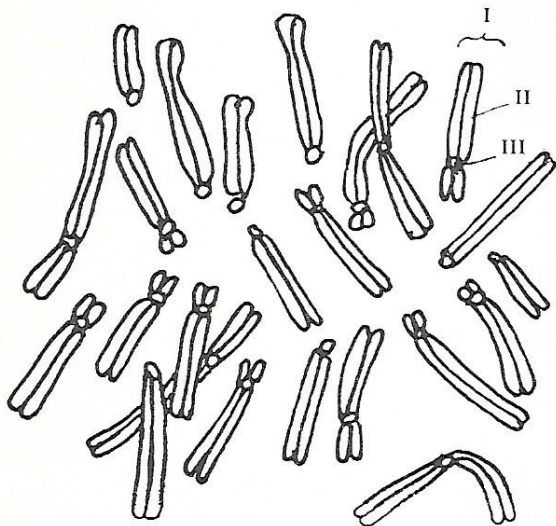


Diagram A

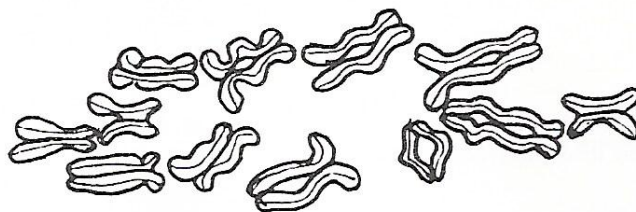


Diagram B

(a) What type of cell division is illustrated by

diagram A? .....

[1 mark]

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diagram B? .....

[1 mark]

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(b) What stage of cell division is shown in

diagram A? .....

[1 mark]

.....

diagram B? .....

[1 mark]

.....

(c) Is cell A diploid or haploid? .....

[1 mark]

.....

Is cell B diploid or haploid? .....

[1 mark]

.....

(d) How many types of chromosomes are there in the *Lilium regale* species?

[1 mark]

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(e) Name the structures labelled I, II and III on diagram A.

I.....

[1 mark]

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II.....

[1 mark]

.....

III.....

[1 mark]

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