

# My Question Paper

Question	Maximum Mark	Mark Awarded
1	7	
2	10	
3	9	
4	6	
5	10	
6	6	
7	8	
<b>Total Mark</b>		

1. (a) Complete the table to show whether each role applies to mitosis, meiosis or both. If the role applies put a tick (✓) and a cross (✗) where it does not apply.

<i>Role</i>	<i>Mitosis</i>	<i>Meiosis</i>
Involved in growth		
Produces variation		
Produces haploid cells		
Occurs in plants		

[4]

- (b) In the space below draw a labelled diagram to show a single chromosome as it appears during prophase of mitosis. [2]

- (c) Describe and explain what happens to chromosomes during anaphase of mitosis. [3]

.....

.....

.....

.....

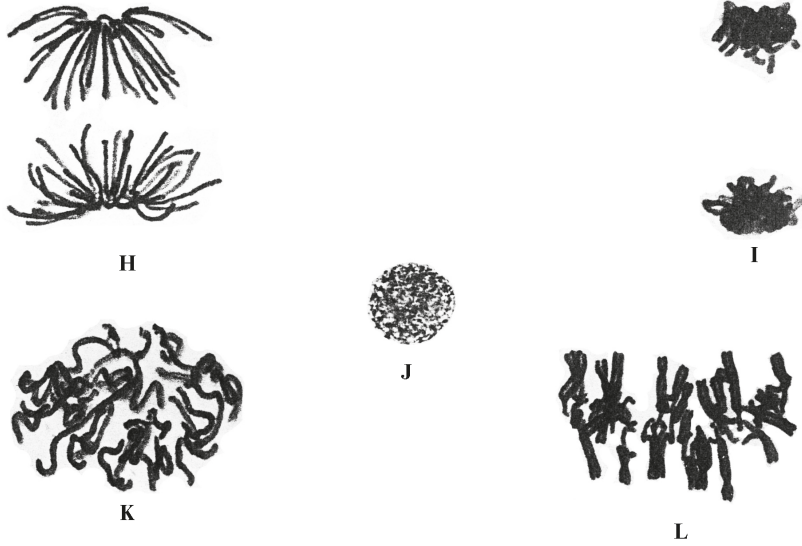
- (d) Name the cell organelle responsible for the production of the spindle fibres. [1]

.....

**(Total 10 marks)**

2.

The photographs show chromosomes during the stages of mitosis.



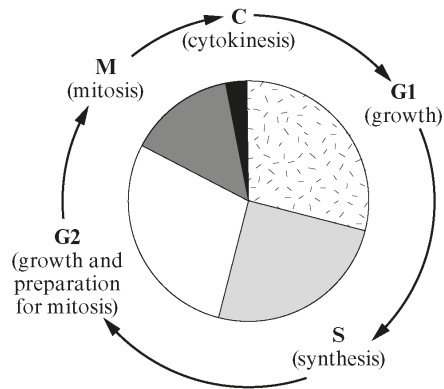
(a) (i) Place the stages into the correct sequence. The first box has been completed. [1]

(ii) Name stages: [2]

I .....

L .....

(b) The diagram represents the events that take place during the cell cycle.



The table below shows the DNA content of a cell measured during one cell cycle.

<i>Stage</i>	<i>DNA content of cell/arbitrary units</i>
G1	20
S	20 increasing to 40
G2	40
M	40
C	40 decreasing to 20

(i) State the name of the period in the cell cycle that includes stages G1, S and G2.[1]

.....

.....

(ii) State **two** events that occur during this period. [2]

.....

.....

(c) Using information provided in the diagram and the table, explain why it is important that the DNA content of the cell increases during stage S and decreases during stage C. [2]

.....

.....

.....

(d) Explain how mitosis maintains genetic stability. [2]

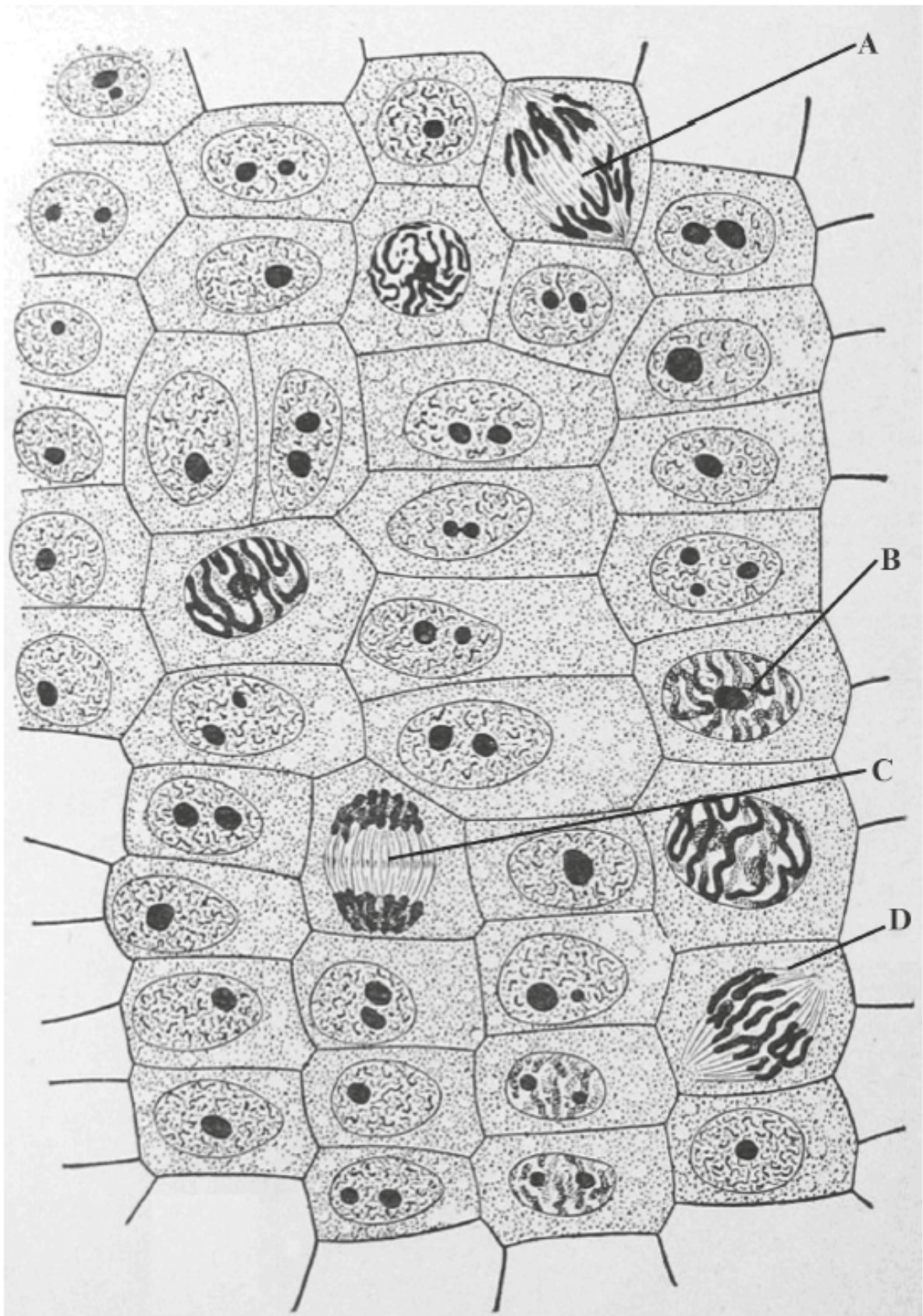
.....

.....

.....

**(Total 10 marks)**

**3.** The drawing below is taken from plant tissue which shows cells undergoing mitosis.



(a) What plant tissue could be observed to produce this drawing?

.....  
(b) Identify from the diagram opposite the stages of mitosis labelled **A** to **D**.

**A**

.....

**B**

.....

**C**

.....

**D**

.....

(c) One stage of the **cell cycle** shown on the diagram is present in greater numbers than the others. Name this stage and explain this observation.

[2]

Stage:

.....

Explanation:

.....

.....

(d) How would cells produced by meiosis differ from those produced by mitosis?

[2]

.....

.....

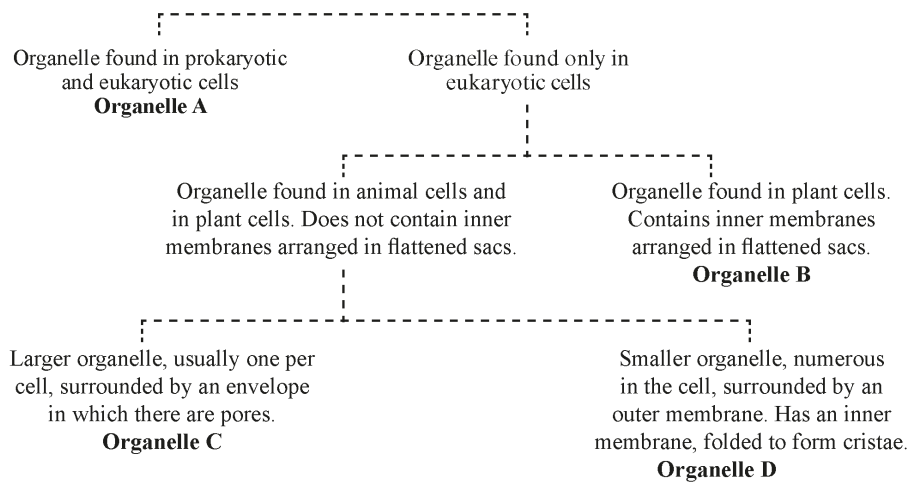
.....

.....

Total

[9]

4. The diagram shows how some organelles may be distinguished from each other.



(a) (i) Name organelle **D**. [1]

.....

(ii) Describe the function of organelle **D**. [2]

.....  
.....  
.....

(iii) Name a cell that contains **large** numbers of organelle **D**. [1]

.....

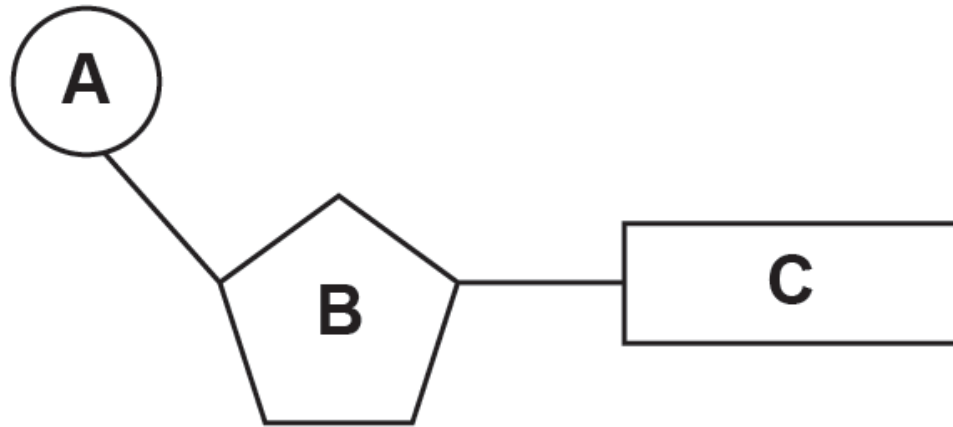
(b) Which of the organelles **A**, **B**, **C** or **D** is a ribosome? [1]

.....

(c) What is the function of the pores in organelle **C**? [1]

.....  
.....

5. The diagram below shows a component of **DNA**.



Name the parts **A**, **B** and **C**.

[3]

**A** .....

**B** .....

**C** .....

(b) Describe how a polymer of DNA would be different from a polymer of RNA.

[2]

.....  
.....  
.....  
.....  
.....

(c) (i) Name the stage in the cell cycle where DNA replication occurs.

[1]

.....

(i)



(ii) Vincristine is a drug which prevents the spindle fibres from shortening. Name the stage in the cell cycle which would be affected.

[1]

.....  
.....

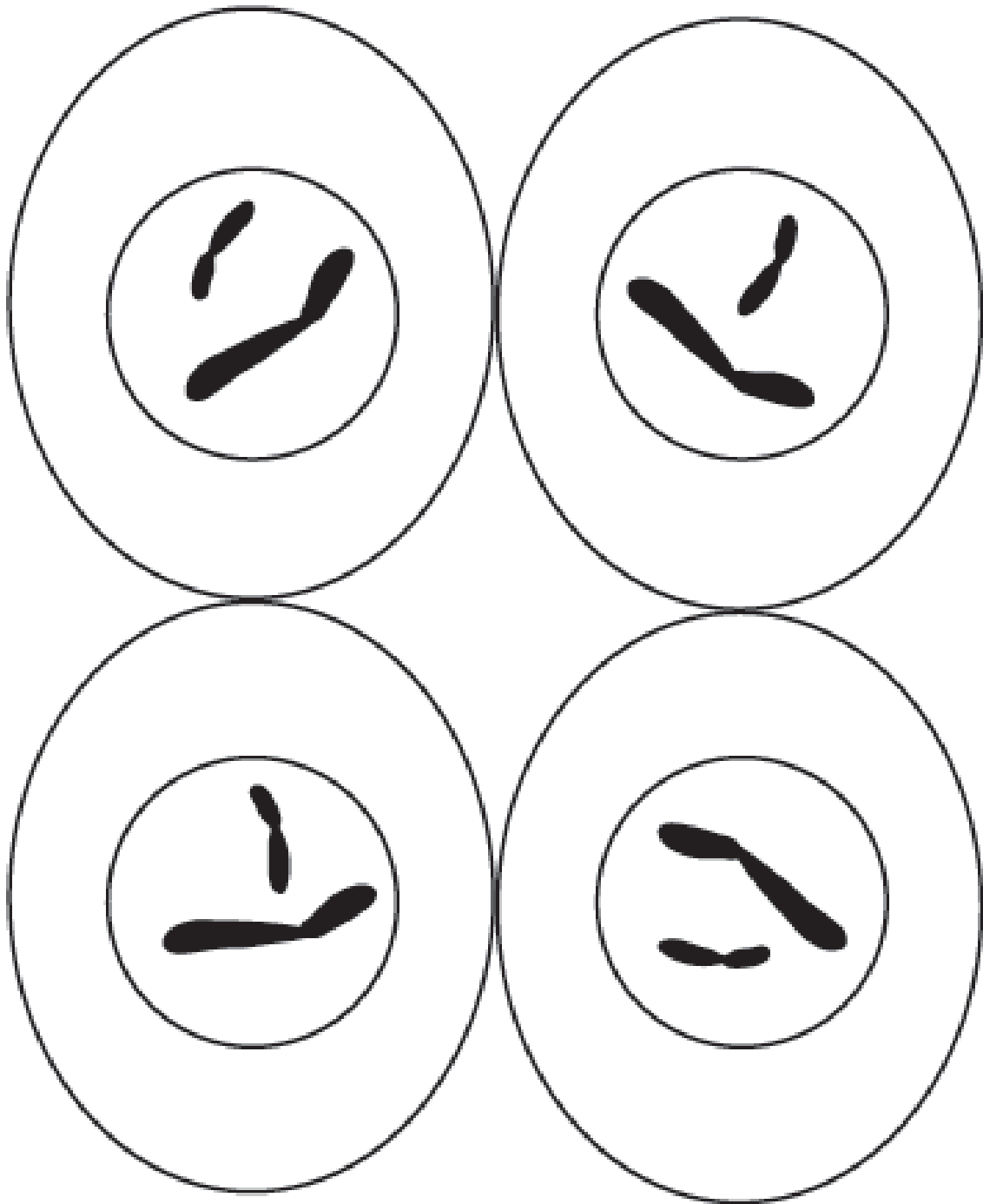
(iii) State **three** differences between daughter cells produced by the process of mitosis and those produced by meiosis.

[3]

.....  
.....  
.....  
.....  
.....  
.....

6. The diagrams below show the different stages of the cell cycle in a body cell from an animal





(b) (i) Using the diagrams above, describe and explain one difference between these cells and those produced in part (a) opposite.

[2]

.....

.....

.....

.....

(ii) Explain the importance of this type of cell division in the animal.

[2]

.....

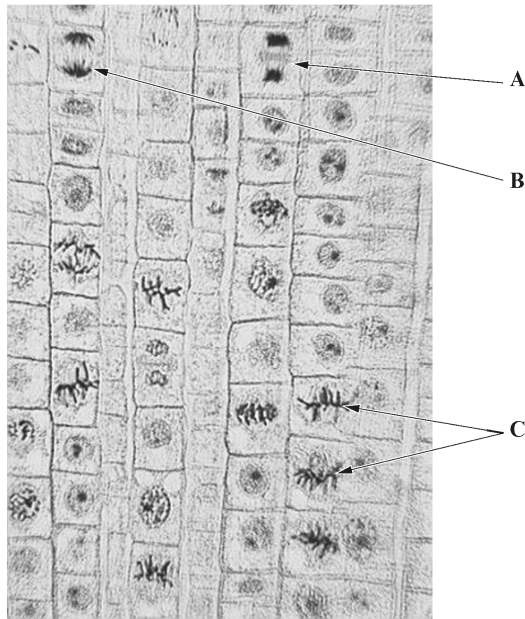
.....

.....

.....

**7.**

The photograph below shows a preparation of garlic (*Allium sativum*) root tip undergoing cell division – the stages of the cell cycle are clearly visible.



(a) (i) Name the stages shown in the diagram labelled **A** and **C**. [2]

Stage **A** .....

Stage **C** .....

(ii) Describe and explain the events occurring during the stage labelled **B**. [2]

.....

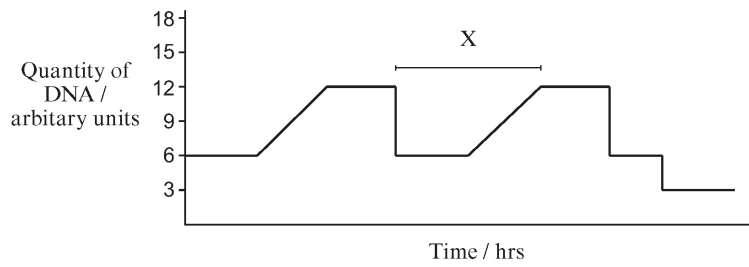
.....

.....

.....

.....

(b) The graph below shows the relative quantity of DNA in an animal cell during **two** complete cell cycles.



(i) Name the stage in the cell cycle which is represented by the time period labelled X on the graph above. [1]

.....

(ii) Using evidence from the graph, give a reason for your answer in part (b)(i). [1]

.....  
 .....  
 .....

(iii) State the type of nuclear division that is shown in the second cell cycle and explain how the evidence in the graph led you to this conclusion. [2]

.....  
 .....  
 .....  
 .....

**(Total 8 marks)**

## Marking Scheme

1. (a)

[4]

Role	Mitosis	Meiosis
	✓	X
	X	✓
	X	✓
	✓	✓

(not: hybrid ticks)

(b) joined pair of chromatids;  
chromatid labelled and centromere labelled;

[2]

(c) centromere splits;  
chromatids pulled to (opposite) poles;  
by shortening/ contraction of spindle fibres;

[3]

(d) centrioles;

[1]

**(Total 10 Marks)**

2.

(a) (i)	J K L H I	1
(ii)	I = telophase	1
	L = metaphase	1
(b) (i)	interphase	1
(ii)	ATP production/ metabolically active;	2
	Replication of DNA; NOT synthesis/ doubling	
	{Making/ replacing} new organelles/ replication of	
	mitochondria/ chloroplasts	
	NOT replication of organelles	
	Protein synthesis;	
	Cell increase in size (not growth) (any two)	
(c)	DNA Doubled / DNA content increased from 20 to 40	1
	and then halved (to maintain DNA content) (in two daughter	1
	cells.)	
	(ignore reference to chromosomes)	
(d)	Two genetically identical daughter cells are produced;	2
	{Genetically identical/ clone} of parent cell.	

**(Total 10 marks)**



3.

Question		Marking details	Marks Available
4.	(a)	Root <u>tip</u> / shoot <u>tip</u> / meristem;	1
	(b)	A Anaphase; B Prophase; C Telophase; D Metaphase;	4
	(c)	Interphase; It is the longest phase;	2
	(d)	(All cells) would be {haploid/half the number of chromosomes};  NOT cells have fewer/ less chromosomes  (All cells) would be <b>genetically different</b> ;	2
		<b>Question 4 Total</b>	<b>[9]</b>

4. (a) (i) Mitochondrion/ mitochondria 1
- (ii) Respiration/ aerobic respiration 1  
 stores {energy/ ATP}/ release energy/ {synthesis/produce 1  
 ATP}/ release energy / ATP for respiration =2 marks NOT  
 production of energy
- (iii) muscle / liver/ epithelial cells of small intestine / cells of 1  
 proximal convoluted tubule/ neurones/ companion cells/  
 sperm/ secretory cells NOT muscle tissue/ the liver/ cardiac  
 tissue
- (b) A 1
- (c) allows transport of { messenger/ mRNA}/ nucleotides/ 1  
 ribosomes NOT out and in

**(Total 6 marks)**

5.	Question	Marking details	Marks Available								
4	(a)	A – Phosphate; Accept phosphoric acid B – Deoxyribose; NOT pentose C – {Organic/nitrogenous} base; NOT named base (can be neutral)	3								
	(b)	Uracil in RNA thymine in DNA; NOT U in RNA and T in DNA RNA is (usually) single stranded, DNA is double stranded; DNA is <u>longer</u> molecule than RNA ; Sugar is ribose in RNA, deoxyribose in DNA;	Max 2								
	(c) (i)	Interphase;	1								
	(ii)	Anaphase;	1								
	(iii)	<table border="1"> <thead> <tr> <th>Meiosis</th> <th>Mitosis</th> </tr> </thead> <tbody> <tr> <td><u>4</u> cells</td> <td><u>2</u> cells produced;</td> </tr> <tr> <td>Haploid/ half the number of chromosomes of the parent cell</td> <td>Diploid/ same number of chromosomes as the parent cell</td> </tr> <tr> <td><u>Genetically</u> different;</td> <td><u>genetically</u> identical; Accept clone</td> </tr> </tbody> </table>	Meiosis	Mitosis	<u>4</u> cells	<u>2</u> cells produced;	Haploid/ half the number of chromosomes of the parent cell	Diploid/ same number of chromosomes as the parent cell	<u>Genetically</u> different;	<u>genetically</u> identical; Accept clone	3
Meiosis	Mitosis										
<u>4</u> cells	<u>2</u> cells produced;										
Haploid/ half the number of chromosomes of the parent cell	Diploid/ same number of chromosomes as the parent cell										
<u>Genetically</u> different;	<u>genetically</u> identical; Accept clone										
<b>Question 4 Total</b>			<b>[10]</b>								

6.		Question	Marking details	Marks Available
2	(a)	(i)	B, D, C, F, E;	1
		(ii)	Cytokinesis;	1
	(b)	(i)	4 cells are produced compared with 2 / cells are haploid as oppose to diploid/only contain one set of chromosomes compared with two sets of chromosomes; NOT 2 chromosomes (can be neutral) As a result of two (consecutive) divisions;	2
		(ii)	(Meiosis produces haploid gametes which) allows the diploid state to be restored {at fertilisation/in the zygote} / prevents doubling of the chromosome number at fertilisation; Meiosis produces <u>genetically</u> different {gametes/cells} / results in <u>genetic</u> variation (in the offspring);	2
<b>Question 2 Total</b>				<b>[6]</b>

- 7.
- (a) (i) Stage A – telophase; 2  
Stage C – metaphase;
- (ii) Centromeres split/ divide; 2  
Chromatids/ chromosomes are being pulled to (opposite) poles;  
(due to) contraction/ shortening of the spindle (fibres);
- (b) (i) Interphase; 1
- (ii) The (quantity of) DNA has doubled / (quantity of) DNA changes 1  
from 6 to 12; NOT increase
- (iii) Meiosis; (correct spelling) 2  
(At the end of the cell cycle) the (quantity) of DNA has been halved (and halved again) / can describe with numbers  
/involves 2 (consecutive) divisions;  
Ignore reference to chromosomes

## Examiner's Comments

1. Most candidates scored well on part (a) with statements 1 and 4 being the ones causing any problems. The diagrams in part (b) were often small and lacking detail of the centromere. Chromatid and chromosome were often confused. The answers to part (c) often lacked the terminology that should be encouraged at A/S. For example, far too many candidates referred to the chromatids as going to the 'ends' of the cells rather than the poles. Only a minority of candidates mentioned the splitting of the centromere and, in many cases, candidates gave the impression of the chromatids meandering apart, rather than being pulled to the poles.

*This comment originally referred to question 4 on paper 1071/01 (11/01/2011)*

2. Candidates are familiar with the sequencing of the stages of mitosis. In part (c) candidates were asked to use 'information provided'. Had they done so the simple requirement that the DNA content is doubled and then halved to maintain the DNA content in the two daughter cells would have been apparent. References to chromosome number gained no marks.

*This comment originally referred to question 6 on paper 1071/01 (11/01/2012)*

3. Very surprisingly, the majority of responses could not name the plant tissue which could be used to see mitosis. This is clearly in the specification; 'Prepare and/or observe slides of root tip for mitosis.' It is of concern that many answers showed no knowledge of the growing points of a plant, either shoot or root tip. Some answers mentioned 'meristems, for example root/shoot tip'. (b) Was very well done, with the majority gaining all marks, but, as might be expected many are confusing the cell cycle with mitosis, so chose a stage other than interphase in (c). Those who knew the work produced text book answers in (d).

*This comment originally referred to question 4 on paper 1071/01 (21/05/2013)*

4. The opening question on cell structure was generally well answered. In part (c) the function of the nuclear pores was less well known.

*This comment originally referred to question 1 on paper 1071/01 (11/01/2012)*

5. This was answered to a high standard by most candidates, especially part (c). In part (a) it was disappointing to see some candidates naming part B as a pentose sugar rather than deoxyribose as the molecule was clearly identified as DNA in the question.

In part (b) it is worth stressing to candidates that whilst we do accept phonetic spellings, care must be exercised when a spelling could be confused with another word, for example thiamine could be confused with thiamine which is vitamin B1 not a nitrogenous base.

In part (c)(iii) some candidates made references to the number of divisions. This was not accepted as the question was asking for differences between the cells produced not the processes. Some also made reference to the cells containing half the number of chromosomes or 23 vs 46 without referring to the parent cell. This was not accepted in place of haploid/diploid.

*This comment originally referred to question 4 on paper 1071/01 (21/05/2014)*

6. Most candidates were able to sequence the diagrams of mitosis, however about half of the candidates then stated that the process occurring at A was telophase. Few candidates scored full marks for part (b) with many making reference to genetic variation in part(i) which cannot be seen from the diagram or by simply stating two differences and not giving an explanation. In part(ii) many candidates gave vague statements and failed to make reference to genetic variation; only the better candidates appreciated that it is necessary to produce haploid gametes so that the diploid state can be restored at fertilisation.

*This comment originally referred to question 2 on paper 1071/01 (08/01/2014)*

7. (a) This question was intended to be a straight forward opening question and was well answered by the majority of candidates.
- (b) The candidates' ability to interpret the changes in quantity of DNA varied. A significant minority failed to appreciate that the quantity of DNA was increasing for a large proportion of the time period and incorrectly identified X as either telophase or cytokinesis.

Many candidates correctly identified the second cell cycle as meiosis, but references to 'halving the chromosome number' or 'the production of haploid cells' demonstrated an inability to use the evidence from the graph provided.

*This comment originally referred to question 1 on paper 1071/01 (09/01/2013)*