

Replication and division of nuclei and cells

Mark Scheme 6

Level	International A Level
Subject	Biology
Exam Board	CIE
Topic	The Mitotic Cell Cycle
Sub Topic	Replication and division of nuclei and cells
Booklet	Theory
Paper Type	Mark Scheme 6

Time Allowed : 22 minutes

Score : / 18

Percentage : /100

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	77.5%	70%	62.5%	57.5%	45%	<45%

Question 1

(a)

metaphase ;

1

(b)

centromeres divide / splits;

R break

chromatids separate ;

idea movt. to opposite poles / centrioles ;

by microtubules / spindle fibres ;

idea.mechanism of movement ;

3 max

(c)

(i)

breaks down / disperses ;

1

(ii)

centrioles divides/replicate;

to form two pairs (of centrioles) ;

move to (opposite) poles;

2 max

(d)

1 random alignment / independent assortment / or description;

different mix of maternal and paternal chromosomes/chromatids ;

2 crossing over / chiasmata formation/exchange of genetic material ;

between chromatids of homologous chromosomes ;

breaks up linkage groups / mixes maternal and paternal alleles ;

In 1 or 2 ref. different gametes produced;

4 max

Total : 11

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- 2 (a) (late) interphase/phase/ after G1 phase/before G2 phase ;
A after first growth phase/before prophase/before mitosis/after cytokinesis [max 1]
- (b) (i) hydrogen/H, (bonds) ; [1]
- (ii) Y, single ring structure ; A smaller molecule compared to X [1]
- (c) (i) change in, nucleotide/base, sequence of DNA ;
any one from
new allele formed ;
deletion/substitution/addition/frame shift , (mutation) ;
change to/ altered, mRNA ; A altered codon(s)
(causing) change in, primary structure/ amino acid sequence, of,
polypeptide/protein ;
A different protein/ altered function of protein/ non-functional protein [max 2]
- (ii) cell cycle shorter/interphase shorter/division more frequent ;
(cell cycle) checkpoints not controlled ;
uncontrolled (growth/division)/AW ;
AVP ; e.g. no differentiation (into epithelial cell)
A no cell death/apoptosis 2]

[Total: 7]

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