OCR GCSE 21ST CENTURY BIOLOGY B · J257

BIOLOGY



EXAM QUESTION PACK

B4.3 HOW DO ORGANISMS GROW AND DEVELOP? (FOUNDATION)

SCORE	PERCENTAGE
/38	%

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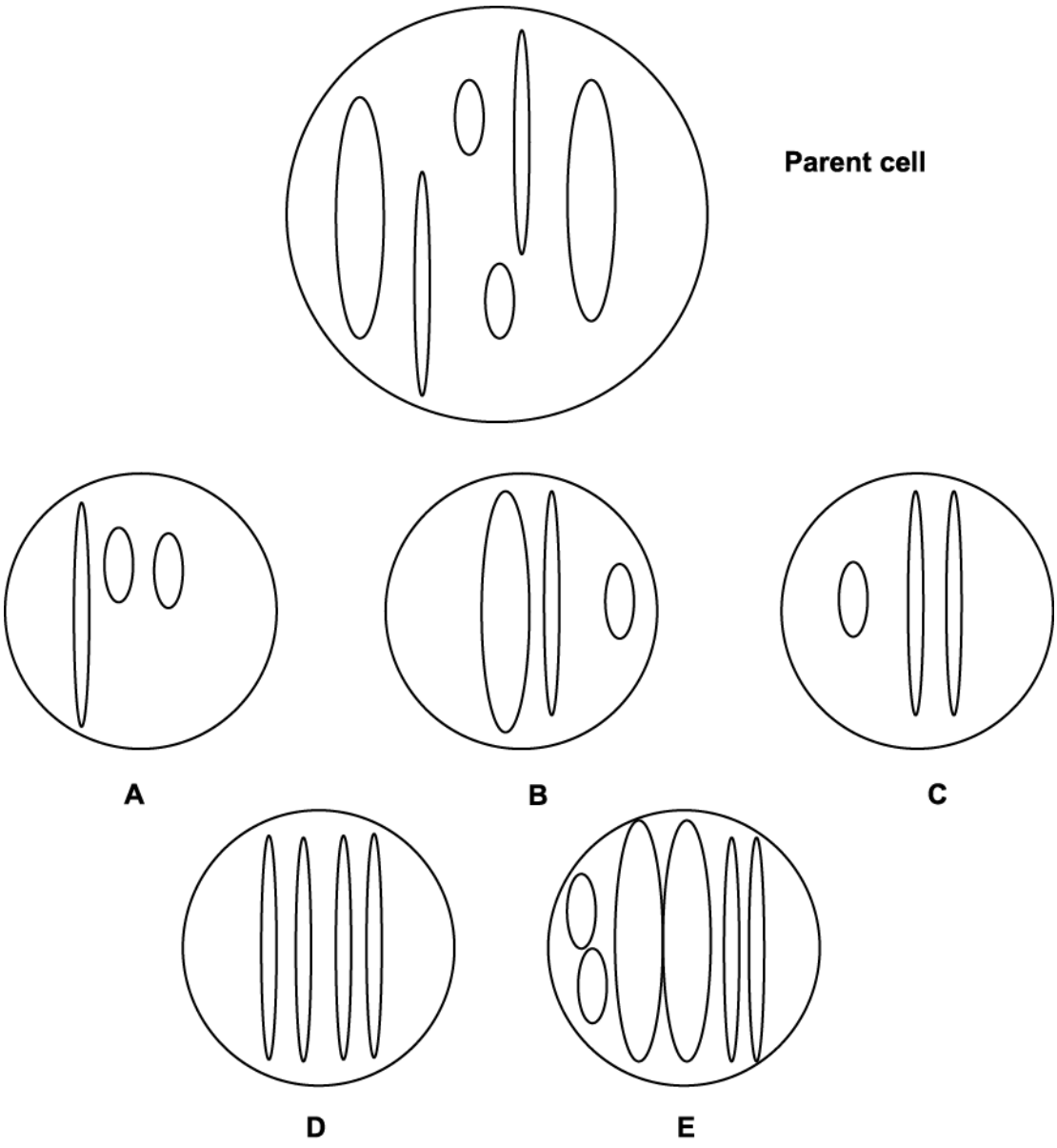
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1(a). Cells divide by mitosis or meiosis.

The diagram below shows a parent cell containing chromosomes.

Cells **A**, **B**, **C**, **D** and **E** are possible daughter cells that **could** result from either mitosis or meiosis.



Complete the table by identifying the daughter cell that correctly shows the result of each type of cell division. Write the letter of the daughter cell in the column headed “Correct daughter cell”.

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Give reasons for your choice in the table.

Type of cell division	Correct daughter cell	Reasons for your choice
Mitosis		1.
Meiosis		1.
		2.

[5]

(b). A newt is a type of amphibian.

It can grow a new leg if one is damaged or bitten off by a predator.

What type of cell division does the newt use to grow a new leg?

---

[1]

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2. Cell division by mitosis only happens in certain regions of a plant.

What are these regions called?

Put a tick (✓) in the box next to the correct answer.

leaves ☐

phloem ☐

meristems ☐

xylem ☐

[1]

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3(a). After fertilisation in humans, the cell divides and an embryo develops.

(i) After which cell stage do the cells in a human embryo stop being identical?

Draw a ring around the correct answer.

2 4 8 16 32

[1]

(ii) Cells found in an early embryo are called stem cells.

Scientists think these stem cells could be used to treat some diseases.

Which of the following statements explain why scientists think this?

Place ticks (✓) in the boxes next to the **two** correct statements.

Stem cells are the same as an egg cell. ☐

Stem cells are unspecialised cells. ☐

Stem cells cannot specialise. ☐

Stem cells can become any type of cell. ☐

Stem cells must be fertilised to become specialised. ☐

[2]

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(b). In mitosis one cell divides to form two new cells.

In a human embryo this doubling time is approximately 30 hours.

How long would it take for a fertilised egg cell to become an 8 cell embryo?

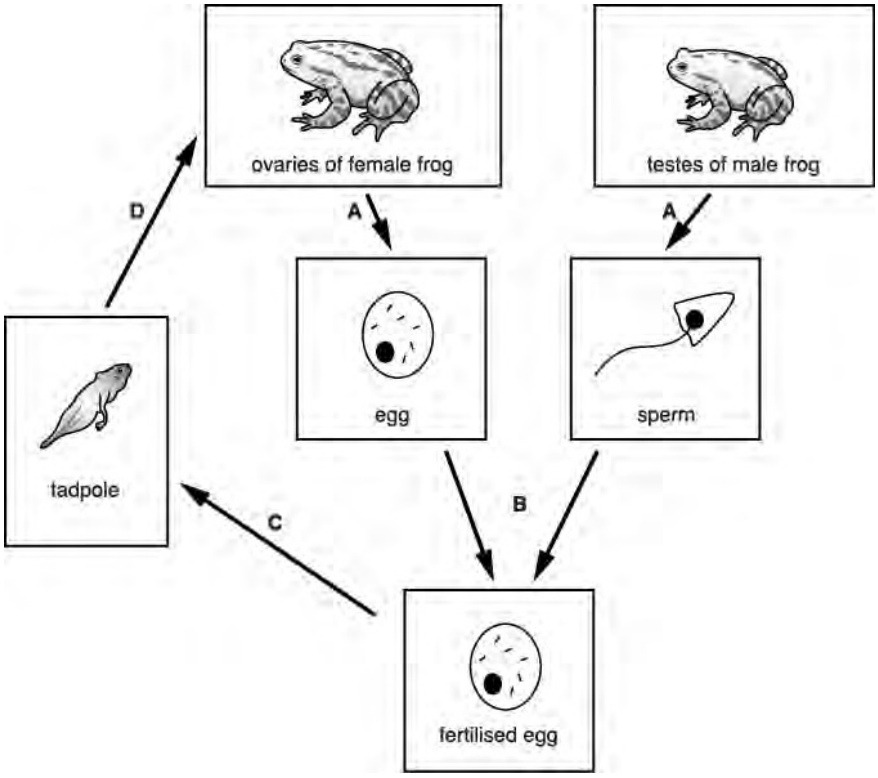
Draw a (ring) around the correct answer.

30 hours 60 hours 90 hours 120 hours

[1]

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4(a). The diagram below shows the life cycle of a frog.



Look at the diagram of the life cycle.

(i) At which part of the life cycle, stage **A**, **B**, **C** or **D**, will meiosis take place?

stage _____ **[1]**

(ii) A cell taken from the eye of a frog has 26 chromosomes.

How many chromosomes will there be in a cell taken from a leg of the same frog?

Place a tick (✓) in the box next to the correct answer.

13 ☐

26

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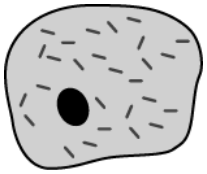
	☐
46	☐
52	☐

[1]

(iii) Chromosomes are located in the nucleus of the cell.

Draw a labelled line to the nucleus on the diagram of the cell.

[1]



(iv) Only 4% of the eggs produced by a frog will be fertilised and become tadpoles.

If the frog produces 2100 eggs, how many of these eggs would you expect to develop into tadpoles?

Show your working.

number of tadpoles _____ **[2]**

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(b). When the nucleus from a sperm cell and egg cell fuse, a zygote is formed.

Which statement describes what the zygote will contain?

Put a tick (✓) in the box next to the correct answer.

a set of chromosomes from each parent ☐

only chromosomes from the female parent ☐

more chromosomes from the mother than from the male parent ☐

no chromosomes from either parent ☐

[1]

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5(a). Emily and Carmel are identical twins.



The twin girls are formed from the division of a zygote (fertilised egg).

This zygote divides into two cells, which then separate.

Name the type of cell division involved when the zygote divides into two cells.

_____ [1]

(b). These cells complete the cell cycle many times to form separate embryos.

Describe the main processes of the **cell cycle**.

---[3]

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6(a). What is the name of the type of cell division that produces gametes?

Put a ring around the correct name.

fertilisation **meiosis** **mitosis** **replication** **specialisation**

[1]

(b). The **cell cycle** consists of two stages, cell growth and cell division.

Put ticks (?) in **four** boxes to indicate when the processes occur.

Process	**Cell growth**	**Cell division**
nucleus splits into two	☐	☐
numbers of organelles increase	☐	☐
chromosomes are copied	☐	☐
copies of the chromosomes separate	☐	☐

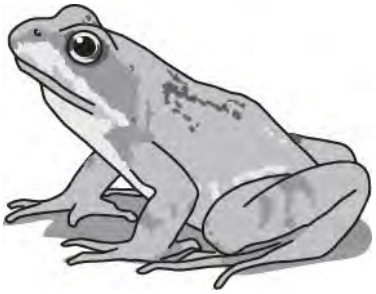
[4]

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7. Frogs grow by producing new body cells.

Adult frogs reproduce sexually by making sex cells (gametes).



Describe how body cells and sex cells are made.

The quality of written communication will be assessed in your answer.

[6]

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8(a). During sexual reproduction a sperm cell fertilises an egg cell.

What is this fertilised egg cell called?

Put a tick (?) in the box next to the correct answer.

embryo ☐

zygote ☐

fetus ☐

gamete ☐

[1]

(b). The fertilised egg divides to form 2 cells.

These 2 cells divide to form 4 cells.

These 4 cells divide to form 8 cells.

How many divisions are needed to form a group of 128 cells from one fertilised egg?

Show your working.

answer = _____ divisions. **[2]**

(c). After how many divisions will the cells start to become specialised?

answer = _____ **[1]**

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(d). Some cells remain unspecialised.

Write down the name of these cells and what may happen to them at a later time.

--- [2]

END OF QUESTION PAPER

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