OCR GCSE 21ST CENTURY BIOLOGY B · J257

BIOLOGY



EXAM QUESTION PACK

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

SCORE	PERCENTAGE
/41	%

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1(a).

(i) Mia has an eye disease that weakens the fibres that hold her cornea in place.

Her cornea has become damaged causing its shape to change.

What is the role of the cornea and how will damage to the shape affect Mia's sight?

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[2]

(ii) Scientists are now using stem cells to repair damage to corneas.

What is a stem cell?

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[1]

(iii) Stem cells can be obtained from embryos.

Why are some people against using embryos as a source of stem cells?

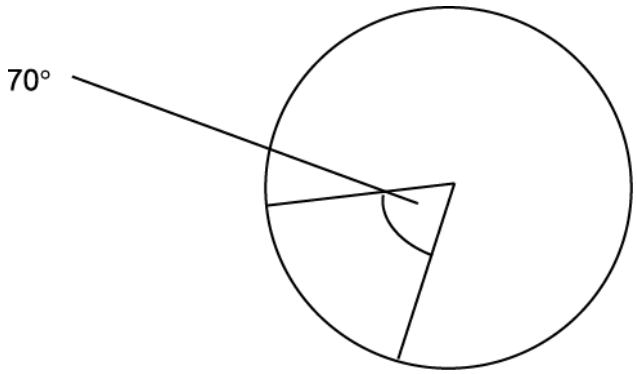
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[1]

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(b). New body cells are created as part of the cell cycle. This is represented in the diagram below.



In this example, the whole cell cycle takes 141 minutes.

Calculate the time spent in mitosis.

Give your answer to two decimal places.

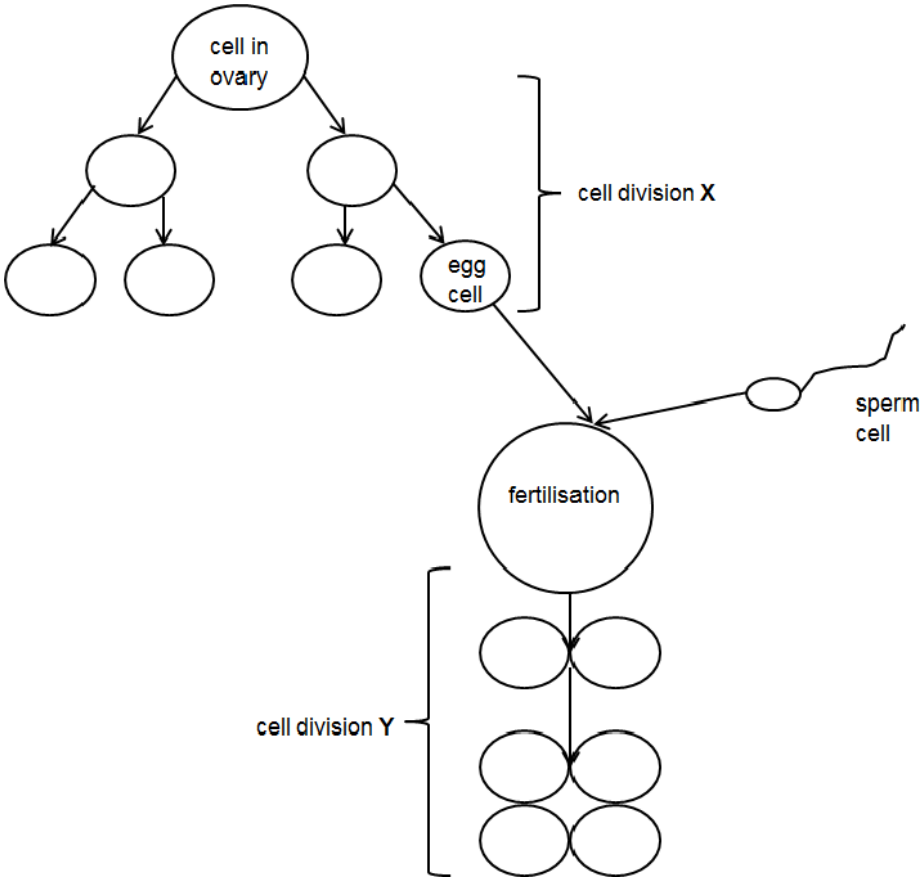
Time spent in mitosis = _____ minutes **[2]**

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2(a). There are two types of cell division.

Human egg cells are produced by one type of cell division. The other type is used for growth of new cells.



Identify the two types of cell division shown in the diagram above.

Cell division **X** _____

Cell division **Y** _____

[2]

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(b). After cells divide they become specialised to form tissues with different functions.

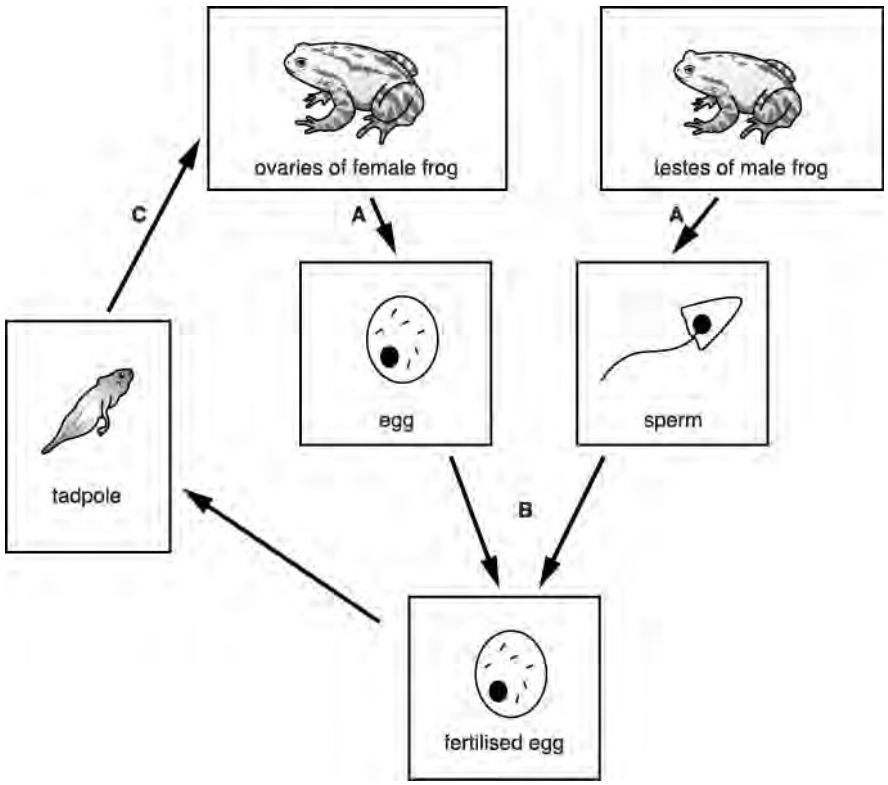
Explain what happens during this process of specialisation.

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[4]

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3. The diagram below shows the life cycle of a frog.



Three stages of the life cycle have been labelled **A**, **B** and **C**.

Identify the **two** stages at which cell division takes place. Describe the similarities and differences between the cell division at these two stages.

[6]

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

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[6]

4(a). Jean grows geranium plants. Her favourite plant has purple flowers.

She takes a cutting from her favourite plant.

After 10 days, roots start to develop.

Explain why Jean takes a cutting from the geranium and does not grow the plant from a seed.

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[3]

(b). Name the plant cells that divide to form unspecialised cells.

---

[1]

(c). As Jean's cutting grows, unspecialised cells become specialised.

These specialised cells form different tissues and organs.

Give **one** example of a plant tissue and **one** example of a plant organ.

Tissue ---

Organ ---

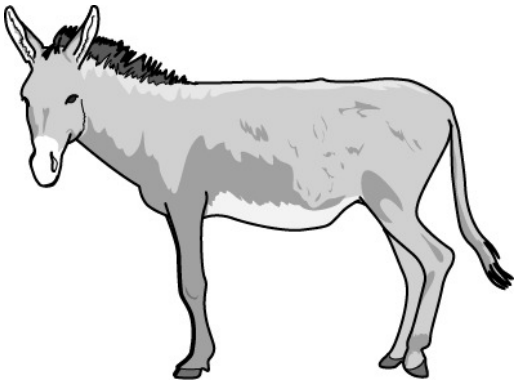
[2]

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5(a). Name the type of cell division that produces gametes.

_____ [1]

(b). The offspring of a male donkey and a female horse is called a mule.



A horse has 64 chromosomes in each body cell. A donkey has 62 chromosomes in each body cell.

Complete the boxes below to show how many chromosomes would be found in the gametes (sex cells) in these two species.

	Female horse	Male donkey
Gametes		

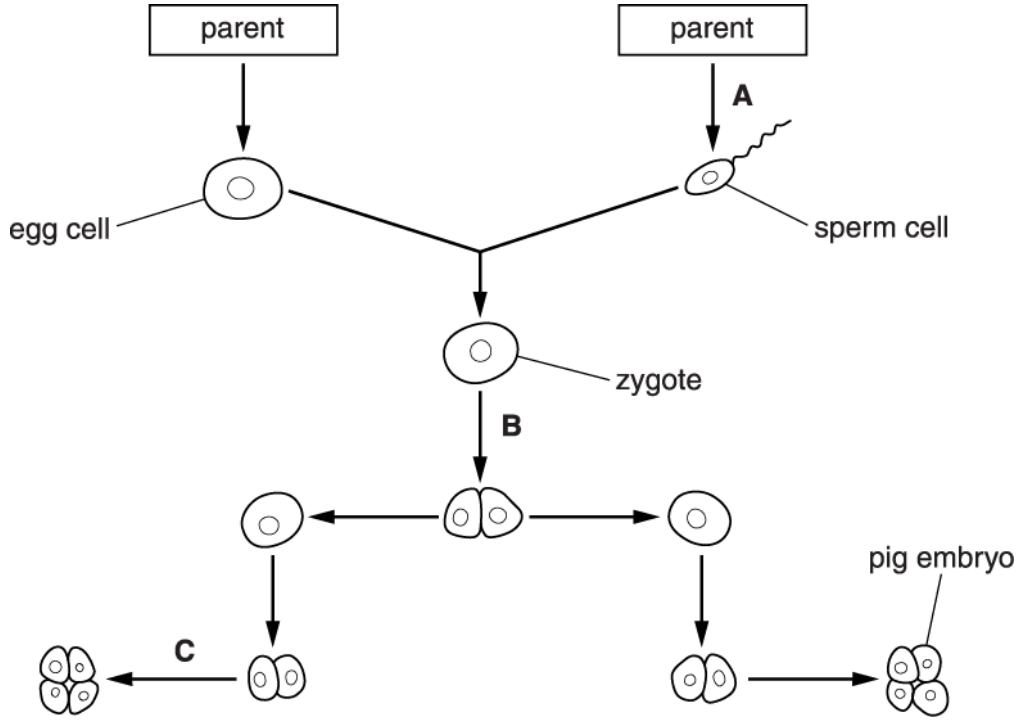
[1]

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6(a). A scientist is studying growth and development in identical twin piglets.

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

The diagram shows the stages involved in the formation of the piglets.



(i) Name the types of **cell division** at stages **A**, **B** and **C**.

Write the correct answer in the box next to each letter.

A	
B	
C	

[1]

(ii) The scientist observes that the piglets are **different** from their parents, but are **identical** to each other.

Explain why.

Use information from the diagram in your answer.

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---[3]

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(b). Muscle cells and skin cells are sampled from one of the piglets.

The muscle cells contain the protein actin, whereas skin cells contain the protein keratin.

(i) How can cells in the same piglet produce different proteins?

Put ticks (✓) in the boxes next to the correct answers.

All of the genes are switched on. ☐

Different cell types contain different genes. ☐

Cells only produce the specific proteins they need. ☐

Only the genes needed for the cell are switched on. ☐

Some of the genes are lost from cells during their development. ☐

[2]

(ii) A cell is taken from a pig embryo just after stage **C** in the diagram.

Explain why this cell can be used to make both skin cells and muscle cells.

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[2]

(iii) Cells can also be taken from **human** embryos for experiments.

Suggest **one** ethical reason **against** this work.

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[1]

END OF QUESTION PAPER

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