2025 Bi H1 Q5

Section: DNA and the Genome

Topic: Evolution

Question Summary:

You are given three descriptions of how genes are transferred in organisms.

1. Coat colour gene transferred by sexual reproduction in hamsters.
2. Ethanol tolerance gene transferred by asexual reproduction in yeast.
3. Antibiotic resistance gene transferred between bacteria of the same generation.

You are asked which processes are examples of **horizontal gene transfer**.

Worked Solution:

- **Horizontal gene transfer** means gene transfer between individuals of the **same generation**, often between unrelated organisms.

- Process 1: Sexual reproduction in hamsters — this is **vertical** gene transfer (from parents to offspring).
- Process 2: Asexual reproduction in yeast — this is also **vertical** gene transfer because genes are passed from a parent cell to its daughter cells.
- Process 3: Antibiotic resistance gene transferred between bacteria of the same generation — this is a classic example of **horizontal** gene transfer, commonly via plasmids or conjugation.

Therefore, only process 3 is horizontal gene transfer.

Final Answer: B (3 only).

Revision Tips:

- Horizontal transfer: between individuals of the same generation; includes bacterial conjugation and viral transfer.
- Vertical transfer: from parent to offspring; includes sexual and asexual reproduction.
- Bacterial gene transfer questions often test the contrast between horizontal (plasmids, transformation, transduction) and vertical inheritance.