Answer all the questions below then check your answers.

1. What is a composite material?

A. A material made of two or more different substances

B. A single element in pure form

C. A naturally occurring metal

D. A type of synthetic polymer

2. What is the role of the matrix in a composite material?

A. To provide strength and rigidity

B. To bind the reinforcement together

C. To add weight to the material

D. To give the material its colour

3. Which material is commonly used as the reinforcement in fibreglass?

A. Steel B. Carbon C. Glass fibres D. Wood

4. Match the composite material with its common application:

Composite material	Use
Fibreglass	Construction of material
Laminate	Bicycle frames
Steel reinforced concrete	Boat Hulls
Carbon fibre	Kitchen worktops

5. Fill in the gaps to complete the sentences below:

a. Composite materials are made by combining two or more materials with different _____ to produce a material with superior properties.

b. In composite materials, the _____ acts as the binding agent, while the _____ provides the strength.

c. Fibreglass is widely used in _____ because of its high strength-to-weight ratio.

6. Explain the difference between the matrix and the reinforcement in a composite material.

7. Explain why composite materials are preferred over traditional materials in the manufacturing of sports equipment such as bicycles, tennis rackets, and golf clubs. (5 marks)

Answers

1. What is a composite material?

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Answer: A. A material made of two or more different substances

2. What is the role of the matrix in a composite material?

A. To provide strength and rigidity

B. To bind the reinforcement together

C. To add weight to the material

D. To give the material its colour

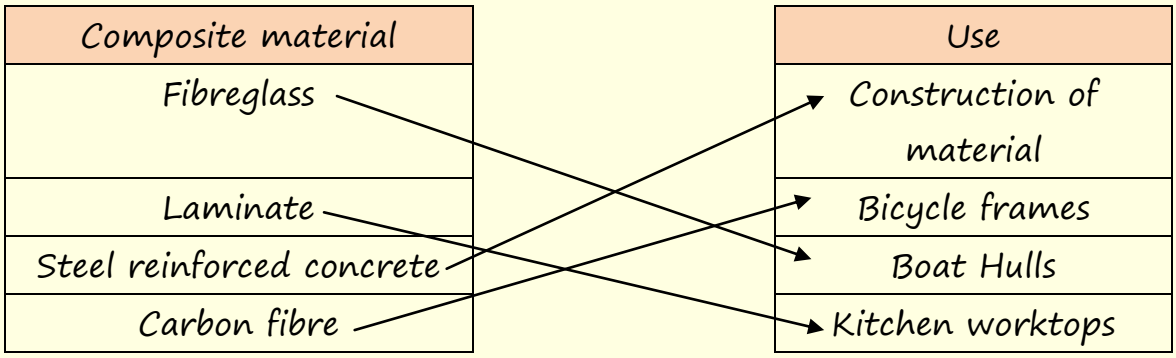
Answer: B. To bind the reinforcement together

3. Which material is commonly used as the reinforcement in fibreglass?

A. Steel B. Carbon C. Glass fibres D. Wood

Answer: C. Glass fibres

4. Match the composite material with its common application:



5. Fill in the gaps to complete the sentences below:

a. Composite materials are made by combining two or more materials with different _____ to produce a material with superior properties.

Answer: properties

b. In composite materials, the _____ acts as the binding agent, while the _____ provides the strength.

Answer: matrix, reinforcement

c. Fibreglass is widely used in _____ because of its high strength-to-weight ratio.

Answer: car/boat manufacturing

6. Explain the difference between the matrix and the reinforcement in a composite material.

Answer: The matrix in a composite material is the component that surrounds and binds the reinforcement together. It transfers the load to the reinforcement and protects it from environmental and mechanical damage. The reinforcement provides strength and stiffness to the composite, often improving its mechanical properties compared to the matrix alone.

7. Explain why composite materials are preferred over traditional materials in the manufacturing of sports equipment such as bicycles, tennis rackets, and golf clubs. (5 marks)

Answer: Composite materials are preferred in sports equipment manufacturing due to several advantages:

Lightweight: Composites such as carbon fibre and fibreglass are much lighter than metals, which improves the performance and manoeuvrability of sports equipment.

High strength: Despite being lightweight, composites offer high strength, which is crucial for the durability and performance of sports equipment.

Flexibility in design: Composites can be moulded into complex shapes, allowing for innovative designs that enhance performance.

Aesthetic appeal: Composites can be designed with various finishes and textures, enhancing the visual appeal of sports equipment.