PiXL Independence

Technology – Student Booklet

KS4

Graphics

Contents:

I. Multiple Choice Questions

Graphic Materials (Paper, card and boards)

1. What is the raw ingredient for the majority of paper, cards and boards

    a. Wood fibres
    b. Cotton fibres
    c. Carbon fibres
    d. Polymer fibres

2. Select the correct option for the order of paper size.

    a. Smallest – A0 to A6 – largest
    b. Smallest – A6 to A0 largest

3. Select the correct unit of measurement for paper.

    a. GSM – grams per measurement
    b. GSM – grams per millimetre
    c. GSM – grams per square meter
    d. GSM – grams per mile
    e. GSM – grams per micron
    f. GSM – grams per measure

4. What sentence best describes corrugated board

    a. It is made entirely from virgin bleach pulp
    b. It is thin and transparent
    c. It is a fluted sandwich between two solid layers
    d. It is brown and thick

5. What is the measurement usually associated with the thickness of card?

    a. GSM
    b. Micron
    c. Millimetre
    d. Centimetre
    e. Meter

6. What is virgin paper?

    a. Paper that has never been drawn on before
    b. Unopened cassettes of paper
    c. Paper that is made of white wood pulp and recycled paper
    d. Paper that is made of wood pulp and no recycled paper

7. Select from the list which material would be best for printing on.

    a. Cartridge paper
    b. Duplex board
    c. Foil lined board
    d. Folding box board
    e. Solid white board
    f. Corrugated card
    g. Cardboard

8. Select from the list which material would be best for containing frozen food.

    a. Cartridge paper
    b. Duplex board
    c. Foil lined board
    d. Folding box board
    e. Solid white board
    f. Corrugated card
    g. Cardboard

9. What sentence best describes the process of paper biodegrading?

    a. When paper is burnt it biodegrades into the atmopshere
    b. When paper is mixed with chemicals in water it biodegrades
    c. When paper is left on a composte it biodegrades naturally

10. What sentence best describes the effects of applying a sizing agent on paper or card?

    a. It improves the ability of the paper or card to accept ink
    b. It improves the ability of the paper or card to repel liquid
    c. It improves the ability of the paper or card to be cut to the correct size
    d. It improves the ability of the paper or card to deform understress

Smart and Modern Materials

1. What is the main difference between modern and smart materials

    a. There is no difference
    b. Modern materials have a reactive capacity
    c. Smart materials are all made form plastic modern materials are not
    d. Smart materials have a reactive capacity

2. What smart material is also known as Nitinol?

    a. Shape memory alloys
    b. Straight moulding alloys
    c. Shape moulding alloys
    d. Strong metallic alloys
    e. Super memory alloys

3. Can you identify the correct smart material?

    a. Thermomix polymer
    b. Thermoregulated polymer
    c. Thermodynamic ink
    d. Thermosetting polymer
    e. Thermochromic ink
    f. Thermoform ink

4. What are Nanomaterials? Select the sentence you think best describes them

    a. A material that has been miniaturised
    b. A material that has been altered at an atomic level
    c. A material that has no weight

5. Which sentence states the correct process of using polymorph

    a. Place granules in a microwave, heat up until soft, remove and mould into shape
    b. Place granules into an oven, heat up until soft, remove and mould into shape
    c. Place granules into a hot bowl of water, remove when soft and mould into shape

6. What is the melting range of polymorph?

    a. 57-59 degrees Celsius
    b. 60-62 degrees Celsius
    c. 63-64 degrees Celsius
    d. 65-66 degrees Celsius

7. Which sentence best describes what happens to nitinol when an electrical current passes through it?

    a. Nothing the electrical current has no effect
    b. The nitinol waves around until the current is turned off
    c. The nitinol reverts to its original cold forged shape
    d. The nitinol starts to glow

8. From the items below can you select which one would be best suited to include the smart material from your answer in question 3.

    a. A mug used for coffee
    b. A mug used for milk

9. Select the smart material from the list below

    a. Phtotographic glass
    b. Reactive glass
    c. Toughened glass
    d. Glass fibre
    e. Frosted glass

10. Select the senatnce that best describes quantun tunneling composite

    a. QTC is expensive, it can be produced in large quantities and has a very limited range of response when pressed
    b. QTC is very reliable, it does not require any special manufacturing and requires daylight to function correctly
    c. QTC is a natural material, it has a distinctive odour and has a large range of response when pressed
    d. QTC has a proportional response when pressed, it is easy to produce and is low cost

Sustainability

1. Select the correct 6 Rs of sustainability

    a. Reduce
    b. Reorganise
    c. Recycle
    d. Reuse
    e. Rectify
    f. Rethink
    g. Replicate
    h. Refuse
    i. recover
    j. Repair
    k. Retry

2. Which sentence best describes sustainability

    a. Sustainability is all about how we design, and use products that can be recycled all the time to safeguard the world for ourselves and future generations.
    b. Sustainability is all about how we design, make and use products to maximise our future generation's ability to continuing buying and using products.
    c. Sustainability is all about how we design, make and use products that minimise the depletion of our energy and other resources, which will safeguard the world for ourselves and future generations.
    d. Sustainability is all about how we design, make and use products to maximise their longevity, allowing us to safeguard the world for ourselves and future generations.

3. Select two of the environmental impacts of extracting oil, ores and timber.

    a. Destruction of species habitats
    b. Increase in species reproduction
    c. Increase in biodiversity
    d. Carbon emissions
    e. Lowering of harmful gas
    f. Expansion of available food stocks

4. What does LCA stand for?

    a. Long Circular Adjustment
    b. Large Cycle Assessment
    c. Life Calculating Assessment
    d. Large Carbon Assessment
    e. Life Cycle Assessment
    f. Land Carbon Assessment
    g. Landfill Calculating Assessment

5. Select which sentence would be of a benefit to the environment by reducing the amount of material used to design a drinking glass.

    a. The product becomes smaller, so it will fit in the consumers hand easier.
    b. The product becomes lighter, so transporting it uses less fuel.
    c. The product becomes more popular, so more people will purchase it.
    d. The product becomes slimmer, so will fit in a recycling bin easier.
    e. The product becomes shorter, so it can be stacked easier in a cupboard.

6. Why would having affective quality control (QC) in a factory that produces computer keyboards benefit the environment?

    a. The Keyboards would be made quicker
    b. The Keyboard would be really well produced
    c. Less waste would be produced
    d. The QC process can be carried out by a machine making it more accurate
    e. The keyboard would be smaller
    f. The keyboard would be more popular when sold

7. Why would a pair of Beats headphones by Dre that are easy to repair be thought of as sustainable?

    a. Because they sound great people would not throw the headphones away.
    b. Because parts could be repaired you would not need to buy a new pair of headphones.
    c. Because Beats are so comfortable and expensive people look after them.
    d. Because lots of them would sell so they would keep making them.

8. Why would a bowl made from a polymer that can biodegrade easily be sustainable?

    a. The bowl can be used again and again so will not need replacing.
    b. The bowl will cost more so the consumer will not want to throw it away.
    c. The bowl will return its nutrients to the ground when composted.
    d. The bowl can be washed quickly so less water is used when cleaning it.
    e. The bowl can be eaten after it has been used, so no material is wasted.

9. Select three things you can do to help reduce your impact on the environment.

    a. Turn off the lights in a room when it is not being used
    b. Sit still when outside
    c. Pass on unwanted items to a charity
    d. Walk in a straight line whenever possible
    e. Try to eat more vegitables
    f. Charge you phone every night
    g. Kick a can around not a football
    h. Use public transport
    i. Eat take out meals more often
    j. Buy the latest products all the time
    k. Keep any unused products in a box

10. What best descibes built in obsolescence.

    a. This is a method used to stimulate consumer demand, by making built in features that are not available anywhere else.
    b. This is a method used to stimulate consumer demand, by using flashy media promotions that inform consumers how obsolete other competitors products are.
    c. This is a method used to stimulate consumer demand, by designing products that are outdated after limited use.
    d. This is a method used to stimulate consumer demand, by using only modern technologies to promote the product as older methods like newspapers and magazines are outdated.
    e. This is a method used to stimulate consumer demand, by building in useful technologies to modern products making their predasessors obsolete.

II. Shorter Answer Questions

Graphic Materials

1. Can you describe what Mounting board is and explain its advantages.

2. Can you describe tracing paper?

3. Can you explain why a card restaurant menu would be laminated?

4. What is solid white board made from? And can you explain why the packaging for a perfume bottle would be made using solid white board?

5. Can you explain two advantages of using cartonboards for retail packaging?

Smart and Modern Materials

1. Explain an advantage and a disadvantage of using Shape memory alloys in glasses

2. Explain the one advantage and one disadvantage of using smart glass on a modern home

3. Explain why photochromic glass might be used in a pair of glasses

4. Can you explain one example of where and how piezoelectric materials might be used.

Sustainability

1. In terms of sustainability discuss the use of glass for a milk bottle.

2. In terms of sustainability discuss the use of plastic for a milk bottle.

3. In terms of sustainability discuss the use of unprotected steel to produce a bike frame

4. Explain 3 of the 6Rs of sustainability.

III. Longer Answer Questions

Graphic materials

1. An engineering company has decided to use corrugated board for the packaging of a common car part to ship to one of their customers. Can you give reasons in relation to the corrugated boards physical characteristics (density) and working properties (flexibility, printability, biodegradability and weight) as why they selected this material?

2. A popular fast food chain has decided to use foil lined board for the packaging of their latest burger. Can you give reasons in relation to the foil lined boards working properties (flexibility, weight, surface finish and absorbency) why they selected this material?

Modern and smart materials

3. Can you justify using Quantum Tunnelling Composite in a robotic hand

4. Each year there seem to be more products produced that contain smart materials. Justify why smart materials are appearing more in products.

5. Can you justify three reasons why nanomaterials would be used in the manufacture of wind turbine blades

Sustainability

6. In terms of sustainability can you compare the use of stainless steel and biodegradable polymers as a material for the following common household product: Cutlery (knives and forks)

7. Can you outline the environmental impact of using aluminium in common products like: bicycles, foil wrapping and laptops.

8. In terms of sustainability what are the considerations of using of recycled materials in products?

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