DTBase©

Design & Technology
Eduqas GCSE

Using surface treatments and finishes

Materials required for questions

- Pencil
- Rubber
- Calculator

Instructions

- Use black ink or ball-point pen
- Try answer all questions
- Use the space provided to answer questions
- Calculators can be used if necessary
- For the multiple choice questions, circle your answer

Advice

- Marks for each question are in brackets
- Read each question fully
- Try to answer every question
- Don’t spend too much time on one question

Good luck!

Q1. Which finish is used only on aluminium?

A Anodising

B Laminating

C Embossing

Q2. Why is a primer applied before paint?

A To make the paint dry faster

B To help the paint stick and improve the finish

C To remove grease

Q3. What is masking?

A Wearing a dust mask

B Sanding the surface smooth

C Protecting areas that should not be coated

Q4. Which application method gives a smooth, even finish but needs ventilation and PPE?

A Spray

B Brush

C Wipe/rub

Q5. Degreasing is especially important before painting or coating which material?

A Timber

B Metals

C Textiles

Q6. Which finishes are applied by wiping or rubbing?

A Powder coating and galvanising

B Foil blocking and embossing

C Oils, stains and wax

Q7. Use notes and/or sketches to describe how a material of your choice would need to be prepared/processed for a surface treatment or finish. Name any equipment you would use and describe how it is set up. **(6 marks)**

Q8. The case of a prototype solar powered garden light is made from high impact polystyrene (HIPS) that has been painted. Use notes and sketches to show how the surface of the HIPS case should be prepared and painted. **(4 marks)**

Q9. The timber handle of a hammer has been varnished. Use notes and sketches to show how the surface of the hammer handle should be prepared and varnished. **(4 marks)**

Q10. The aluminium frame of a children's easel has been finished with a powder coating. Explain one reason why a powder coating has been applied to the frame of the children's easel. **(2 marks)**

Q11. A cuff bracelet is made from aluminium with a decorative finish applied. Unfinished aluminium can be affected by oxidisation. Describe how oxidisation affects the appearance of aluminium. **(2 marks)**

Q12. State two suitable finishes that could be used to protect an outdoor teak bench. **(2 marks)**

Q13. A tumbling figure toy has a back made from pine. Name one surface finish or surface treatment that could be applied to the pine back. **(1 mark)**

Q14. A clear finish will be applied to a hardwood desk organiser.

Q14a. State the name of a suitable clear finish, other than varnish, that could be applied to the desk organiser. **(1 mark)**

Q14b. When glasspapering the hardwood before the clear finish is applied, the glasspaper could be wrapped around a cork sanding block. State one benefit of using a cork sanding block with the glasspaper. **(1 mark)**

Q15. Choose one of these products: a child's paper camera kit, a child's fabric dinosaur toy, a child's metal toy car, a child's wooden jigsaw, a child's mechanical toy or an acrylic clock for a child's bedroom. Name one finishing or decorative technique that could be used to improve the aesthetic of your chosen product. **(1 mark)**

Answers

Q1. A
Q2. B
Q3. C
Q4. A
Q5. B
Q6. C

Q7. (6 marks)

Marks	Descriptor
5 to 6	A detailed description making several correct points for the selected process, using notes and/or sketches. Specific, correct and appropriate process stages and specific equipment given.
3 to 4	A description showing some understanding of the selected process, using notes and/or sketches. Basic reference to some stages of the process, with some equipment given.
1 to 2	Simple notes or a sketch showing limited understanding of the selected process and/or equipment.
0	No response or nothing worthy of credit.

Indicative content:

Papers and boards

- Select the right paper weight; check the paper or board is uncreased and free from defects; check alignment before finishing, e.g. feeding into an offset litho printer
- Finishes: printing (offset litho); spot varnishing through a stencil, cured with UV light; embossing with male and female dies, pressure and sometimes heat; lamination at the correct temperature through motorised rollers

Timbers

- Check the timber is free from defects, e.g. splits, warping, knots
- Sand with increasingly fine abrasive paper (bigger numbers are finer grades)
- Apply the finish in a dry, dust-free place; a primer (e.g. knotting compound) may be needed, then an undercoat and one or more top coats

- Allow to dry and lightly rub down between each layer
- Typical finishes: painting, varnishing, oiling, waxing, staining

Metals

- Many metal finishes involve volatile organic compounds (VOCs), so work in a well-ventilated room with suitable PPE
- Make sure the metal is free from dust, dirt and grease (commercially, a pickling bath may be used)
- Plastic dip coating: heat the metal (e.g. with a brazing torch) and dip it in a fluidising tank of polymer powder with air blown through
- Powder coating: a commercial, sprayed polymer finish applied electrostatically as items move through a heated oven
- Metal primer and paint; galvanising by hot dipping after thorough degreasing; electroplating in a tank with a current passed through

Polymers

- Most plastics are self-finished, so expect reference to correct laser cutter settings (power, speed, PPI) or vacuum forming
- Vinyl graphics or decals: degrease the surface with solvent; use application (frisk) film to apply the decals

Textiles

- Many textile finishes use VOCs, so work in a well-ventilated room with PPE
- In school: batik, screen or block printing, dye sublimation printing, iron-on printing
- Preparation: wash to remove size; scour to remove grease; wash or steam to pre-shrink; stretch on a tenter or stenter to keep the fabric taut

Q8.

Cap at 3 marks if there are no sketches, or sketches with no notes. One mark for each:

- The case is sanded down (1)
- Dust is removed with a damp cloth and left to dry, or the case is degreased (1)
- Primer or paint is applied with a brush or spray (1)
- The case is left to dry (1)
- The case is rubbed down once dry (e.g. with wet and dry paper) and a second coat applied (1)

Q9.

Cap at 3 marks if there are no sketches, or sketches with no notes. One mark for each:

- The timber is sanded down (1)
- Dust is removed with a damp cloth and left to dry (1)
- Rub down with wire wool (1)
- Varnish is applied with a brush or spray (1)
- Leave to dry (1)
- Rub down once dry and apply a second coat (1)

Q10.

A reason (1) and a linked justification (1). For example:

- The powder coating gives a protective layer to the metal frame (1), so if paint gets on the surface it will not react with the metal or cause oxidisation (1)
- Powder coating is available in a range of colours (1), so the easel does not have a raw aluminium look and is more attractive (1)

Q11.

The surface of the aluminium becomes white (1) and loses its clean, shiny appearance (1). Or: unfinished aluminium has a strong affinity for oxygen (1) and the oxide forms a hard, whitish surface (1).

Q12.

Any two (1 mark each), e.g. Danish oil; teak oil; polyurethane varnish; beeswax. Credit any other appropriate finish.

Q13.

Any one (1): paint; stain; varnish; wax; oil; shellac; veneer.

Q14a.

Any one (1): white polish; French polish; button polish; cellulose; teak oil; tung oil; wax; lacquer. Do not accept “oil” on its own.

Q14b.

Any one (1): applies even pressure to the surface; faster than using fingers or hand alone; gives a flat, even finish.

Q15.

One mark for a correct technique that improves the aesthetic of the chosen product. For example:

- Camera kit: printed pattern or symbolic images; lamination or embossing of the card for texture
- Fabric dinosaur: hand or machine embroidery; a printing method; appliqué; brushing
- Metal toy car: enamelling, painting, engraving letters, numbers or patterns; anodising for aluminium
- Acrylic clock: numbers in a different coloured acrylic; hands painted a bright colour
- Mechanical toy or wooden jigsaw: sealant and primer; varnish; wood stain; polish; paint