**Design & Technology**

**Finishing techniques**

**Materials required for questions**

* Pencil
* Rubber
* Calculator

**Instructions**

* Use black ink or ball-point pen
* Try to 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
* Don’t spend too much time on one question

**Good luck!**

**Q1.** Which one of the following materials needs to have a surface finish applied if it is to be used outside?

**A** Aluminium

**B** Copper

**C** Oak

**Q2.** When applying a surface finish, what is key?

**A** A smooth surface to paint on

**B** A rough surface to paint on

**C** A clean surface to paint on

**Q3.** What is an alloy?

**A** A mixture of 2 or more elements, where at least 1 is a metal

**B** A mixture of 3 or more elements, where at least 1 is a metal

**C** A compound of 2 or more elements, where at least 1 element is a metal

**Q4.** Which one of the following finishes is best applied to a mild steel hanging plant basket?

**A** Stain

**B** Plastic dip coating

**C** Varnish

**Q5.** Which of the following finishes is used for woods?

**A** Shellac

**B** Chemical lacking

**C** Anodising

**Q6.** Which of the following finishes is used on aluminium?

**A** Anodising

**B** Galvanising

**C** Electroplating

**Q7.** Which of the following is the process called etching?

**A** A process whereby paint is sprayed onto the surface of a material

**B** A process that creates a long-lasting protective coating on a metal

**C** Acid is used to remove the unprotected surface of a metal for a decorative finish

**Q8.** Which one of the following processes involves dipping a metal into molten zinc?

**A** Galvanising

**B** Cathodic protection

**C** Electroplating

**Q9a**. Explain why surface finishes are applied to materials and fabrics for aesthetic reasons. Give examples in your answer **(3 marks)**

**9b**. Explain why surface finishes are applied to materials and fabrics for functional reasons. Give examples in your answer **(3 marks)**

**Q10a.** Name **two** appropriate finishes that could be applied to mild steel **(2 marks)**

1.

2.

**10b.**  Explain **two** reasons for applying a finish to the mild steel sheet **(4 marks)**

1.

2.

**Q11.** Explain **two** advantages of adonising in preference to painting **(4 marks)**

1.

2.

**Q12.** The steel handles of a desk drawer have been electro-plated with brass. Explain **two** reasons why the handles would be electro-plated with brass **(4 marks)**

1.

2.

**Q13.** Name **two** paper and board finishing processes that could be used to improve the aesthetics of packaging for a toy **(2 marks)**

1.

2.

**Q14.** A children’s climbing frame has been finished with a powder coating. Explain why powder coating is an appropriate finish **(6 marks)**

**Q15**. Explain why galvanisation is a good finish for a low carbon lamppost. **(6 marks)**

**Answers**

**Q1.** A **Q2.** B **Q3.** C **Q4.** B **Q5.** A **Q6.** A **Q7.** C

**Q8.** A

**Q9a**.

Any named aesthetic reason:

* Change the colour of a product (1)
* Improving appearance/make the product look more attractive (1)
* Change the look and feel of a product (1)

Aesthetic finish examples:

* Painting cars different colours to suit different customer tastes (1)
* Embossing in card to create a decorative 3D effect (1)
* Self-finished surface, e.g. the injection moulding process can ‘build in’ a textured surface in contrast to a smooth surface (1)
* Add to decoration and quality of finish, e.g. enamelling jewellery
* Wood stains to enhance the colour of timber (1)
* Anodising to produce brightly coloured aluminium products, e.g. bike wheels, Maglites (1)
* Stonewashing jeans (distressing) gives a soft peach skin effect (1)
* Heat setting thermoplastic fibres to give crushed effect, creases and pleating (1)

**Q9b**.

* To make more suited to intended use/improve durability (1)
* To inhibit combustion/reduce fire risk (textiles) (1)
* Protect from moisture/water (1)
* Stain resist finish (1)
* To prevent insect/fungal attack (wood) (1)
* To resist corrosion (1)
* Build in a textured finish (polymers) (1)
* Provide a non-slip finish (1)
* Flame retardants to textiles (1)
* Waterproof finish on a jacket (1)
* Laminating a book cover to protect from moisture (1)
* Anodising aluminium to improve durability (1)
* Electro plating to provide a durable finish (1)
* Wood preservative on a garden fence to protect from moisture and insect attack (1)
* Dip/powder coating of metals to inhibit corrosion (1)
* Galvanising (not aesthetic reason) mild steel to resist corrosion (1)
* Self-finished surface, e.g. injection moulding process can ‘build in’ a textured surface to provide a non-slip surface/grip on a chair, child’s toy etc. (1)

**Q10a.**

Any **two** finishes from:

• Plastic dip coating / dip coating / plastic coating (1)

• Powder coating (1)

• Electroplating (1)

• Galvanising (1)

• Lacquer (1)

Do not accept ‘painting’ of any form.

**10b.**

Any **two** reasons explained from:

* It will make it look nicer (1) which will potentially increase sales (1)
* Mild steel will rust / develop a surface oxide (1) so any finish will protect it / make it last longer / more durable (1)
* Colours can be applied (1) therefore making it more visually appealing to children / users / increase sales (1)

**Q11.**

Any **two** of the following explanations that include identification of a benefit (1) and linked justifications of that benefit (1):

* Durable / lasts a long time (1) does not fade / so will not flake / peel / chip / so does not need repeating / recoating (1)
* More scratch resistant (1) as it penetrates into the surface / add a harder layer to the surface (1)
* Negligible thickness (1) so holes do not get clogged / do not need cleaning out / does not prevent it functioning / more accurate tolerances possible (1)
* Fully covers every surface (1) as anodising fluids fully penetrate holes (1)

**Q12.**

Any **two** of the following explanations that include a correct reason (1) and linked justifications of that reason (1):

* To improve the aesthetics / makes the desk more appealing (1) so that it sells more (1)
* To prevent corrosion (1) resulting from moisture on skin / moisture / oxygen in the air (1)
* Because it is a durable finish (1) it will not flake, peel or chip over time / so the handle will retain its good aesthetics (1)
* Cost effective finish (1) for the economic / low priced market (1)

**Q13.**

Any **two** from:

* Varnishing / spot varnishing (1)
* Hot foil blocking (1)
* Embossing (1)
* Debossing (1)
* Laminating (1)

**Q14.**

* Powder coating provides a hard, durable finish which will resist the wear from children’s shoes (1)
* Thicker coats can be achieved than feasible with liquid paint finishes (1)
* A wide range of colours are available, as pigments can be added (1)
* Powder coating will protect the frame from oxidising (1)
* Powder coating gives an even coat of material around cylindrical shapes (1)
* Overspray from the climbing frame can be recycled and reused (1)
* Powder coated finished are less prone to fading from UV degradation due to the use of stabilisers (1)
* Powder coated finishes are less likely to chip than traditional paint finishes (1)
* Powder coated finishes are not affected by extremes of temperature found outdoors during summers and winters (1)

**Q15.**

* The scaffold is a functional object, where aesthetics are not as important as function therefore the inconsistent galvanised patterned finish causes no issue. (2)
* Galvanising protects the low carbon steel from corrosion. The galvanising process is hardwearing so will resist the scratching likely to occur from assembly, storage and transportation. (2)
* The cathodic protective nature of galvanising means that the scaffold would continue to be protected even if damage did occur. (2)
* The dip coating nature of galvanising means that the hollow steel structure of the scaffold is protected on all surfaces. (2)
* Galvanising provides a zinc protective layer to the low carbon steel which provides cathodic protection for the base metal. (2)
* Galvanising provides a surface finish that requires little or no maintenance allowing for extend use and reducing any ongoing costs to the scaffold user. (2)