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**DESIGN TECHNOLOGY
STANDARD LEVEL
PAPER 1**

Tuesday 18 November 2014 (afternoon)

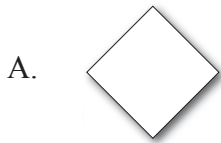
45 minutes

INSTRUCTIONS TO CANDIDATES

- Do not open this examination paper until instructed to do so.
- Answer all the questions.
- For each question, choose the answer you consider to be the best and indicate your choice on the answer sheet provided.
- The maximum mark for this examination paper is *[30 marks]*.

1. What is meant by the “goal” in a design brief?
 - A. The target market
 - B. The initial prototype
 - C. The final specification
 - D. The final outcome

2. Which flow chart symbol represents an input?



3. **Figure 1** shows a freehand drawing developed during the early stages of the design development of a picnic basket which can be mounted on a bicycle as a pannier (**Figure 2**). The pannier can be unpacked and used as a picnic table (**Figure 3**).

Figure 1: Freehand drawing

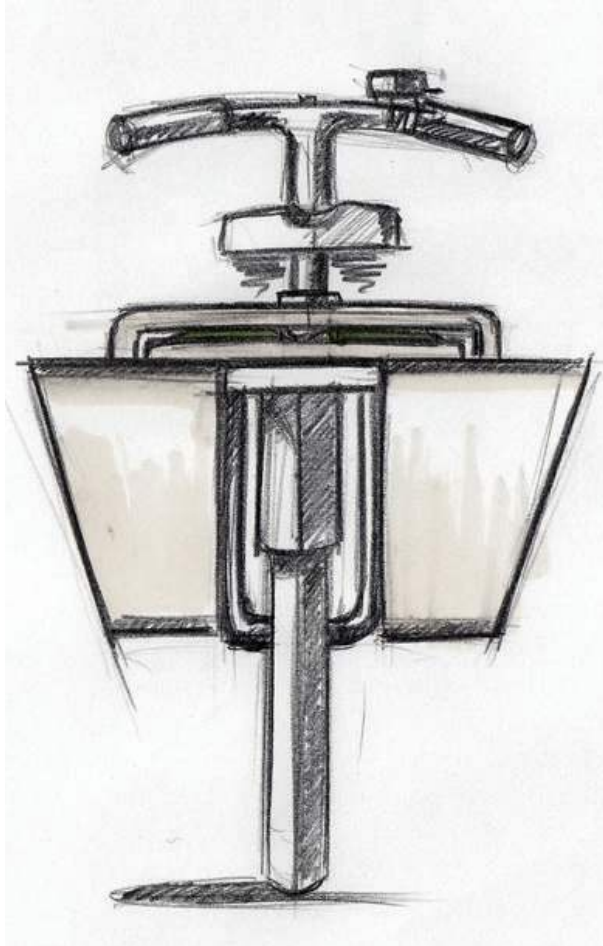


Figure 2: The bicycle-mounted picnic basket



Figure 3: The picnic basket unpacked into a picnic table



[Source: www.designboom.com]

What is a major advantage of using freehand drawings, such as **Figure 1**, with non-designers in the early stages of design development?

- A. They can be used as production drawings.
- B. They show the proposed solution in shape and form.
- C. They show the sequence of assembly of a product.
- D. They are easily understood.

4. Which constraints in the design brief for a product have implications for fixed costs?
- I. Must be produced by injection moulding
 - II. Manufacturing must be energy-efficient
 - III. Must be a pioneering design
- A. I and II only
 - B. I and III only
 - C. II and III only
 - D. I, II and III
5. What is defined as the transfer of an idea from one context to another?
- A. Adaptation
 - B. Attribute listing
 - C. Analogy
 - D. Constructive discontent
6. What term describes a product accepted as the market standard?
- A. Invention
 - B. Innovation
 - C. Dominant design
 - D. Robust design

7. What is least likely to be the impetus for green design?
- A. Consumer pressure
 - B. Profitability
 - C. Standards
 - D. Health and safety
8. Which is true of an ecolabel?
- A. It indicates that a product meets the most recent environmental standard for a particular product category.
 - B. It indicates that a product covers all aspects of green design.
 - C. It provides information to guide consumer decision-making.
 - D. It is a mandatory international standard.
9. Which combination of “high environmental impact” and in the “global marketplace” identifies the types of product targeted by life cycle analysis?

	High environmental impact	In the global marketplace
A.	No	No
B.	No	Yes
C.	Yes	No
D.	Yes	Yes

10. What is a major advantage of reconditioning a computer?
- A. It makes it more energy-efficient.
 - B. It is as reliable as a new product.
 - C. It is easy to undertake.
 - D. It extends the product life.
11. What is defined as a mixture composed of two or more substances with one substance acting as the matrix or glue?
- A. Atom
 - B. Molecule
 - C. Alloy
 - D. Composite
12. Which material would be **most** resistant to damp environments?
- A. Mahogany
 - B. Particle board
 - C. Plywood
 - D. Pine wood

13. Which phrase describes a metallic bond?
- A. Positively charged nuclei in a sea of electrons
 - B. Sharing of electrons between atoms
 - C. Attraction between a positively charged ion and a negatively charged ion
 - D. Attraction between molecules with no sharing or transfer of electrons
14. Which plastic would be suitable for use in the production of the electrical socket shown in **Figure 4**?

Figure 4: An electrical socket



[Source: “Australian dual switched power point” by Original uploader was Auspowerpoint at en.wikipedia - Transferred from en.wikipedia. Licensed under Public Domain via Wikimedia Commons—http://commons.wikimedia.org/wiki/File:Australian_dual_switched_power_point.jpg#mediaviewer/File:Australian_dual_switched_power_point.jpg]

- A. Urea-formaldehyde
- B. Polyethene
- C. Polyvinyl chloride
- D. Polyurethane

15. Which application would use laminated glass?
- A. Display cabinet
 - B. Car windscreen
 - C. Glass tabletop
 - D. Oven door
16. What is true of **both** composites **and** alloys?
- A. A wide variety of material groups can be combined.
 - B. The atomic structure is the same.
 - C. Materials are combined to improve selected material properties.
 - D. There is a fixed ratio of constituent materials.
17. Which material could be used to convert the force of an impact into an electrical charge for an airbag sensor in a car?
- A. Magneto-rheostatic
 - B. Electro-rheostatic
 - C. Piezoelectric
 - D. Shape memory alloy

18. **Figure 5** shows laminate wood flooring made of plywood with a hardwood veneer.

Figure 5: Laminate wood flooring



[Source: www.carpet-services.com]

What is a disadvantage of hardwood-veneered plywood compared to solid hardwood for flooring?

- A. Durability
- B. Aesthetics
- C. Cost
- D. Availability

- 19.** What is an advantage of using natural timber as a structural material for buildings?
- A. Ease of use
 - B. Stability
 - C. Lack of defects
 - D. No finish is required
- 20.** Which property is defined as the mass per unit volume of a material?
- A. Electrical conductivity
 - B. Thermal expansivity
 - C. Tensile strength
 - D. Density

21. The Terracotta Army is a collection of over 8000 terracotta sculptures. Careful studies have shown that they would probably have been produced using just 8 different head moulds and clay would then have been added to produce individual facial features. **Figure 6** shows the faces of some of the soldiers.

Figure 6: Faces of the terracotta soldiers



[Source: www.chinatourguide.com]

What scales of production would have been used for the head shapes and the facial features of the terracotta soldiers?

	Head shapes	Facial features
A.	Craft	Craft
B.	Batch	Craft
C.	Craft	Batch
D.	Batch	Batch

22. What combination of response and approach characterizes an end-of-pipe solution in dealing with pollutants from a manufacturing system?

	Response	Approach
A.	Reactive	Incremental
B.	Reactive	Radical
C.	Proactive	Incremental
D.	Proactive	Radical

23. What is true of just-in-case (JIC) production but **not** just-in-time (JIT) production?

- A. Increased pressure on the workforce
- B. Increased flexibility of the workforce
- C. Reduced storage requirements
- D. Reduced set-up costs

24. Which percentile range would be used for the commercial production of an adjustable ironing board?

- A. 5th–50th
- B. 50th–95th
- C. 5th–95th
- D. 1st–99th

25. Which evaluation strategy would generate a “problem list” relating to product usability issues that would inform the redesign of a product?
- A. Literature search
 - B. Performance test
 - C. User trial
 - D. User research
26. Which evaluation strategy is most likely to be carried out in a laboratory?
- A. Field trial
 - B. Performance test
 - C. User research
 - D. Expert appraisal

Questions 27–30 relate to the following case study. Please read the case study carefully and answer the questions.

As part of its Design for Environment programme Nokia has designed a phone that disassembles itself when it is heated above a certain temperature – active disassembly (**Figure 7**).

Figure 7: The Nokia phone

Removed for copyright reasons

27. What type of drawing is shown in **Figure 7**?
- A. Isometric drawing
 - B. Exploded isometric drawing
 - C. Orthographic drawing
 - D. Perspective drawing

28. Which composite material would be appropriate for the manufacture of the screws for the Nokia phone so that the thread disappears when heated and the screws fall out so the phone can be easily disassembled?
- A. Piezoelectric
 - B. Magneto-rheostatic
 - C. Electro-rheostatic
 - D. Shape memory alloy
29. At which life cycle stage would design for disassembly have the most environmental benefit?
- A. Pre-production
 - B. Production
 - C. Utilization
 - D. Disposal
30. What is a disadvantage of injection moulding for the production of the components for the Nokia phone?
- A. High volume
 - B. High accuracy
 - C. High capital costs
 - D. High energy
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