



**DESIGN TECHNOLOGY
STANDARD LEVEL
PAPER 1**

Tuesday 3 November 2009 (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.

1. What is an example of convergent thinking?
 - A. Brainstorming
 - B. Adaptation
 - C. Analogy
 - D. Attribute listing

2. What are design specifications **not** used for?
 - A. To evaluate solutions
 - B. To identify the problem
 - C. To formulate a design brief
 - D. To realize the design

3. What is an advantage of using mathematical models?
 - A. Symbolic representation
 - B. Physical representation
 - C. Scale representation
 - D. Graphical representation

4. Which drawing would **best** show how a product is assembled?
 - A. Exploded isometric
 - B. Orthographic
 - C. Freehand
 - D. Perspective

5. Which drawing technique demonstrates foreshortening?
- A. Freehand
 - B. Isometric
 - C. Perspective
 - D. Orthographic
6. What makes a product robust in the market place?
- A. Durability
 - B. Fashionability
 - C. Adaptability to changing technical requirements
 - D. Manufacturers with a clear corporate strategy
7. Which statement relates to innovation?
- A. A novel idea
 - B. Diffusion into the market place
 - C. Incremental design
 - D. Constructive discontent
8. What is **not** a barrier to recycling thermoplastics?
- A. Unlabelled plastic types
 - B. The collection process
 - C. The amount of energy used in processing
 - D. The molecular structure

9. Who would dislike discussing environmental protection?

- A. Eco-champion
- B. Eco-fan
- C. Eco-warrior
- D. Eco-phobe

10. Which material can be easily and economically recycled?

- A. Nickel
- B. Thermoset plastic
- C. Superalloy
- D. Plywood

11. Which combination of properties is important in the design of a frying pan handle?

A.	Stiffness	Thermal expansivity
B.	Toughness	Thermal conductivity
C.	Toughness	Thermal expansivity
D.	Stiffness	Thermal conductivity

12. What is an alloy composed of?

- A. Only metals
- B. At least one metal
- C. Two or more substances
- D. Only ceramics

13. What is a characteristic of laminated wood?

- I. Uniform strength
- II. Use of an adhesive
- III. Resistant to decay

- A. I and II only
- B. I and III only
- C. II and III only
- D. I, II and III

14. Which characteristic of glass enables it to be used as a load-bearing structural material?

- A. Toughness
- B. Transparency
- C. Low thermal conductivity
- D. Resistance to compression

15. What characteristic makes metal a good electrical conductor?

- A. Positively charged nuclei
- B. Crystalline structure
- C. Free electrons
- D. Small grain size

16. What is the name of the material in a car shock absorber that responds to an electric charge by becoming more viscous?
- A. Smart
 - B. Piezoelectric
 - C. Electro-rheostatic
 - D. Shape memory alloy
17. Which manufacturing technique would be used to design for disassembly?
- A. Using adhesives
 - B. Using fasteners
 - C. Fusing
 - D. Stitching
18. Which production method does **not** take advantage of economies of scale?
- A. Mechanized production
 - B. Craft production
 - C. Mass production
 - D. Automated production

19. Which product is least likely to be mass produced?

A. The Airbus A380



[Source: www.zdnet.com.au]

B. The Ford Model T



[Source: www.musclecarclub.com]

C. iPod



[Source: www.compareipod.com]

D. Plastic cutlery



Best endeavour

20. Many coal-fired power stations treat pollutants from burning coal. What is this called?

- A. Life cycle analysis
- B. End-of-pipe approach
- C. Green design
- D. Design for manufacture

21. Which production system allows for variations on a basic product?

- A. Assembly line
- B. Computer-aided manufacturing
- C. Mass production
- D. Mass customization

22. Which physiological factor affects ergonomics?
- A. Fatigue
 - B. Temperature
 - C. Furniture dimensions
 - D. Leg length
23. Which design consideration does **not** apply to motorcycle helmets?
- A. Range of sizes
 - B. Adjustability
 - C. Suitable for 50th percentile
 - D. Safety
24. Who would find this scale model useful as part of an evaluation strategy?



[Source: <http://scale-models.archiform3d.com/07-rocksuger-scale-model/01-scale-model-640.jpg>]

- I. Designer
 - II. Manufacturer
 - III. Consumer
- A. I and II only
 - B. II and III only
 - C. I and III only
 - D. I only

25. Which combination of evaluation techniques would be a low cost strategy to obtain qualitative data?

A.	User research	User trial
B.	User research	Performance test
C.	Field trial	User trial
D.	Field trial	Performance test

26. How do manufacturers provide consumers with product confidence?

- A. Quality assurance
- B. Quality control
- C. Value for money
- D. Cost effective products

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

Scrap plastic is collected (**Figure 1(a)**), processed into plastic boards (**Figure 1(b)**) and then used to make furniture such as the bench in **Figure 1(c)**.

Figure 1(a): Scrap plastic collection facility



Figure 1(c): Finished plastic seat product



Figure 1(b): Standard sized processed plastic boards



[Source: www.itsrecycled.com. Reproduced by permission of American Recycled Plastic, Inc.]

27. At what stage of the design cycle would the use of the processed plastic boards be a major constraint?
- A. Evaluation
 - B. Specification
 - C. Identifying a need
 - D. Researching

28. If the plastic seat is sold to existing customers, what does this exemplify?

- A. Market development
- B. Product development
- C. Market penetration
- D. Market segmentation

29. Why is the plastic seat an example of a green product?

- I. Long term environmental harm is minimized.
 - II. It is not affected by insects.
 - III. Plastic is not biodegradable.
- A. I only
 - B. I and II only
 - C. I and III only
 - D. I, II and III

30. What type of plastic would be most likely used in the seat?

- A. polyethene
 - B. polyurethane
 - C. urea-formaldehyde
 - D. any plastic which has a non-reversible effect from being heated
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