

**DESIGN TECHNOLOGY  
HIGHER LEVEL  
PAPER 1**

Friday 7 November 2003 (afternoon)

1 hour

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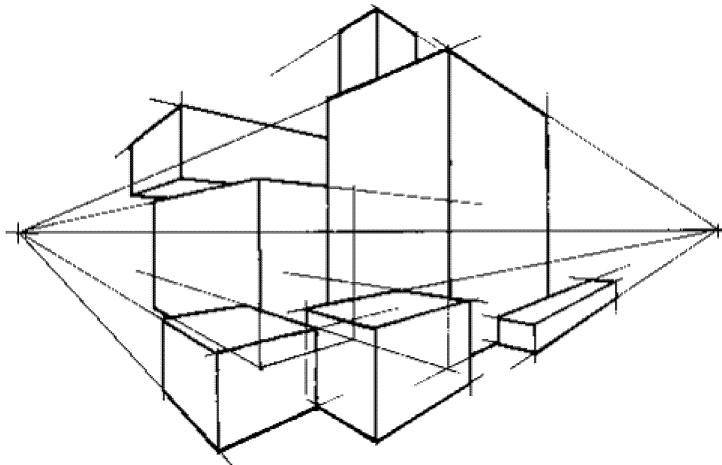
**INSTRUCTIONS TO CANDIDATES**

- 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 the formal starting point for the design of a new product?

- A. The client
- B. The manufacturer
- C. The brief
- D. The specification

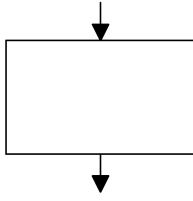
2. What is the following picture an example of?



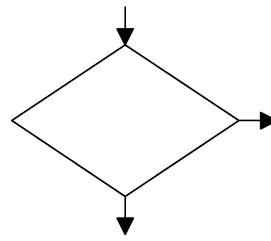
- A. Isometric drawing
- B. Annotated freehand drawing
- C. Perspective drawing
- D. Orthographic drawing

3. Which symbol would be used to represent a decision in a flow chart?

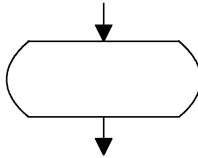
A.



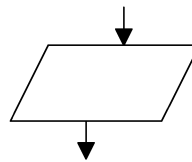
B.



C.



D.



4. At which point in the IB simple design cycle would orthographic drawings be produced?

- A. Researching and specification
- B. Generating ideas
- C. Developing the chosen solution
- D. Planning and realizing the chosen situation

5. Which concept takes account of the relationship between what a product is worth and the amount of money spent on it?

- A. Cost-effectiveness
- B. Value for money
- C. Overheads
- D. Material costs

6. What is an example of qualitative data?
- A. Temperature
  - B. Anthropometrics
  - C. Comfort
  - D. Percentile range
7. What is a disadvantage of using a performance test to collect data?
- A. Very accurate data
  - B. Safety of users
  - C. Largely qualitative data
  - D. Costly in time and money
8. Which is a physical property of a material?
- A. Density
  - B. Tensile strength
  - C. Toughness
  - D. Stiffness
9. Which property of food is of least relevance to consumers?
- A. Density
  - B. Colour
  - C. Texture
  - D. Electrical resistivity

10. In which manufacturing technique is a thicker piece of material produced by joining thinner pieces with adhesive?

- A. Sintering
- B. Extrusion
- C. Joining
- D. Lamination

11. Which combination of hardness and toughness make a material suitable for use as a cutting and machining tool?

**Hard    Tough**

- A. Low    High
- B. High    Low
- C. High    High
- D. Low    Low

12. Which manufacturing technique is used to make plastic pipes?

- A. Machining
- B. Extrusion
- C. Injection moulding
- D. Fusing

13. Which product is in the early stages of its product life cycle?
- A. Domestic robot
  - B. Calculator
  - C. Ball point pen
  - D. Personal computer
14. What is a robot vehicle that moves over a “shop floor”?
- A. CNC
  - B. AGV
  - C. CAD/CAM
  - D. CAM
15. Which are variable costs?
- A. Design costs
  - B. Research and development costs
  - C. Material costs
  - D. Overhead costs
16. At which point in the product life cycle is the following symbol most relevant?



- A. Production
- B. Distribution
- C. Utilization
- D. Disposal

17. Which consideration does **not** form part of an environmental assessment?
- A. Water usage
  - B. Aesthetics
  - C. Pollution
  - D. Energy consumption
18. Which is **not** a design objective for green products?
- A. Cost effectiveness
  - B. Efficient use of materials
  - C. Minimizing noise
  - D. Accounting for the end disposal of the product
19. Which technique for joining metal parts together promotes ease of maintenance?
- A. Fusing
  - B. Sintering
  - C. Screwing
  - D. Glueing
20. What describes a company that voluntarily modifies its entire manufacturing process to adopt clean technologies?
- A. Reactive - Incremental
  - B. Proactive - Radical
  - C. Reactive - Radical
  - D. Proactive - Incremental

21. Which process involves drying out timber after conversion?
- A. Laminating
  - B. Tempering
  - C. Hardening
  - D. Seasoning
22. Which material is laminated?
- A. Softwood
  - B. Plywood
  - C. Particle board
  - D. Hardwood
23. Why is powdered glass used in the manufacture of new glass?
- A. To reduce energy costs
  - B. To reduce brittleness
  - C. To increase toughness
  - D. To increase transparency
24. What is represented by the formula  $3\text{CO} + \text{Fe}_2\text{O}_3 \rightarrow 2\text{Fe} + 3\text{CO}_2$  ?
- A. Production of carbon monoxide
  - B. Reduction of iron oxide to iron
  - C. Production of slag
  - D. Production of carbon dioxide



25. Why is stainless steel chosen by designers to make kitchen sinks?
- A. Aesthetics
  - B. Cost effectiveness
  - C. Corrosion resistance
  - D. Ease of manufacture
26. Which material is a composite and has almost zero electrical resistance at very low temperatures?
- A. Mycoprotein
  - B. Iron
  - C. Cotton
  - D. Superconductor
27. Which property is reduced by alloying?
- A. Ductility
  - B. Hardness
  - C. Toughness
  - D. Tensile strength
28. What is nylon?
- A. Element
  - B. Alloy
  - C. Compound
  - D. Mixture

29. Which material has very high solubility in organic solvents, high electrical resistivity and low stiffness?
- A. Metals
  - B. Plastics
  - C. Ceramic
  - D. Timber
30. Which grain size is produced in a metal by rapid cooling?
- A. Small grains
  - B. Large grains
  - C. Irregular grains
  - D. Linear grains
31. What describes the effect of a load on a thermoplastic when secondary bonds are weakened allowing molecular chains to slide over each other?
- A. Plastic deformation
  - B. Elastic deformation
  - C. Degradation
  - D. Melting
32. How are the atoms in diamond bonded?
- A. Ionic
  - B. Simple covalent
  - C. Network covalent
  - D. Metallic

33. Which materials are composites?

- I. Wattle and daub
- II. Superconductors
- III. Papier Mache

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

34. What is calculated using the formula  $\frac{\text{force}}{\text{area}}$ ?

- A. Strain
- B. Change of length
- C. Stress
- D. Body load

35. Which consideration might result in wind power being rejected as an appropriate form of renewable energy?

- A. Conservation of resources
- B. Reduction of atmospheric pollution
- C. Reduction of operating costs
- D. Aesthetics

36. What is the major advantage of using solar and wind energy sources?
- A. Continuity of supply
  - B. Reduced capital costs
  - C. Reduced maintenance costs
  - D. Reduction of environmental impact
37. Which requires close cooperation between manufacturers and government?
- A. Subsidies for reducing emissions
  - B. Reduced use of raw materials
  - C. Reduced use of energy
  - D. Reduced use of labour
38. What has the growing number of green consumers created?
- A. Market pull
  - B. Technology push
  - C. Short term profitability
  - D. Legislation
39. What is **not** a characteristic of an appropriate technology?
- A. Involves centralised, non-renewable energy sources
  - B. Low in capital cost
  - C. Makes technology understandable to the people who use it
  - D. Not detrimental to quality of life.

40. Products are **not** consistent with sustainable development when they have high:
- A. exchange value.
  - B. use value.
  - C. durability.
  - D. repairability.
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