



**DESIGN TECHNOLOGY  
HIGHER LEVEL  
PAPER 1**

Wednesday 4 May 2005 (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 included in the Product Design Specification (PDS) but not in the design brief?
  - A. The design goal
  - B. The target market
  - C. The criteria for a good design proposal
  - D. The precise limits for performance requirements
  
2. What is **not** represented in the IB elaborated design cycle?
  - A. Designing is a linear process
  - B. Evaluation takes place throughout the process not just at the end
  - C. Ideas for possible solutions may emerge early in the process
  - D. Communication is a key part of the design process
  
3. What is defined as “drawing on a similar situation for a solution”?
  - A. Adaptation
  - B. Analogy
  - C. Constructive Discontent
  - D. Divergent Thinking
  
4. Which model would use symbols to represent the order of activities, *e.g.* in a manufacturing process?
  - A. Mathematical model
  - B. Flow chart
  - C. Algorithm
  - D. Physical model

5. What is **not** true of an ergonome?
- A. It is a scaled 3D model
  - B. It is a scaled 2D model
  - C. It is based on a specific percentile range
  - D. It is used to establish spatial considerations between people and products
6. Which evaluation criterion is of particular importance to manufacturers?
- A. Value for money
  - B. Aesthetics
  - C. Cost-effectiveness
  - D. Availability
7. A performance test is used to
- I. prove that the product complies with relevant standards.
  - II. show how users carry out tasks.
  - III. compare a product with others of a similar design.
- A. I and II
  - B. II and III
  - C. I and III
  - D. I, II and III
8. Which material group has very low electrical resistivity and very high toughness?
- A. Timber
  - B. Metals
  - C. Ceramics
  - D. Plastics

9. The ability of a material to resist penetration or scratching defines
- A. hardness.
  - B. stiffness.
  - C. density.
  - D. toughness.
10. Using a chemical substance to bond two surfaces together is known as
- A. adhesion.
  - B. fusing.
  - C. stitching.
  - D. fastening.
11. What distinguishes sintering from injection moulding?
- A. No finishing is required
  - B. It is suitable for high melting point materials
  - C. A mould is required
  - D. There is a limitation to the size and shape of products
12. Which manufacturing technique can be used for the volume production of regular cross-sectional hollow shapes?
- A. Extrusion
  - B. Lamination
  - C. Sintering
  - D. Injection moulding

13. Which combination of “changes to the design” and “sales” best describes the mature stage of the product life cycle?

	<b>Changes to the design</b>	<b>Sales</b>
A.	Many	Increasing
B.	Many	Steady
C.	Few	Decreasing
D.	Few	Steady

14. Which combination of “flexibility” and “consistency of product quality” characterizes an automated system?

	<b>Flexibility</b>	<b>Consistency of product quality</b>
A.	High	High
B.	High	Low
C.	Low	High
D.	Low	Low

15. Which cost is a variable cost?

- A. Research development costs
- B. Marketing costs
- C. Material costs
- D. Design cost

16. Clean technology applies to which of the following stages in the product life cycle?
- I. Production
  - II. Distribution
  - III. Utilization
- A. I and II
  - B. I and III
  - C. II and III
  - D. I, II and III
17. Which term best represents the objectives of life cycle analysis?
- A. End-of-pipe
  - B. Cradle to grave
  - C. Clean technology
  - D. Green design
18. Acid rain which damages forests is caused by
- A. carbon dioxide from the burning of fossil fuels.
  - B. sulfur dioxide from the burning of fossil fuels.
  - C. chlorofluorocarbon gases being used as propellants for aerosols.
  - D. carbon monoxide from car exhausts.
19. Upgrading a computer by replacing the central processing unit with a more powerful one is an example of
- A. reuse.
  - B. repair.
  - C. recycling.
  - D. reconditioning.

20. Which benefit is **not** likely to be achieved by a manufacturer adopting clean technology?
- A. Avoidance of fines
  - B. Reduced pollution
  - C. Short-term profit
  - D. Reduced use of energy
21. What is true of nylon?
- I. It is a synthetic polyamide fibre
  - II. It needs to be treated to achieve the desired characteristics
  - III. It has low absorbency
- A. I and II
  - B. I and III
  - C. II and III
  - D. I, II and III
22. Why is timber seasoned?
- A. To modify its colour
  - B. To reduce attack by micro-organisms
  - C. To reduce its moisture content
  - D. To enhance its aesthetics
23. Which characteristic of glass is altered in borosilicate glass?
- A. Thermal shock resistance
  - B. Transparency
  - C. Brittleness
  - D. Low reactivity

24. Which statement is **not** true of iron production in a blast furnace?

- A. The raw materials inputs are iron ore, limestone and coke
- B. Limestone is used to remove silicon dioxide
- C. The product outputs are pig iron and slag
- D. Carbon monoxide from the carbon oxidizes the iron

25. Which combination of “fibre content” and “cholesterol content” characterizes mycoprotein?

	<b>Fibre content</b>	<b>Cholesterol content</b>
A.	High	Low
B.	High	High
C.	Low	Low
D.	Low	High

26. Which combination of “fibre type” and “absorbency” characterizes cotton?

	<b>Fibre type</b>	<b>Absorbency</b>
A.	Natural	High absorbency
B.	Synthetic	High absorbency
C.	Natural	Low absorbency
D.	Synthetic	Low absorbency



27. A compound is
- A. the smallest part of an element that can exist chemically.
  - B. a substance that cannot be decomposed into simpler substances.
  - C. two or more atoms which are normally bonded together covalently.
  - D. a substance formed by the combination of elements in fixed portions.
28. Which type of bond involves the sharing of electrons between nuclei?
- A. Ionic
  - B. Hydrogen
  - C. Metallic
  - D. Covalent
29. What does **not** occur as a result of the effect of a load on a thermoplastic material?
- A. Coiled chains are stretched
  - B. Secondary bonds weaken
  - C. Covalent bonds forming cross-linking between chains are broken
  - D. Molecular chains slide over each other
30. What is true of thermosets?
- A. Thermosets are linear chain molecules with little cross-linking
  - B. Thermosets can be elastically deformed
  - C. Thermosets can be easily recycled by the reversible effect of temperature
  - D. Thermosets have strong links between adjacent molecules

31. What is **not** true of Kevlar™?
- A. Linear chains of hydrocarbon rings
  - B. Low elasticity
  - C. High absorbency
  - D. High tensile strength
32. The force per unit area at which plastic deformation begins is called the
- A. strain.
  - B. Young's modulus.
  - C. yield stress.
  - D. stiffness.
33. The factor of safety for a structure is calculated by dividing the design load by the
- A. load.
  - B. normal maximum load.
  - C. yield stress.
  - D. Young's modulus.
34. The product of the distance from a pivot times the load is known as the
- A. bending moment.
  - B. elastic modulus.
  - C. moment arm.
  - D. moment.

35. Which combination of “market demand” and “availability” is likely to increase the exploitation of a reserve?

	<b>Market demand</b>	<b>Availability</b>
A.	High	Low
B.	Low	Low
C.	High	High
D.	Low	High

36. Which technology is low in capital costs, uses local materials, renewable energy sources and creates jobs using local skills and labour?

- A. Alternative technology
- B. Intermediate technology
- C. Appropriate technology
- D. Clean technology

37. What is likely to be most important when considering the use of solar energy to supplement domestic energy sources?

- A. Continuity of supply
- B. Maintenance costs
- C. Environmental impact
- D. Capital costs

38. A designer can respond to consumer pressure for fashion products whilst maintaining sustainability by ensuring that the materials used are
- A. easily cleaned.
  - B. readily available.
  - C. man-made.
  - D. easily recycled.
39. What is **least** likely to encourage a shift from private car-based travel?
- A. Improved public transport systems
  - B. Green design of cars
  - C. Increasing working hours
  - D. Charging for entering urban areas
40. Which characteristic of a product is **not** consistent with sustainable development?
- A. High exchange value
  - B. High use value
  - C. Durability
  - D. Repairability
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