

**DESIGN TECHNOLOGY
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PAPER 1**

Tuesday 18 May 2004 (afternoon)

1 hour

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. Which statement best defines a product design specification (PDS)?
 - A. A description of a design problem.
 - B. The generation of design ideas.
 - C. A target market for the design.
 - D. The precise limits of all performance requirements.

2. In which way does the IB elaborated design cycle model better represent design thought and action than the IB simple design cycle model?
 - A. Evaluation takes place at the end of the cycle
 - B. Market research is recognized
 - C. Designing is a linear process
 - D. Ideas emerge at the “Generating Ideas” stage

3. In which technique for solving problems do designers draw most on similar situations for solutions?
 - A. Adaptation
 - B. Animation
 - C. Analogy
 - D. Algorithm

4. Which statement best describes the outcome of incremental design over a short period of time?
 - A. No changes to a product.
 - B. Small changes to a product.
 - C. Large changes to a product by introducing new materials.
 - D. A completely new product.

5. Observing drivers parking a prototype vehicle is an example of
- A. user research.
 - B. user trial.
 - C. expert appraisal.
 - D. performance test.
6. A manikin is a
- A. 2-D physical model.
 - B. 3-D physical model.
 - C. 2-D mathematical model.
 - D. 3-D mathematical model.
7. The most efficient way of designing and producing a product from the manufacturer's perspective is known as
- A. cost-effectiveness.
 - B. value for money.
 - C. ergonomics.
 - D. manufacturing costs.
8. A material that resists scratching is described as
- A. hard.
 - B. tough.
 - C. brittle.
 - D. stiff.

9. Which material group can be sub-divided into “ferrous” and “non-ferrous”?
- A. Timber
 - B. Plastic
 - C. Food
 - D. Metals
10. What is an example of joining?
- A. Casting
 - B. Fusing
 - C. Weaving
 - D. Moulding
11. What is a disadvantage of sintering?
- A. Size limitations
 - B. Can be used with a wide range of materials
 - C. Low energy requirements
 - D. No surface machining required
12. Which properties are relevant to a material suitable for lamination?
- I. Toughness
 - II. Tensile Strength
 - III. Compressive Strength
- A. I, II and III
 - B. I and II
 - C. I and III
 - D. II and III

13. What is true of mechanising a production process?
- I. Product quality normally increases
 - II. Product cost decreases
 - III. Labour costs increase
- A. I and II
 - B. I and III
 - C. II and III
 - D. I, II and III
14. A machine that uses a computer with appropriate software to perform basic control functions in product manufacture is called a
- A. CAD machine.
 - B. CAM machine.
 - C. CNC machine.
 - D. CIM machine.
15. Which product is in the mature, as opposed to the new or late, stage of its product life cycle?
- A. Ballpoint pen
 - B. Cassette tape
 - C. Floppy disc
 - D. DVD

16. The most obvious initial response a company can make to reduce its emission of atmospheric pollutants is to
- A. minimise waste.
 - B. use renewable energy.
 - C. conserve natural resources.
 - D. apply an end-of-pipe approach.
17. Which strategy promotes the repair of products?
- A. Specifying the use of non-standard parts during product design
 - B. Reducing the packaging material used for product distribution
 - C. Maximising energy efficiency in product use
 - D. Ensuring that the product is easy to maintain
18. Which environmental consideration is likely to be of major importance for a washing machine during the utilization stage of its life cycle?
- A. Water pollution
 - B. Air contamination
 - C. Noise
 - D. Consumption of natural resources
19. Eco-labelling schemes
- A. only consider energy consumption during use.
 - B. are used in every country.
 - C. promote green design.
 - D. do not consider noise during use.

20. Energy-labelling schemes

- A. take account of the energy used at the end disposal of the product.
- B. communicate the energy used in production to potential customers.
- C. analyse potential safety hazards.
- D. communicate the energy efficiency of products in use.

21. What is a composite material?

- A. Stainless steel
- B. Polypropene
- C. Cotton
- D. Plywood

22. Drying out timber after conversion is called

- A. treatment.
- B. seasoning.
- C. dipping.
- D. veneering.

23. Glass is primarily composed of

- A. iron oxide.
- B. calcium oxide.
- C. silicon dioxide.
- D. sodium oxide.

24. Wrought iron in comparison to pig iron
- A. is more brittle.
 - B. has a lower tensile strength.
 - C. has a higher carbon content.
 - D. is a more useful engineering material.
25. Compared with nylon thread, cotton is
- A. very absorbent.
 - B. weaker when wet.
 - C. very elastic.
 - D. more resistant to degradation by ultraviolet rays.
26. One advantage of designing mycoprotein into a range of novel food products is that it is
- A. low in protein.
 - B. high in salt.
 - C. high in cholesterol.
 - D. virtually tasteless.
27. What is the smallest part of an element that can exist chemically?
- A. Element
 - B. Compound
 - C. Atom
 - D. Molecule

28. The strongest bonds are
- A. ionic.
 - B. metallic.
 - C. covalent.
 - D. hydrogen.
29. Permanent deformation of a solid subjected to stress is known as
- A. elasticity.
 - B. plasticity.
 - C. fatigue.
 - D. failure.
30. Which properties characterise Kevlar?
- I. Low absorbency
 - II. Low tensile strength
 - III. Low elasticity
- A. I, II and III
 - B. I and II
 - C. II and III
 - D. I and III

- 31.** The stiffness of a material is defined by its
- A. elastic limit.
 - B. Young's modulus.
 - C. yield point.
 - D. body load.
- 32.** Strain is defined as the
- A. force per unit area acting on a body.
 - B. ratio of a change in dimension to its original value.
 - C. point at which failure occurs.
 - D. ability of a material to resist sudden impacts.
- 33.** The distance of a load from a pivot is called the
- A. moment.
 - B. moment arm.
 - C. factor of safety.
 - D. bending moment.
- 34.** Which type of force tends to shorten a structural member?
- A. Tension
 - B. Compression
 - C. Torsion
 - D. Shear

35. What is an advantage of using renewable energy resources?
- A. Low fixed costs
 - B. Continuity of supply
 - C. Non-depletion of non-renewable resources
 - D. High variable costs
36. Major proposals agreed in Rio de Janeiro in 1992 as part of Agenda 21 aim to prevent
- A. sustainable energy development.
 - B. environmentally-sound transport systems.
 - C. stratospheric ozone depletion.
 - D. reduction in the exploitation of natural resources.
37. Factors favouring recycling include
- A. increases in the availability of virgin raw materials.
 - B. decreases in the cost of virgin raw materials.
 - C. consumer resistance to some products which include waste-based materials.
 - D. subsidies for using recycled materials.
38. Appropriate technologies
- A. are high in capital costs.
 - B. use imported materials, wherever possible.
 - C. create jobs for local people.
 - D. use non-renewable energy sources.

39. What is an example of a non-renewable energy resource?

- A. Wind
- B. Biomass
- C. Coal
- D. Solar

40. Developments that meet present needs without compromising future needs are described as

- A. renewable.
 - B. non-renewable.
 - C. sustainable.
 - D. green.
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