Design Technology HL P1

2006 May

School Level 12th IB Diploma Programme

Board Exam

International Baccalaureate (IB Board)

Solved

IB DIPLOMA PROGRAMME
PROGRAMME DU DIPLÔME DU BI
PROGRAMA DEL DIPLOMA DEL BI

M06/4/DESTE/HPM/ENG/TZ0/XX

22066201

DESIGN TECHNOLOGY
HIGHER LEVEL
PAPER 1

Thursday 18 May 2006 (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. The design brief does **not** identify

A. the design problem.

B. the major constraints for the design solution.

C. the target market.

D. the precise limits for the complete range of performance requirements which must be met.

2. It is important to annotate freehand drawings to

A. explain the thinking behind the visual images.

B. depict the proposed solution in 3-D.

C. enable them to be used as production drawings.

D. enable numerical manipulation.

3. What is defined as *"analysing the situation which would benefit from re-design and working out a strategy for improving it"*?

A. Adaptation

B. Analogy

C. Brainstorming

D. Constructive discontent

4. At which stage in the design cycle would orthographic drawings be most relevant?

A. Generating ideas

B. Developing the chosen solution

C. Planning and realizing the chosen solution

D. Testing and evaluating the chosen solution

5. What is true of an ergonome?

I. It would be used by designers to consider the relationship between people and a product.

II. It is a two-dimensional physical model used with drawings of the same scale.

III. It is based on a specific percentile range.

A. I and II

B. I and III

C. II and III

D. I, II and III

6. What applies to fashion but not to planned obsolescence?

A. Predictable product cycle length

B. Unpredictable product cycle length

C. Increased use of raw materials

D. Increased waste production

7. For which stakeholder group would value for money be the highest priority?

A. Retailers

B. Consumers

C. Designers

D. Manufacturers

8. In order to resist the propagation of cracks a material used to manufacture a tennis racquet should have high

A. toughness.

B. hardness.

C. electrical resistivity.

D. stiffness.

9. Which material group has high density, high tensile strength and high stiffness?

A. Ceramics

B. Plastics

C. Timber

D. Metals

10. Which property combines with toughness to make a material suitable for lamination?

A. Ductility

B. Thermal expansivity

C. Tensile strength

D. Thermal conductivity

11. Shaping processes include the techniques of

A. bending, moulding and casting.

B. machining, cutting and abrading.

C. fusing and stitching.

D. adhesion and use of fasteners.

12. Which technique fuses solid particles using heat and pressure?

A. Injection moulding

B. Casting

C. Lamination

D. Sintering

13. Which combination of capital costs and variable costs characterizes injection moulding?

	Capital costs	Variable costs
A.	High	Low
B.	High	High
C.	Low	Low
D.	Low	High

14. In which stage of the product life cycle has a product diffused into the market place and is selling well?

A. Early

B. Mature

C. Late

D. Decline

15. Which combination of flexibility and labour costs characterizes automation?

	Flexibility	Labour costs
A.	Increased	Decreased
B.	Increased	Increased
C.	Decreased	Decreased
D.	Decreased	Increased

16. Using an empty plastic ice cream container as a toy box is an example of

A. recycling.

B. reconditioning.

C. reuse.

D. repair.

17. One example of an "end-of-pipe" approach to clean-up technologies is

A. the development of renewable energy-based power generating equipment.

B. the use of filters to remove sulfur dioxide from the emissions from a power station.

C. the use of extrusion techniques to produce plastic pipe.

D. the development of a sustainable transport system.

18. The analogy "cradle to grave" considers the environmental impact of a product at all stages of its

A. product cycle.

B. design cycle.

C. product life cycle.

D. planned obsolescence.

19. Labelling plastic products with the plastic type they are made from

A. facilitates recycling of the plastic.

B. minimizes nuisances, such as noise or smell.

C. reduces energy consumption during manufacturing.

D. minimizes potential safety hazards.

20. Which benefit would a company derive from early adoption of a voluntary energy-labelling scheme?

A. Avoidance of fines

B. Competitive advantage with green consumers

C. Reduced advertising costs

D. Reduced production costs

21. What is true of coniferous trees?

A. They grow in temperate and tropical climates

B. They are deciduous

C. They are referred to as softwoods

D. They do not need to be seasoned to be workable

22. The primary reason for adding scrap glass to new raw materials for making glass is to

A. reduce the cost of raw materials.

B. make the process more economic.

C. recycle the scrap glass.

D. toughen the glass.

23. What is used to remove silicon dioxide from iron ore in a blast furnace?

A. CaO

B. Fe_2O_3

C. C

D. $CaSiO_3$

24. Which combination of properties characterizes cotton?

	Absorbency	Elasticity
A.	Low	High
B.	Low	Low
C.	High	High
D.	High	Low

25. Which process is used to give mycoprotein its required shape for a novel food product?

A. Mixing

B. Binding

C. Forming

D. Fermenting

26. Which statement is **not** true of superconductors?

A. They are ionic compounds

B. Their resistivity becomes nearly zero at temperatures below about 140K

C. They are ceramic alloys

D. They are manufactured by sintering

27. A negative ion results from

A. decomposing a substance into simpler substances.

B. two atoms bonding together.

C. electron loss from an atom or molecule.

D. electron gain by an atom or molecule.

28. A material which does **not** have a regular crystal pattern is described as

A. a mixture.

B. a network covalent structure.

C. an amorphous material.

D. a fibre.

29. What material group has covalent bonding, high electrical resistivity, very low hardness and medium-high toughness?

A. Plastics

B. Textile fibres

C. Timber

D. Ceramic

30. What is true of cooling a molten metal?

I slow cooling results in a smaller grain size

II rapid cooling results in a smaller grain size

III selective cooling results in directional properties

A. I and II

B. I and III

C. II and III

D. I, II and III

31. Which type of bonding is there between the linear chain molecules of a thermoplastic?

A. Metallic bonds

B. Ionic bonds

C. Primary bonds

D. Secondary bonds

32. Extremely fine Kevlar® fibres can be woven into a fabric and laminated with resin to make a material that can be used for bullet proof garments. Which combination of material properties makes Kevlar® suitable for this application?

	Tensile strength	Elasticity
A.	High	High
B.	High	Low
C.	Low	High
D.	Low	Low

33. Where on a stress-strain graph does plastic deformation begin?

A. Elastic region

B. Yield point

C. Plastic flow region

D. Ultimate tensile stress (UTS)

34. Stiffness is calculated as:

A. $\frac{\text{force}}{\text{area}}$

B. $\frac{\text{change of length}}{\text{original length}}$

C. $\frac{\text{stress}}{\text{strain}}$

D. $\frac{\text{load}}{\text{deflection}}$

35. Alternative technology

I. may use new types of equipment

II. may use new organizational forms

III. is a viable alternative to existing mainstream technologies

A. I and II

B. I and III

C. II and III

D. I, II and III

36. Which factor is likely to promote exploitation of reserves?

A. High demand

B. High market availability

C. Expensive exploitation technology

D. Low recycling costs

37. Passive solar design maximizes the benefits of heat gained from the sun through a range of strategies (*e.g.* careful design of the size of the windows). It can be used to reduce energy consumption during which stage of the life cycle of a building?

A. Design

B. Production

C. Use

D. Disposal

38. Consumer resistance about returning products to collection points is a major barrier to the feasibility of recycling. Consumer resistance to recycling could be overcome by

A. increasing manufacturing capacity.

B. providing incentives for consumers.

C. reviewing technical factors.

D. improving product labelling.

39. Which combination of profit and timescales characterizes the motivation of many manufacturers and makes sustainable development more difficult to achieve?

	Profit	Timescales
A.	Low	Long
B.	High	Long
C.	Low	Short
D.	High	Short

40. Designing planned obsolescence into products is consistent with sustainable development if the materials are

A. easily recycled.

B. easily cleaned.

C. readily available.

D. man-made.

IB DIPLOMA PROGRAMME
PROGRAMME DU DIPLÔME DU BI
PROGRAMA DEL DIPLOMA DEL BI

M06/4/DESTE/HPM/ENG/TZ0/XX/M

MARKSCHEME

May 2006

DESIGN TECHNOLOGY

Higher Level

Paper 1

2 pages

1.	D	16.	C	31.	D	46.	–
2.	A	17.	B	32.	B	47.	–
3.	D	18.	C	33.	B	48.	–
4.	C	19.	A	34.	D	49.	–
5.	B	20.	B	35.	D	50.	–
6.	B	21.	C	36.	A	51.	–
7.	B	22.	B	37.	C	52.	–
8.	A	23.	A	38.	B	53.	–
9.	D	24.	D	39.	D	54.	–
10.	C	25.	C	40.	A	55.	–
11.	A	26.	A	41.	–	56.	–
12.	D	27.	D	42.	–	57.	–
13.	A	28.	C	43.	–	58.	–
14.	B	29.	A	44.	–	59.	–
15.	C	30.	C	45.	–	60.	–