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

N05/4/DESTE/HPM/ENG/TZ0/XX+

DESIGN TECHNOLOGY
HIGHER LEVEL
PAPER 1

Monday 7 November 2005 (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. A design brief is

A. the formal starting point for the design of a product.

B. a set of precise limits outlining performance requirements.

C. set by the manufacturer.

D. the criteria against which the design can be evaluated.

2. The final product is tested and evaluated against the

A. design brief.

B. chosen solution.

C. product design specification.

D. detailed design.

3. Constructive discontent is a strategy for developing

A. a design brief.

B. a new solution.

C. an initial idea.

D. a working drawing.

4. As a result of a brainstorming session, it was decided to call a computer input device a mouse. This is an example of

A. adaptation.

B. analogy.

C. constructive discontent.

D. convergent thinking.

5. What is anthropometrics?

I. Using body measurements, including size, strength and physical capacity.

II. The application of scientific information about humans to the design of objects.

III. The analysis of comments by people who have used a product.

A. I only

B. II only

C. I and II only

D. I, II and III

6. Which methods would be used for evaluating the ergonomics of a motorcar?

I. User trial

II. User research

III. Expert appraisal

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

7. What is a disadvantage of planned obsolescence for consumers?

A. More choice

B. Increased innovation

C. More competition

D. Need to replace products more often

8. Which material group usually has very high thermal conductivity, high density and very high toughness?

A. Metals

B. Timber

C. Ceramics

D. Plastics

9. Which property is difficult to quantify scientifically?

A. Tensile strength

B. Density

C. Aesthetics

D. Stiffness

10. Which manufacturing technique would be most suitable for the production of rectangular metal tubing?

A. Sintering

B. Injection moulding

C. Extrusion

D. Welding

11. The advantage of injection moulding as a manufacturing technique is

A. rapid production and little or no finishing required.

B. low capital costs.

C. can be used for a range of material groups.

D. the ability to produce continuous lengths of hollow shapes.

12. Shaping is best defined as

A. a general term for making products.

B. putting two or more components together.

C. removing material using hand tools and machines to create shapes.

D. forming materials into shape by particular techniques.

13. What is a disadvantage of automating a production system?

A. Increased capital costs

B. Increased flexibility of manufacturing

C. Reduced need for quality control

D. Increased employment

14. A product that has diffused into the marketplace, gained acceptance and is selling well with no sign of decline is at which stage of its product life cycle?

A. Early

B. Mature

C. Late

D. Decline

15. Which cost is high as a proportion of the total cost in a hand crafted wooden toy?

A. Capital

B. Labour

C. Research

D. Sales

16. Which strategy can be considered an end of pipe approach to dealing with carbon dioxide emissions?

A. Introducing new technologies

B. Enhancing efficiency in the use of energy

C. Using renewable energy resources

D. Planting trees to capture carbon dioxide

17. During which stage of the life cycle of a refrigerator would energy consumption be a major concern for the consumer?

A. Production

B. Distribution

C. Use

D. Disposal

18. Which chemical causes destruction of the ozone layer?

A. Oxygen

B. Carbon monoxide

C. Chlorofluorocarbon

D. Nitrogen

19. The behaviour of environmentally irresponsible companies has resulted in

A. more efficient use of raw materials.

B. legislation.

C. less pollution.

D. increased product life.

20. Designing computers so that they can be upgraded is an example of

A. reuse.

B. repair.

C. recycling.

D. redesigning.

21. Raw timber needs to be seasoned to

A. cut it into useful sizes.

B. reduce the size.

C. reduce moisture content.

D. increase quality.

22. Approximately how much scrap glass can be added to new raw materials to make glass manufacturing more economical?

A. 10 %

B. 20 %

C. 50 %

D. 90 %

23. Which material is added to soda-lime silica glass to improve its thermal shock resistance?

A. SiO_2

B. Na_2O

C. B_2O_3

D. Al_2O_2

24. What is a characteristic of hardwood trees?

A. Needle like leaves

B. Fast growing

C. Grow only in temperate regions

D. Lose leaves in winter

25. Which statement is **not** true?

A. Carbon monoxide from carbon reduces iron oxide to iron metal in a blast furnace.

B. Calcium oxide from limestone removes the impurity silicon dioxide from iron in a blast furnace.

C. Wrought iron has a higher carbon content than pig iron.

D. The product of a blast furnace is an alloy called pig iron.

26. The most common treatment for mild steel used in car bodies is

A. anodizing.

B. painting.

C. plastic coating.

D. vitreous enamelling.

27. What is defined as force per unit area?

A. Strain

B. Stress

C. Young's modulus

D. Stiffness

28. A molecule is

A. the smallest part of an element that can exist chemically.

B. a substance formed by the combination of elements in fixed proportions.

C. a substance that cannot be decomposed into simpler substances.

D. two or more atoms which are normally bonded together covalently.

29. In which type of bond does the outer electron shells of atoms overlap and become shared between nuclei?

A. Ionic

B. Covalent

C. Metallic

D. Hydrogen

30. Selective cooling of metal allows

A. material to diffuse between neighbouring grains.

B. smaller grains to form.

C. directional properties to be developed in the metal.

D. larger grains to form.

31. Which statements are true?

I. Thermosets have strong primary bonds between adjacent polymer chains.

II. Thermosets cannot be reshaped repeatedly with heat.

III. Polypropene is a thermoset.

A. I and II only

B. II and III only

C. I and III only

D. I, II and III

32. Which material is **not** a composite?

A. Wood

B. Concrete

C. Kevlar

D. Glass

33. Which type of force extends a structural member?

A. Tension

B. Compression

C. Torsion

D. Bending

34. The distance between a load and a pivot is called the

A. bending moment.

B. moment.

C. couple.

D. moment arm.

35. Which technology stands between traditional and modern technologies?

A. Intermediate

B. Appropriate

C. Alternative

D. Information

36. Sustainable development includes a concern for

A. energy efficiency.

B. selling more products.

C. planned obsolescence.

D. short-term profits.

37. Resources that are naturally replenished in a short time are known as

A. local.

B. appropriate.

C. renewable.

D. non-renewable.

38. Which form of electricity generation produces least pollution?

A. Coal

B. Nuclear

C. Oil

D. Hydro

39. Which factors affect the choice of manufacturing process?

I. Availability of energy

II. Efficiency of energy conversion

III. Cost and type of energy source

A. I and II only

B. II and III only

C. I and III only

D. I, II and III

40. A product that is consistent with sustainable development should

I. control humans.

II. be produced locally.

III. be regarded as part of a culture.

A. I and II only

B. II and III only

C. I and III only

D. I, II and III