IBO

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

DESIGN TECHNOLOGY
STANDARD LEVEL
PAPER 1

Monday 20 May 2002 (afternoon)

45 minutes

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 symbol is used to represent input/output in a flow chart?

A. ▭

B. ⬭

C. ◇

D. ▱
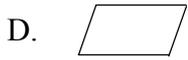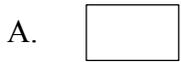
2. What could be represented by an algorithm?

A.   A range of design ideas

B.   An algebraic equation

C.   A sequence of instructions

D.   A complicated electronic system

3. Which tool would a designer use for analysing complicated electronic systems?

A.   A processing block diagram

B.   An algorithm

C.   An orthographic sketch

D.   A 3D sketch

4. Which types of thinking are most important when developing the final details of a design?

    I.   Analytical
    II.   Convergent
    III. Divergent

A.   I and II

B.   II and III

C.   I and III

D.   I, II and III

5. Which is an example of symbolic modelling?

    A. A wooden replica of a proposed new object

    B. A computer spreadsheet

    C. A folded paper model

    D. A computer-generated 3D representation

6. Which is likely to be the **least** significant design consideration in planning an office layout?

    A. Smell

    B. Sound

    C. Light

    D. Colour

7. Which percentile range would be used to design a new playground ride?

    A. 99th percentile

    B. 95th percentile

    C. 50th percentile

    D. 5th percentile

8. Which strategy ensures a continuing market for products and enables the incorporation of new technologies in later versions?

    A. Responsible Designing

    B. Social Engineering

    C. Planned Obsolescence

    D. Scientific Marketing

Turn over

9.   Which statement does **not** reflect social responsibility in design?

   A.   Material use

   B.   Recyclability

   C.   Energy use

   D.   Aesthetics

10.   When producing a range of new toys a designer has to appeal to both children and parents.   Which consideration is **most** likely to influence the parent?

   A.   Safety

   B.   Feel

   C.   Smell

   D.   Colour

11.   Which is a mechanical property of a material?

   A.   Density

   B.   Hardness

   C.   Stiffness

   D.   Thermal Conductivity

12.   Which material property uses units of $Wm^{-1} K^{-1}$?

   A.   Density

   B.   Thermal expansion

   C.   Thermal conductivity

   D.   Electrical resistance.

13. Which material group **cannot** be shaped by moulding?

    A.   Metals

    B.   Timber

    C.   Food

    D.   Ceramics

14. What defines toughness?

    A.   A mixture of materials, one of which is plastic

    B.   The ability of the material to resist deterioration in a damp environment

    C.   The ability of the material to resist the propagation of cracks

    D.   The resistance of the material to abrasion

15. Which statements are true of a woven fabric?

        I.   Made up of a number of interlocked threads

        II.   Can be fastened by stitching

        III.   Must be cut by machine

    A.   I, II and III

    B.   I and III

    C.   II and III

    D.   I and II

16. What is defined as a general term for making products covering a range of techniques?

    A.   Mechanisation

    B.   Manufacturing process

    C.   Manufacturing technique

    D.   Machining

17. How would the body of the product shown below be produced?

    A.   Casting

    B.   Machining

    C.   Weaving

    D.   Extruding

18.   Which material group has the following properties?

Density	High
Electrical Resistance	Very low
Toughness	Very high
Thermal Conductivity	High
Stiffness	High

   A.   Food

   B.   Metals

   C.   Ceramics

   D.   Plastics

19.   Why are new materials produced?

   A.   Materials with the required properties do not exist.

   B.   Consumers demand new things.

   C.   To create consumer demand.

   D.   To use scientific resources.

20.   What is a composite?

   A.   A material made up of small pieces joined together

   B.   A mixture of one or more metals

   C.   A mixture composed of two or more materials with one substance acting as the matrix or glue

   D.   A thermoplastic material able to withstand high impact loads

21. Which combination of "relative value" and "market demand" is generally true of craft-produced items?

	Relative Value	Market Demand
A.	High	High
B.	High	Low
C.	Low	High
D.	Low	Low

22. Which are examples of one off production?

I.   A mould for an injection moulding machine

II.   A scale model of a proposed new product

III.   An exhibition stand and display

A.   I and II

B.   II and III

C.   I and III

D.   I, II and III

23. Which combination of "number of items being disposed of" and "value of materials" encourages recycling?

	Number of items being disposed of	Value of recycled materials
A.	Low	Low
B.	Low	High
C.	High	Low
D.	High	High

24. Which are variable costs?

    A.   Capital costs

    B.   Design costs

    C.   Material costs

    D.   Plant and machinery costs

25. Which statements describe a NAND gate?

    I.   It has two or more inputs

    II.

    III.   It performs the AND function and inverts the output

    A.   I and II

    B.   I and III

    C.   II and III

    D.   I, II and III

26. What is the output voltage (V_{out}) for the operational amplifier circuit shown below?

    A.   0.08 V

    B.   – 8 V

    C.   8 V

    D.   – 80 V

Turn over
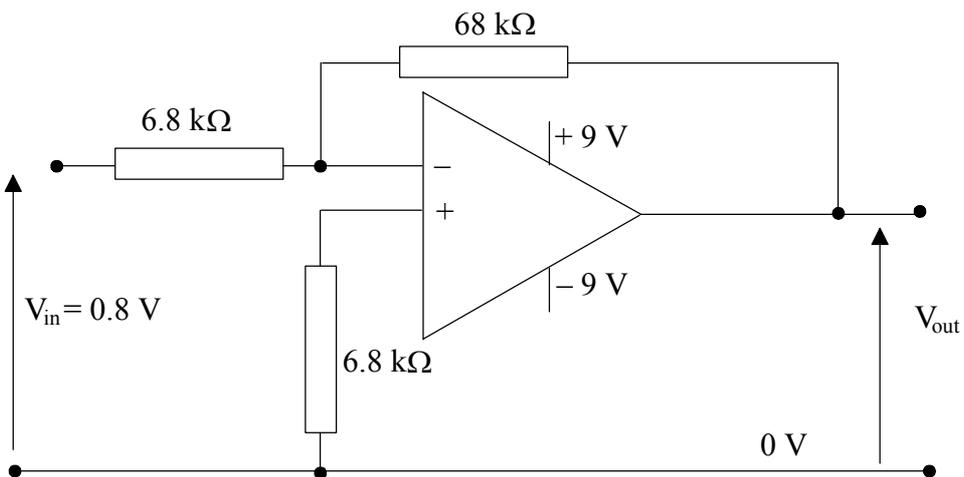
27. Which statements are true of a closed loop system?

      I.   A reference signal is compared with a feedback signal so that a control action can be performed.

      II.   An analogue signal is converted to a digital signal.

      III.   A non-electrical signal is converted into an electrical signal.

    A.   I only

    B.   II only

    C.   III only

    D.   I and II

28. Which logic gate has the truth table shown below?

Input		Output
A	B	
0	0	1
0	1	0
1	0	0
1	1	0

A.

B.
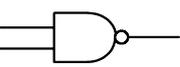
C.

D.

29. What is the function of a transducer?

    A.   It changes an analogue signal to a digital signal.

    B.   It changes a non-electrical signal into an electrical signal or vice versa.

    C.   It changes a low voltage to a higher voltage.

    D.   It amplifies a signal so that it can be detected.

30. Which term describes the output (V_{out}) from the circuit shown below?
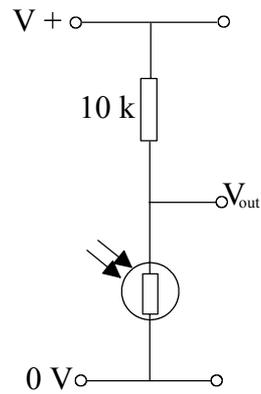
A. Analogue

B. Open loop

C. Digital

D. Feedback