

**You should attempt all questions.**

**Each question is equally weighted.**

**Answer all questions in the script book provided.**

### **Question 1. (Project Management)**

According to Haynes, throughout a project's life cycle, management focuses on three basic parameters. Each of these parameters is specified in detail during the planning phase of the project. These specifications then form the basis for control during the implementation phase.

List the three basic parameters and *briefly* explain how each sets and controls a different dimension of a project's operation and outcomes.

### **Question 2. (CAD Drawing)**

1. What is the name of the Australian drawing standard? (Select one answer and write it in your script book.)
  - (a) SAA HB1.
  - (b) 74LS32.
  - (c) AS1100.
  - (d) IEEE/ANSI Standard 91-1984.
  - (e) CAD Metrics-1986.
  
2. Which phrase describes **orthogonal projection**? (Select one answer and write it in your script book.)
  - (a) All axes are inclined to plane of projection, lines of sight are perpendicular to plane of projection.
  - (b) Object is shown with principal face parallel to plane of projection, one axis inclined. Lines of sight are parallel to each other but oblique to plane of projection.
  - (c) Six 2-dimensional views of an object are drawn from both sides of three perpendicular planes.
  - (d) Lines of sight converge at eye of observer. Plane of projection is between observer and object.
  
3. Define **tolerance**.

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### Question 3. (Electronic Wiring Diagrams)

1. Draw a **crossover**.
2. Draw a **four-way junction**.
3. *Why* is a four-way junction drawn in that way?
4. Usually lines and symbols are drawn horizontally or vertically. *Name* one circuit that is often drawn *diagonally*.

### Question 4. (Electronic Logic Symbols)

Draw **all** the following gates using either the Australian standard for Electronic Logic Symbols, or the very similar IEEE standard symbols.

1. Three input NAND gate.
2. Four input OR gate.
3. Two input XOR gate.

### Question 5. (Interconnection of Circuits)

*Describe* these two types of electrical connections. (Sketching some pictures may help you to explain.)

1. Thru-hole.
2. Wire-wrap.

### Question 6. (Drawing Circuit Diagrams and Protel Schematic)

1. Suppose you are a design engineer who needs to draw a circuit diagram. The old method was to make a freehand sketch then hand it to a draughtsman to produce a professional drawing. *In point form*, state **three** advantages of using CAD (computer aided design) tools instead.
2. In Protel, a **netlist** actually comprises two lists, the components and the nets (representing the nodes or connections between components in the circuit). Each item in the component list has four parts. *List* them, in point form.

**Question 7. (Designing Printed Circuit Boards)**

1. When placing components on the PCB, it must be done with the aim of **minimizing** what?  
*Why?*
2. What is a **rats nest**?
3. What is **routing**?

**Question 8. (Electronic Workbench, Protel, and Mini-Project)**

1. Did you find Electronic Work Bench easier or more difficult to use than Protel Schematic? Very briefly *discuss* (one paragraph should suffice), giving **three reasons** for your opinion.
2. In the Mini-Project, what was the purpose of the DIP Switch?