



Practice Aptitude Assessment
for
Electrical Industry
(Electrical/Electronics Apprentice)

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ENGLISH

Spelling

1. Put the following words into alphabetical order: _____
- | | | |
|----------------------|----------------------|-------|
| Electrical fitter | Air conditioning | _____ |
| Trainee electrician | Electronics consumer | _____ |
| Air compressors | Electrical equipment | _____ |
| Training coordinator | | _____ |

2. The following text has spelling errors. Correct those errors and list them in the order you find them in the text.
- To become a Systems Electrician usually requires the completion of a New Apprenticeship in Electro-technology or Engineering - Electrical/Electronics Trade.
- _____
- _____
- _____
- _____

Comprehension

This is a test of how well you understand what you read. Read the following passages below then answer the questions that follow.

Programmable Logic Controllers.

There are three common control systems in use today, and each has its advantages and disadvantages. The oldest system is the **hard-wired relay system**, using relays as the control and logic devices, and using insulated wires for the interconnections between the relays. The system is time-consuming to set up and fault-find, and due to the large number of contacts and interconnections, may be unreliable over a long period of time. It is easy to fault-find, however, as most relays have visible contacts, and the moving parts make it simple to observe what is happening in the circuits. It is not easily damaged by slightly elevated supply voltages, and is not affected by electrical 'noise' and static electricity.

The second system is the **fixed logic system**. It employs hard-wired 'silicon chips' to simulate the equivalent relay circuit, and it is usually built on a printed circuit board, which uses copper 'tracks' on the circuit board instead of wires. Its reliability is very good, as it lacks the moving contacts of the relay system, but cheap units may develop faults due to poor soldering or mishandling. The 'silicon chip' circuitry can easily be destroyed by relatively low voltages or static electricity, and specialised skills and equipment may be required to repair fixed logic systems. Often, a fixed logic system printed circuit board is treated as an unrepairable module, and may be replaced (at significant expense) rather than being repaired due to this difficulty in repairing it. It may be sensitive to elevated supply voltages, may respond to electrical 'noise' and can be destroyed by static electricity.

The third system is the **Programmable Logic Controller**. The Programmable Logic Controller (PLC) is a simple computer that can accept inputs from electrical control devices such as thermostats, pressure switches, relays, and other contacts. It can also drive electrical outputs such as lamps, relays, solenoids, contactors etc. These devices are often referred to as 'Programmable Controllers'. The computer is built on a printed circuit board, like the fixed logic systems. Early models performed only logic functions, so the name 'Programmable Logic Controller' was appropriate. Recent models are capable of complex, non-logic functions, and some manufacturers have reflected this ability by dropping the 'Logic' reference. As the abbreviation for 'Programmable Controller' became 'PC', there was often confusion between these devices and the Personal Computer. Hence, although the PLC is capable of far more than simple 'logic' operations, the abbreviation usually retains the 'L' reference to differentiate the PLC from the IBM-type PC.

Although the initial cost of a PLC system may be higher than other systems, PLCs are appearing in many applications these days because of their advantages over other systems. These include:

- their flexibility in being reprogrammable to do different tasks;
- their reliability due to their lack of moving parts and contacts;
- the ease with which they can be programmed;
- their simplicity of design and installation. Like fixed logic systems, PLCs may also be sensitive to elevated supply voltages, may respond to electrical 'noise' and can be destroyed by static electricity.

Now read each of the following questions and possible answers given below, and from the previous description, indicate what you think the suitable answer or answers might be for each of the questions below. Note that there may be **more than one** suitable answer to some questions.

3. Which of the 3 systems described above is the oldest one?
 (a) Hard-wired Relay System, (b) Fixed Logic System
 (c) Programmable Logic Controller _____
4. Which of the above systems may develop problems due to poor soldering?
 (a) Hard-wired Relay System, (b) Fixed Logic System
 (c) Programmable Logic Controller _____

Mathematics

Numbers (Scientific Notation, Rounding, Estimating)

1. Round
 (a) $35 \cdot 6754$ to two decimal places _____
 (b) $425 \cdot 8$ to the nearest tens _____
2. Write in descending order:

$\frac{2}{3}$	$0 \cdot 3$
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3. Evaluate the following:

(a) 10^2

(b) $\sqrt{36}$

Arithmetic (Addition, Subtraction, Multiplication, Division)

4. Find the total of:

(a) \$2, \$21 · 45 and \$8 · 23

5. Simplify:

(a) $\frac{50 + 50}{2 \times 25}$

Fractions

6. Add the following:

(b) $\frac{2}{9}$ and $\frac{5}{6}$

7. Subtract the following:

(a) $\frac{5}{6} - \frac{1}{4}$

8. Express as a fraction in lowest terms

(a) $2 \cdot 6$

Percentages

9. Michelle earns \$500 a week as an apprentice electrician. She gets a pay rise of 5%. What is her new wage?

10. Electrical goods are subject to a goods and services tax (GST) of 10% of the sale price. If a refrigerator's pre-tax price is \$850

(a) what is the tax

(b) selling price

Algebra

11. Remove the brackets and simplify the following:

(a) $(2x+y) - (x-4y)$ _____

12. The formula for working out the voltage is $V=E-iR$.
Re-arrange the formula to:

(a) make E the subject _____

Perimeter, Area, Volume

13. An electric car is travelling at 60km/hr, how far will it travel in 3 hours? _____

14. Two numbers add up to 40. Find the other number if one of the numbers is 15? _____