

**Psychometric Success**

***Fault  
Diagnosis***

***Practice Test 1***

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# FAULT DIAGNOSIS – PRACTICE TEST 1

**F**ault Diagnosis tests are used to select technical personnel who need to be able to find and repair faults in electronic and mechanical systems. As modern equipment of all types becomes more dependent on electronic control systems (and arguably more complex) the ability to approach problems logically in order to find the cause of the fault is increasingly important.

Fault Diagnosis		Operatives	Supervisory	Management
Craft & Technical		Y	Y	Y
Clerical & Administrative				
Police, Fire, Military etc.	M	M - Usually restricted to technical roles in military		
Management Trainee				
Graduate & Professional				

This type of test is used extensively to select technical and maintenance personnel as well as to select for artificer (technical) roles within the armed forces. For example, aircraft technician.

This type of test usually forms part of a test battery in which verbal and numerical reasoning also feature. No specialised knowledge is required to answer these fault diagnosis questions (unlike mechanical reasoning).

Only when you are happy that you understand how these questions work should you attempt the sample paper. Remember that the object is to work systematically through the questions and avoid mistakes.

## *Example Question 1*

There are two components to this question.

1. A grid which describes the function of a series of switches.
2. A flowchart showing: input—switches—output.

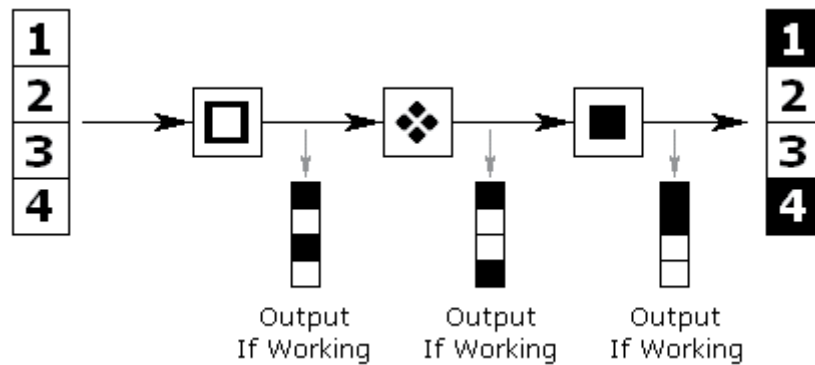
Each of the switches acts to alter the input before the next switch in the series.

Switch	Function	Code
◆	Inverts 1 & 2 (on=off, off=on)	<b>A</b> - Indicates Fault
□	Inverts 1 & 3 (on=off, off=on)	<b>B</b> - Indicates Fault
■	Inverts 2 & 4 (on=off, off=on)	<b>C</b> - Indicates Fault
⬢	Inverts 3 & 4 (on=off, off=on)	<b>D</b> - Indicates Fault
	<b>N</b> = On <b>N</b> = Off	<b>E</b> - Indicates No Faults

This grid shows four switches and their effect on four numbered inputs which may be either on or off. The first switch (diamond symbol) inverts inputs one and two. That is, if the input is on, it is turned off and if it is off it is turned on. The other switches act in a similar way as detailed in the grid. If a switch is not working then it has no effect on the input which passes through unchanged.



## FAULT DIAGNOSIS—PRACTICE TEST 1



In this example flowchart, all of the inputs (numbered 1, 2, 3, 4) are on.

When these inputs pass through the first switch 1 & 3 are inverted (i.e. switched off).

These modified inputs (1=off, 2=on, 3=off, 4=on) then pass through the second switch.

The second switch inverts inputs 3 & 4, which gives (1=off, 2=on, 3=on, 4=off).

These modified inputs (1=off, 2=on, 3=on, 4=off) then pass through the third switch.

The third switch should invert inputs 2 & 4, giving (1=off, 2=off, 3=on, 4=on).

However the third switch is not working so the output from switch two is not changed.

The answer to this question is therefore 'C' — because switch type 'C' is at fault.

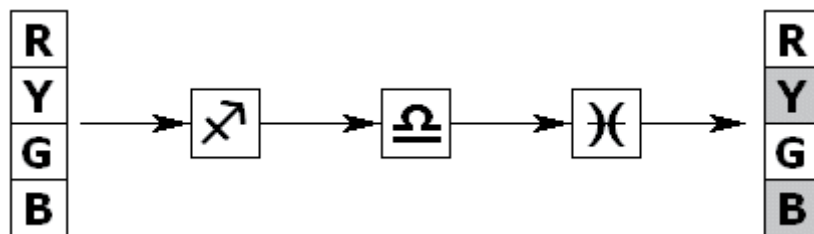
## Example Question 2

There are two components to this question.

1. A grid which describes the function of a series of switches.
2. A flowchart showing: input – switches – output.

Switch	Function	Fault	Code
↗	Allows all colours to pass	Allows only red to pass	<b>A</b>
Ω	Allows only red & yellow to pass	Allows only green & blue to pass	<b>B</b>
)(	Turns on red & green	Turns on yellow & blue	<b>C</b>
⌘	Toggles all colours	Toggles red & blue	<b>D</b>
No Faults			<b>E</b>
<span style="border: 1px solid black; padding: 2px;">R</span> = Red <span style="border: 1px solid black; padding: 2px;">Y</span> = Yellow <span style="border: 1px solid black; padding: 2px;">G</span> = Green <span style="border: 1px solid black; padding: 2px;">B</span> = Blue <span style="display: inline-block; width: 15px; height: 15px; border: 1px solid black; background-color: white; margin: 0 5px;"></span> = On <span style="display: inline-block; width: 15px; height: 15px; border: 1px solid black; background-color: gray; margin: 0 5px;"></span> = Off			

This grid shows four switches and their effect on four coloured inputs which may be either on or off. For example, the first switch (arrow symbol) allows all colours to pass when working but when at fault allows only red to pass.



In this example, all of the inputs (Red, Yellow, Green, Blue) are on.

When these inputs pass through the first switch, all colours are allowed to pass if the switch is working and only red is allowed to pass if the switch is at fault.

## FAULT DIAGNOSIS – PRACTICE TEST 1

This modified input passes through the second switch which allows only red and yellow to pass if the switch is working and only green and blue to pass if the switch is at fault.

This modified input passes through the third switch which turns on red and green if the switch is working and turns on yellow and blue if the switch is at fault.

Once again, you need to compare the input and output and determine which of the switches is at fault. In this case, it is switch 'A' (the first switch) which allows all colours to pass when working but allows only red to pass when at fault.

Note that the fourth switch (not used in this question) 'toggles' the lights. That is, it switches a light off if it is on and vice versa.

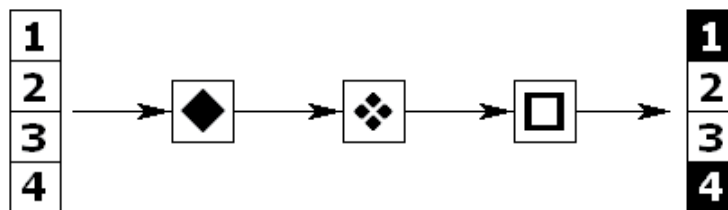
# FAULT DIAGNOSIS—PRACTICE TEST 1

## Test 1—12 Questions

Answer as many questions as you can in 10 minutes. Circle the letter on the right which corresponds to the correct answer.

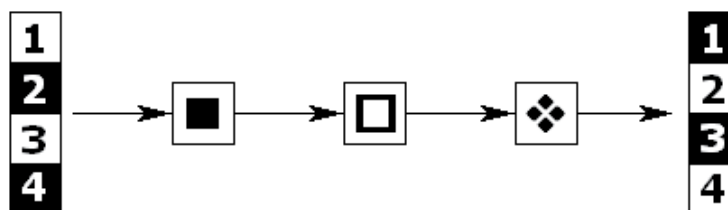
Switch	Function	Code
◆	Inverts 1 & 2 (on=off, off=on)	<b>A</b> - Indicates Fault
□	Inverts 1 & 3 (on=off, off=on)	<b>B</b> - Indicates Fault
■	Inverts 2 & 4 (on=off, off=on)	<b>C</b> - Indicates Fault
◆◆	Inverts 3 & 4 (on=off, off=on)	<b>D</b> - Indicates Fault
<div style="display: inline-block; border: 1px solid black; padding: 2px;">N</div> = On <div style="display: inline-block; border: 1px solid black; padding: 2px; background-color: black; color: white;">N</div> = Off		<b>E</b> - Indicates No Faults

1) Which switch is showing a fault?



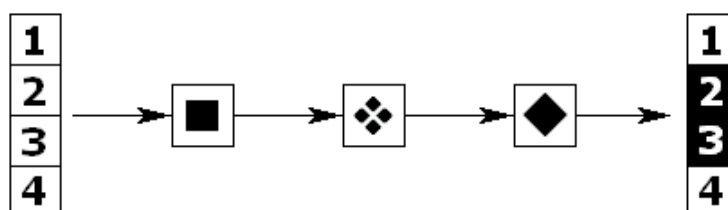
A B C D E

2) Which switch is showing a fault?







A B C D E

3) Which switch is showing a fault?

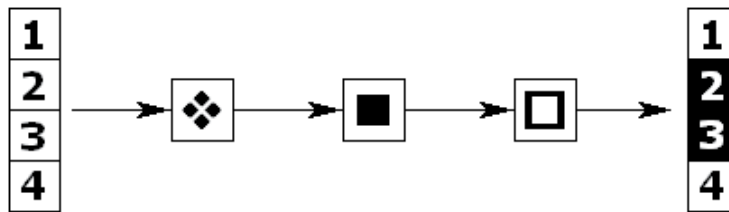


A B C D E

# FAULT DIAGNOSIS – PRACTICE TEST 1

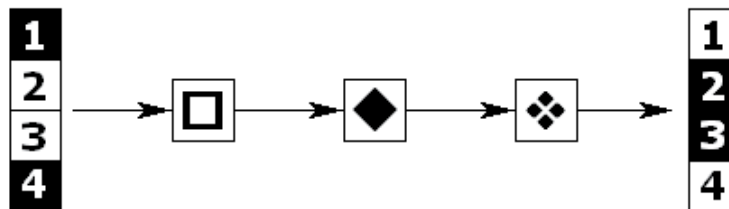
Switch	Function	Code
	Inverts 1 & 2 (on=off, off=on)	<b>A</b> - Indicates Fault
	Inverts 1 & 3 (on=off, off=on)	<b>B</b> - Indicates Fault
	Inverts 2 & 4 (on=off, off=on)	<b>C</b> - Indicates Fault
	Inverts 3 & 4 (on=off, off=on)	<b>D</b> - Indicates Fault
<b>N</b> = On <b>N</b> = Off		<b>E</b> - Indicates No Faults

4) Which switch is showing a fault?



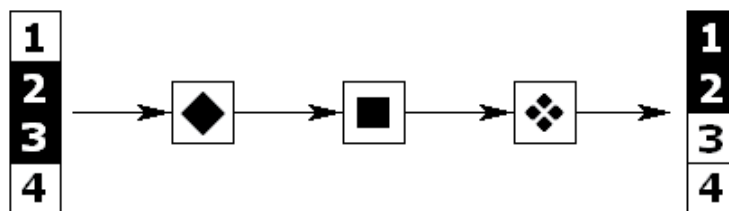
A B C D E

5) Which switch is showing a fault?



A B C D E

6) Which switch is showing a fault?



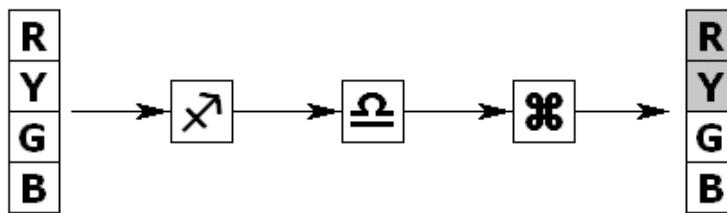
A B C D E



# FAULT DIAGNOSIS – PRACTICE TEST 1

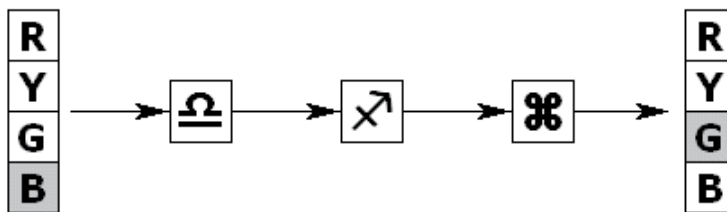
Switch	Function	Fault	Code
	Allows all colours to pass	Allows only red to pass	<b>A</b>
	Allows only red & yellow to pass	Allows only green & blue to pass	<b>B</b>
	Turns on red & green	Turns on yellow & blue	<b>C</b>
	Toggles all colours	Toggles red & blue	<b>D</b>
No Faults			<b>E</b>
<div style="display: flex; justify-content: space-between; align-items: center;"> <span><b>R</b> = Red</span> <span><b>Y</b> = Yellow</span> <span><b>G</b> = Green</span> <span><b>B</b> = Blue</span> <span style="margin-left: 20px;"><input type="checkbox"/> = On</span> <span><input checked="" type="checkbox"/> = Off</span> </div>			

7) Which switch is showing a fault?



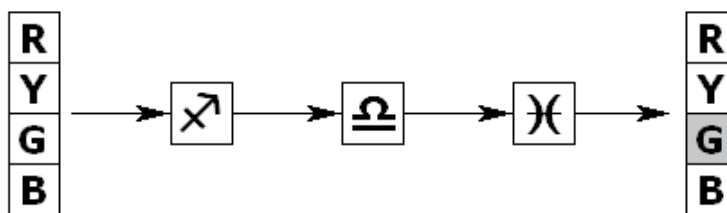
A B C D E

8) Which switch is showing a fault?



A B C D E

9) Which switch is showing a fault?

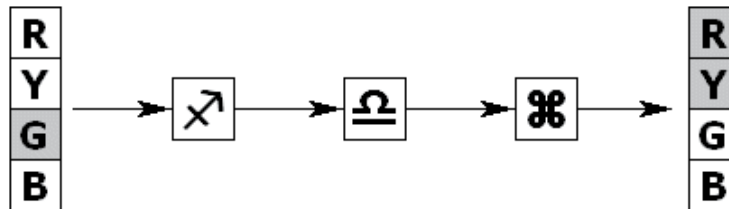


A B C D E

# FAULT DIAGNOSIS – PRACTICE TEST 1

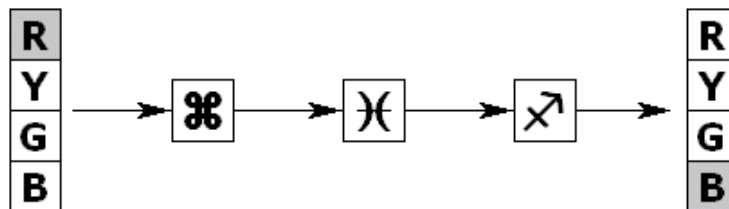
Switch	Function	Fault	Code
	Allows all colours to pass	Allows only red to pass	<b>A</b>
	Allows only red & yellow to pass	Allows only green & blue to pass	<b>B</b>
	Turns on red & green	Turns on yellow & blue	<b>C</b>
	Toggles all colours	Toggles red & blue	<b>D</b>
No Faults			<b>E</b>
<b>R</b> = Red <b>Y</b> = Yellow <b>G</b> = Green <b>B</b> = Blue <input type="checkbox"/> = On <input checked="" type="checkbox"/> = Off			

10) Which switch is showing a fault?



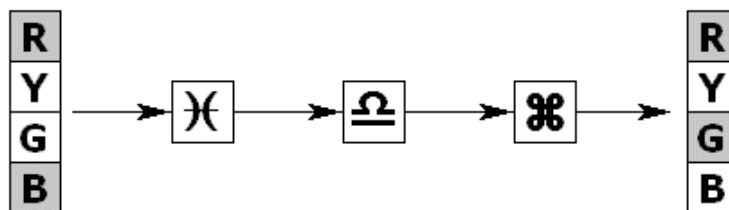
A B C D E

11) Which switch is showing a fault?



A B C D E

12) Which switch is showing a fault?



A B C D E

**End of Fault Diagnosis – Test 1**

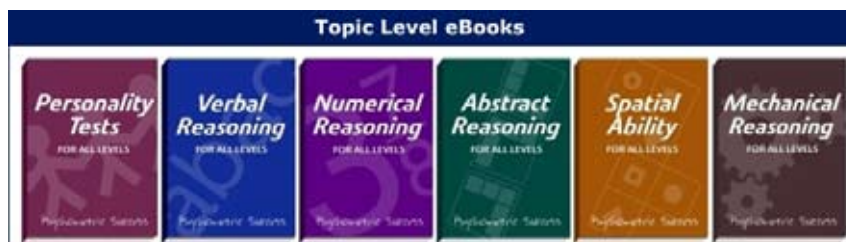
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# FAULT DIAGNOSIS – PRACTICE TEST 1

<i>Answers</i>							
	Test 1						
1)	A						
2)	D						
3)	A						
4)	B						
5)	B						
6)	E						
7)	E						
8)	B						
9)	C						
10)	E						
11)	D						
12)	D						

