

Tutorial 1

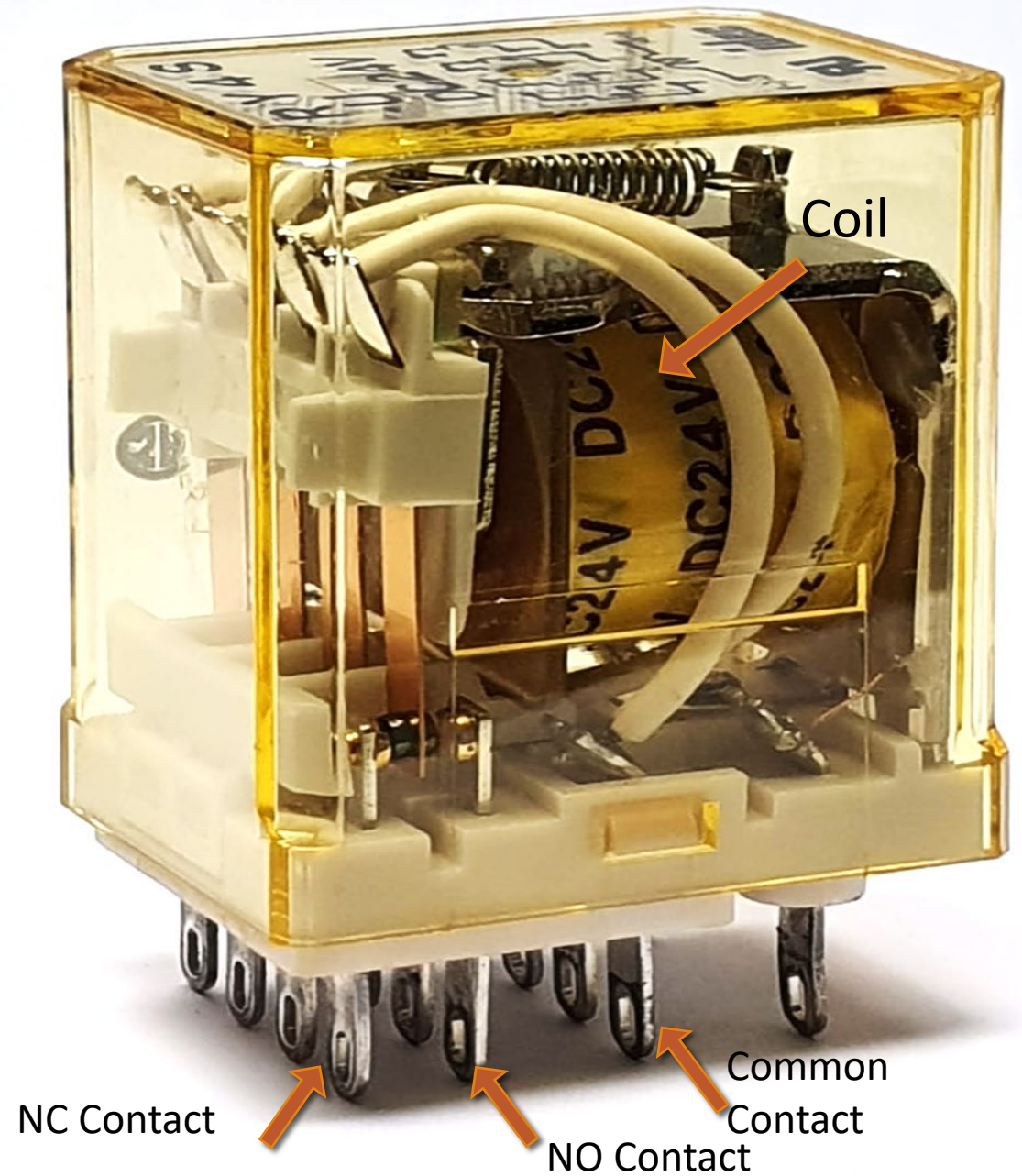
ET0917 / ET0817 / ET0832

RELAY FUNDAMENTALS

MCQ

How many sets of contacts does this relay have?

- a) 1
- b) 2
- c) 3
- d) 4**

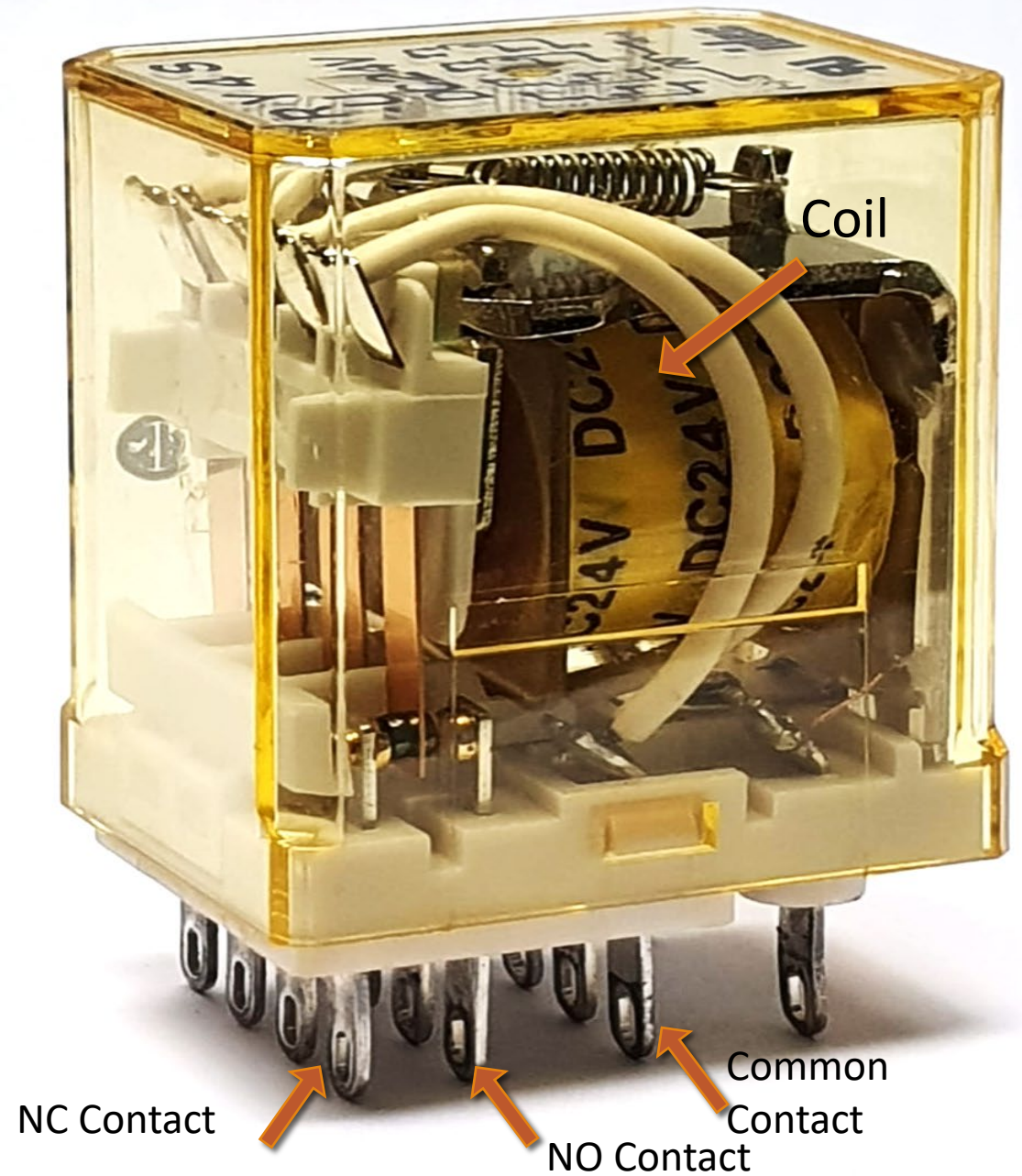


RELAY FUNDAMENTALS

MCQ

This relay is also known as _____ relay.

- a) SPDT
- b) DPDT
- c) 4PDT**
- d) Solid State

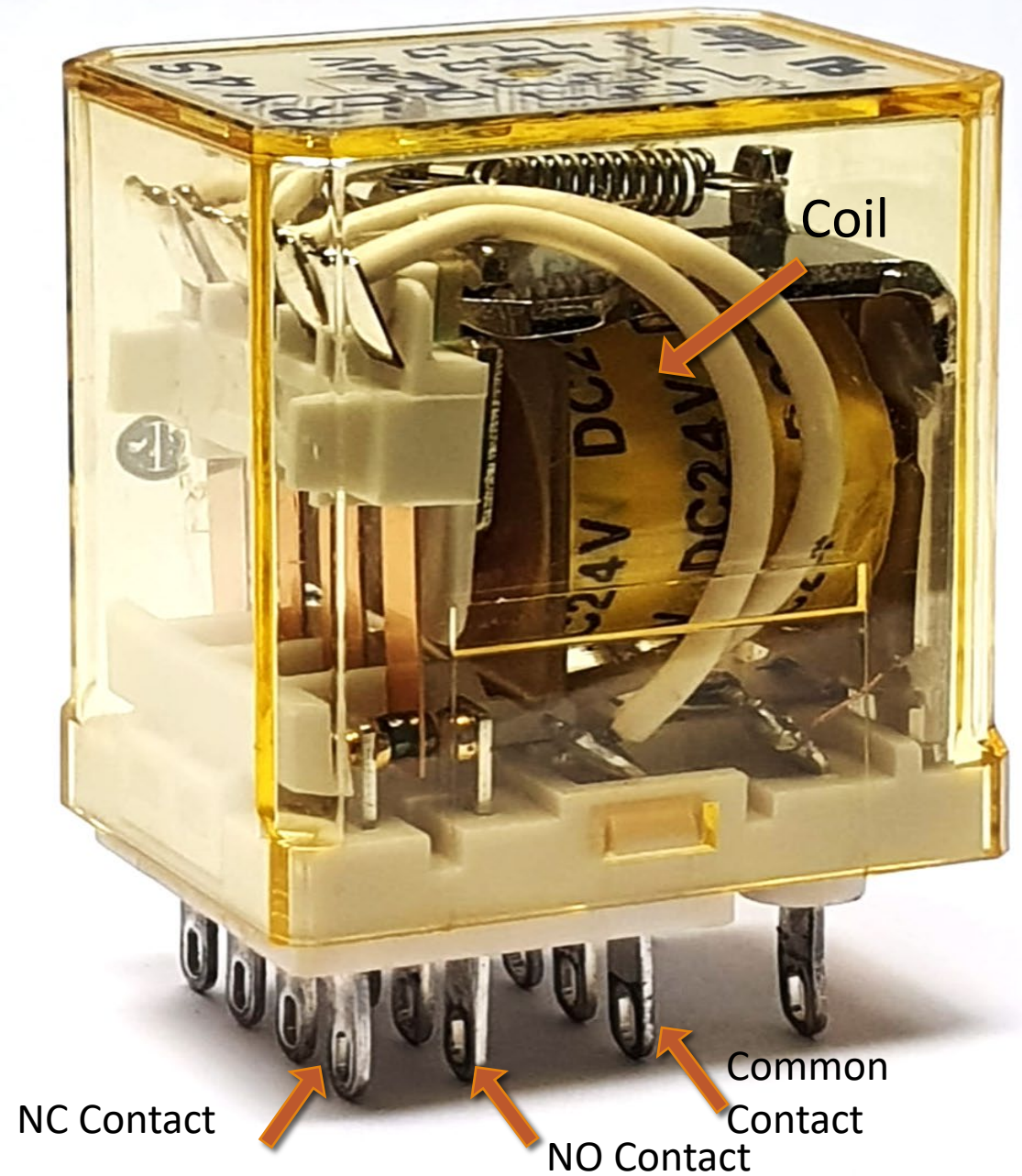


RELAY FUNDAMENTALS

MCQ

What is the operating voltage for this relay?

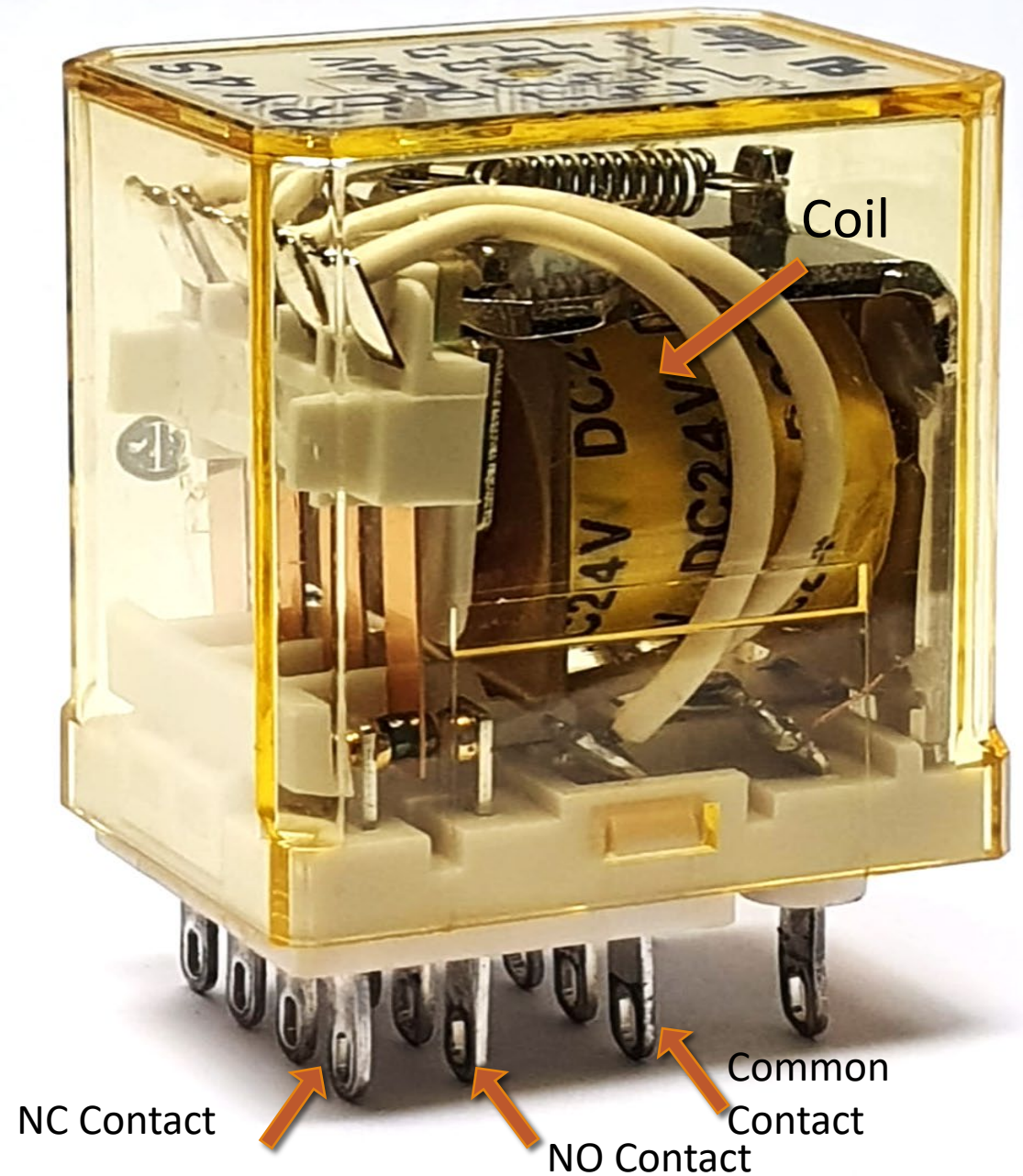
- a) 5 Vdc
- b) 24 Vdc
- c) 24 Vac**
- d) 230 Vac



RELAY FUNDAMENTALS

- What is an electromechanical relay?
- How does a relay work?
- Why do we need a relay?
- How to select a relay?

In a few words, answer what you understand
(You could submit more than 1 answer)



Q1 - MCQ

The main purpose of inventing PLC is to _____ Hardwired Relay Logic.

- a) **replace**
- b) understand
- c) simulate
- d) test

Q2 - MCQ

Ladder programming make sense as they are almost _____ to Hardwired Relay logic. Therefore widely understood by technicians and control engineers.


- a) real
- b) replace
- c) **identical**
- d) virtually

Q3 - MCQ

If the PLC logic needs to be changed, it can be achieved through programming, without _____ at all.

- a) intervention
- b) software
- c) replacement
- d) **rewiring**

Q4 - MCQ

In PLC ladder diagram, all inputs, sensors, and internal relay contacts, are represented as “contacts” , and all outputs are represented as “_____”.

- a) relays
- b) **coils**
- c) software
- d) ladder

Q5 – MCQ

Which of the following is NOT considered as benefit of PLC:

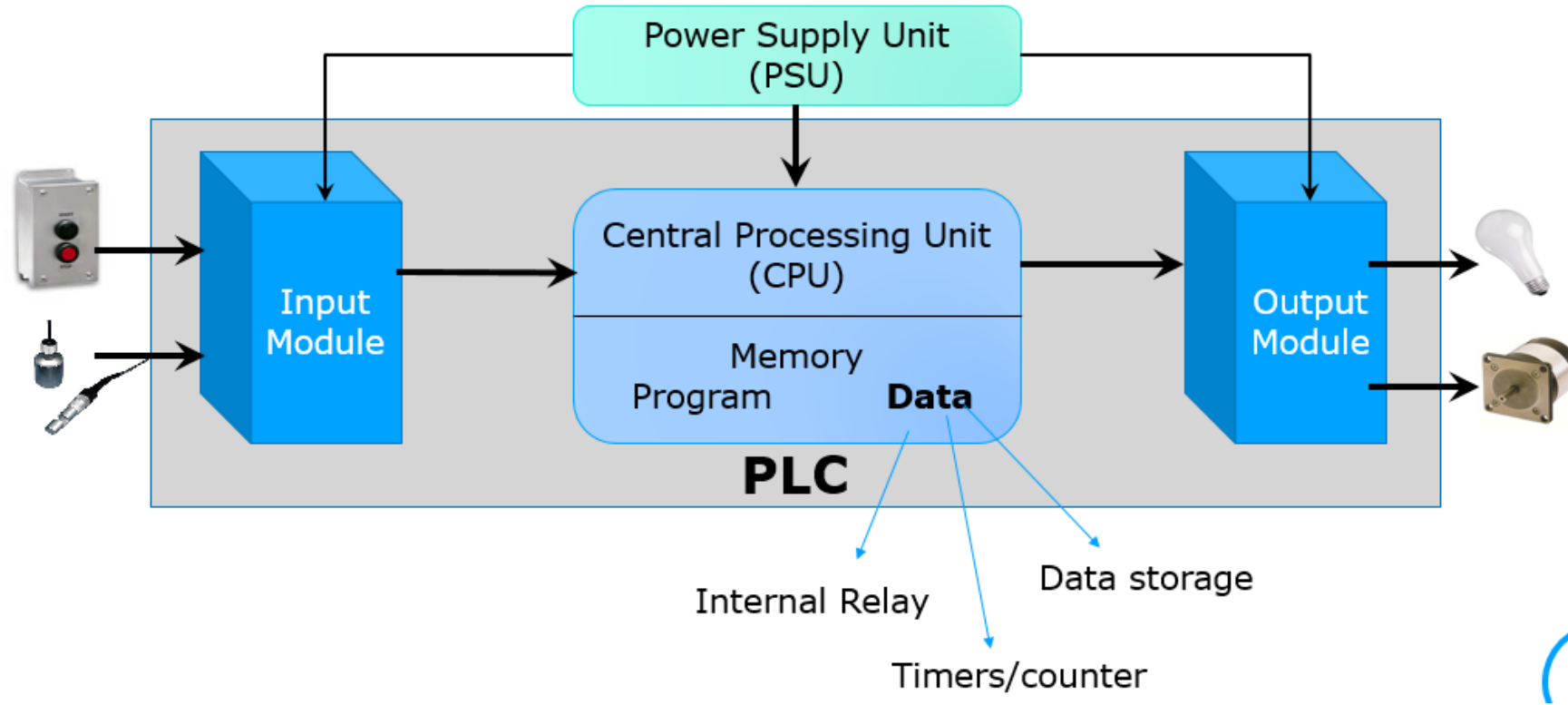
- a) Ability to handle multiple inputs and outputs with small footprint
- b) Suitable for industrial environment with electrical noise and vibration
- c) **Provide control using wired relay logic**
- d) Ease of changing logic

Q6 – MCQ

Select the correct sequence of PLC Scan Cycle

- a) Read Outputs -> Update Inputs -> Execute Program
- b) Read Inputs -> Execute Program -> Update Outputs**
- c) Execute Program -> Read Inputs -> Update Outputs
- d) Read Inputs -> Update Outputs -> Execute Program

Q7 – Word



Why do we say that PLC has infinite number of relays, counters & timers?

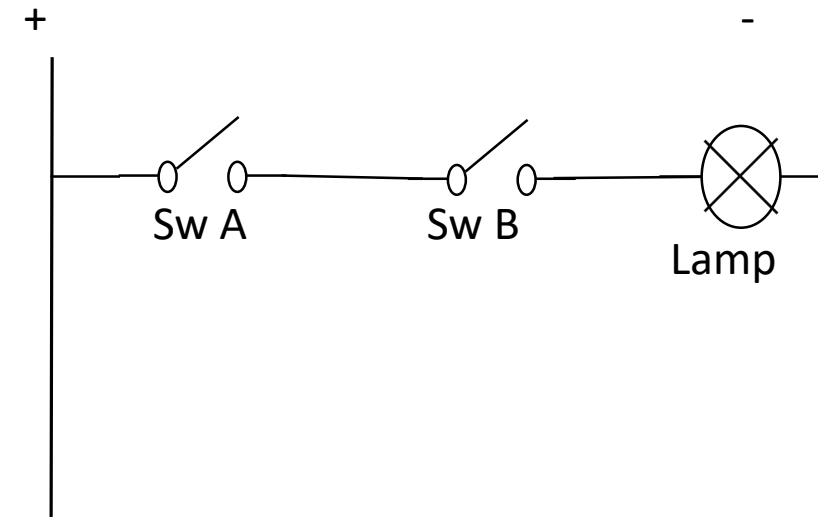
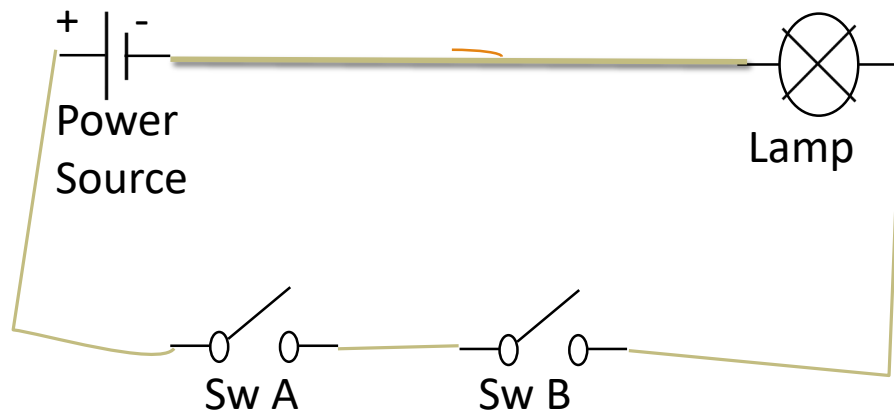
- **Infinite as they do not exist physically – it is from the data storage**
- **Internal relays are simulated via bit locations in memory registers**
- **Counters and timers are software simulated to count up/down and on/off delay timers**

Suggested Solution

Q8 – Drawing “AND” Logic.

Given the components (2x switches, 1x lamp) **wire** up the required circuit such that Sw A and Sw B needs to be closed to turn on the lamp.

Next, represent in ladder diagram

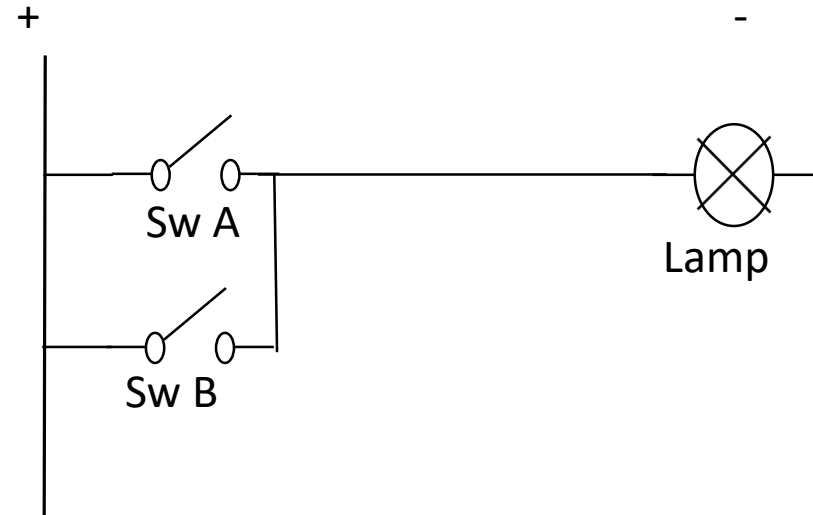
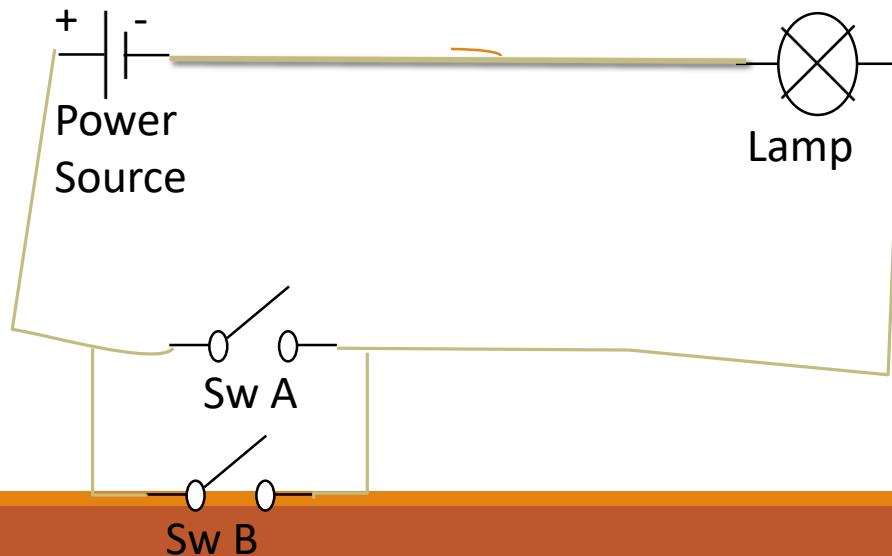


Suggested Solution

Q9 – Drawing “OR” Logic.

Given the components (2x switches, 1x lamp) **wire** up the required circuit such that Sw A or Sw B needs to be closed to turn on the lamp.

Next, represent in ladder diagram



Suggested Solution

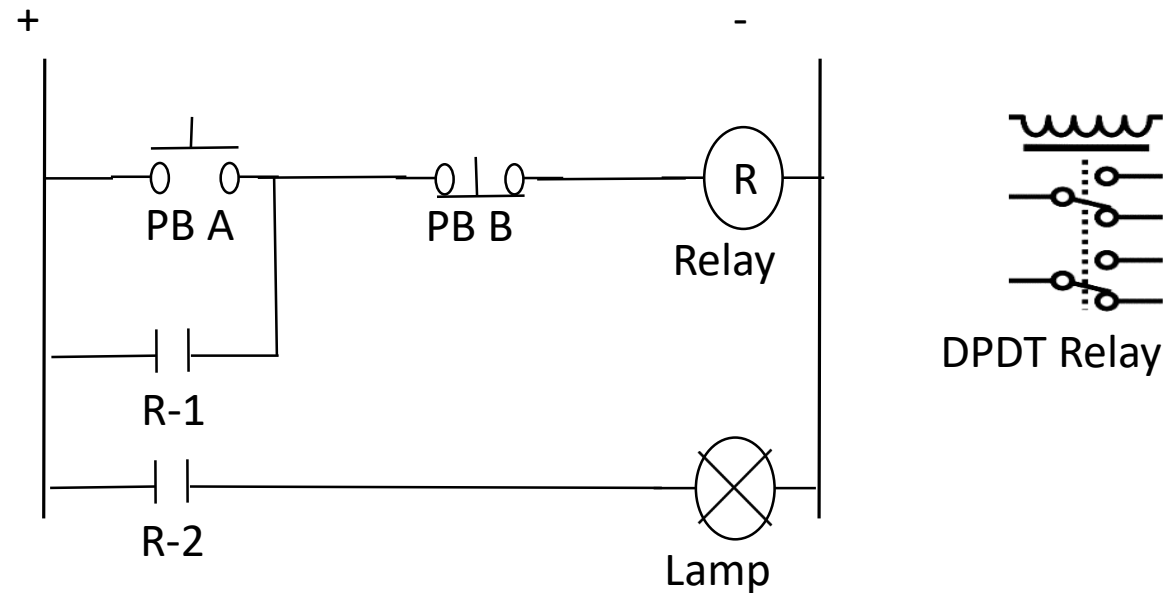
Q10 – Drawing “Latch Circuit”

Given the components (2x Push Buttons, 1x DPDT relay, 1x lamp) **design the ladder diagram** such that push button PB A is pressed momentarily (press and release) would turn on the lamp. The lamp would turn off when push button PB B is pressed.

Could this circuit add a red lamp that will turn ON whenever this Lamp is NOT on yet?

When the lamp turns on, the red lamp will turn off.

What need to be done?



Suggested Solution (additional Question)

Q11 – Drawing “Latch Circuit”

Push button PB A is pressed momentarily (press and release) would turn on the lamp. The lamp would turn off when push button PB B is pressed. Red lamp shall turn on whenever the lamp is NOT on. Red lamp will turn off when the lamp turns on.

