

QUESTION 1

- a) You are to design a hydraulic or pneumatic system comprising a piston cylinder actuator used for pushing and pulling loads. Your design should include the following:
- A position sensor that actuates the control valve
 - An emergency stop function that halts operation once engaged.
- Provide a circuit design diagram of this system.

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- b) Modify your circuit to increase the speed of extending while the speed of retraction is fixed. Include a circuit diagram for the new system showing the modification.

M4

- c) Discuss the implications of this modification on the overall performance of the system. This discussion should highlight the impact of this on power consumption, system pressure and safety implications.

D4

QUESTION 2

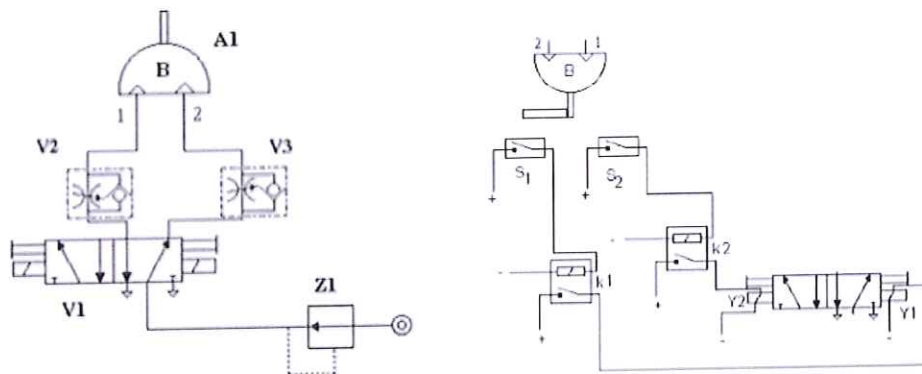
- a) Modify the system in Question 1a to include a speed control mechanism in both directions.
- b) Discuss the effect of this speed control modifications on the system power consumption?

P8

M5

QUESTION 3

Study the figures below



The circuit on the left is a pneumatic system. Write out an accurate description of all components in the system and their functions. The circuit on the right is used to control the pneumatic system. Explain the train of event when the 24 V supply for this circuit is switched on.

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QUESTION 4

Using an application, explain how are hydraulic or pneumatic systems made fail safe? Provide a circuit diagram for your chosen application.

P 10