

FEDERAL UNIVERSITY OF TECHNOLOGY MINNA, NIGERIA
SCHOOL OF ELECTRICAL ENGINEERING AND TECHNOLOGY
DEPARTMENT OF MECHATRONICS ENGINEERING
FIRST SEMESTER 2018/2019 B.Eng. DEGREE EXAMINATION
COURSE : MCE 314: Mechatronics Laboratory I
INSTRUCTION: Attempt all questions. All questions carry equal mark.
TIME ALLOWED: 3 Hours

Question One

The figure A below shows an hydraulic circuit diagram. If at the end of the experiment the following observations were made:

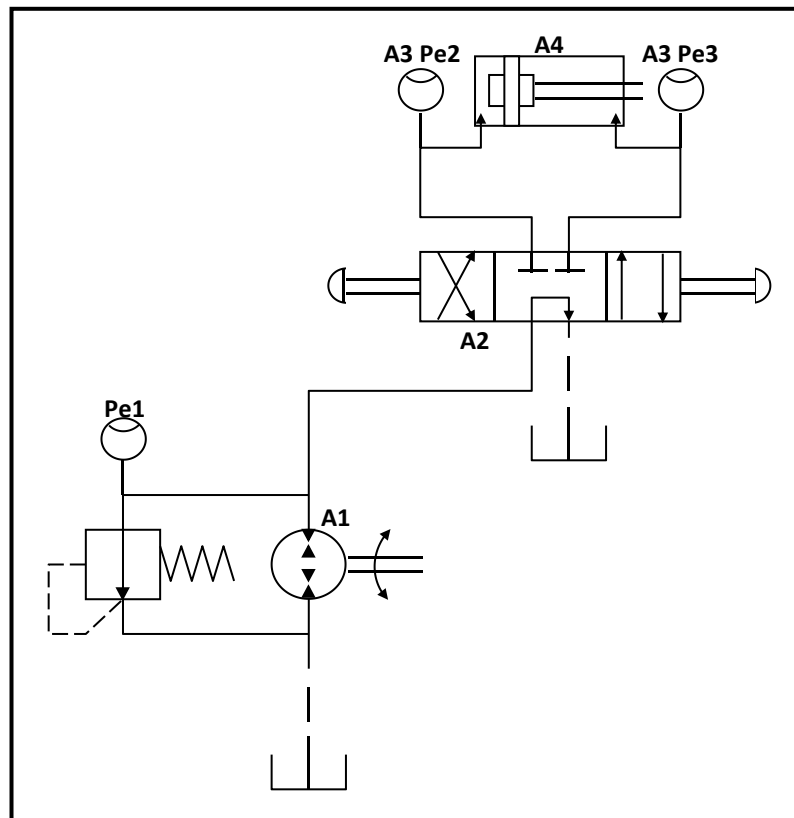


Figure. A

Toggle switch	Pe 2 (bar)	Pe 3 (bar)	Force, F
Handle raised	25	-	?
Handle lowered	-	20	?

- (a). Calculate the force of the piston, applied during its activation and deactivation mode given the diameter of piston equal 75mm. (8marks)
- (b). Explain the following terms as apply to hydraulic training systems:
 - i. Control valve
 - iv. Electronic board

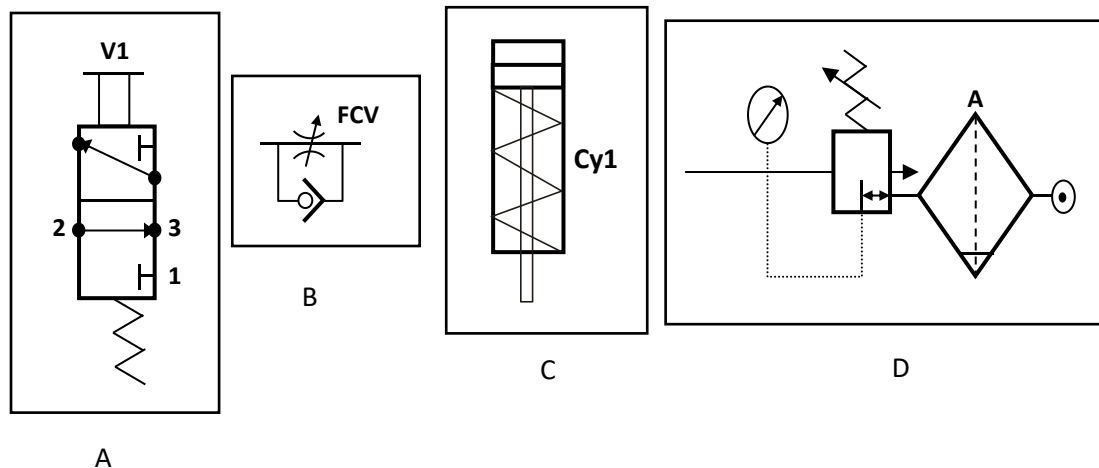
- ii. Hydraulic accessories
 - iii. Actuator
 - v. Solenoid Valve
- (5marks)
- (c). What is the function of the pressure regulatory valve? In a hydraulic system. (2marks)

Question Two

- a) With the aid of a neat diagram(s), describe how the two electric circuit (OR and AND) conditioning are operated. (10marks)
- b) Give two examples each where pushbutton and toggle switch should be used. (2marks)
- c) During the practical titled: The operation of a single acting cylinder controlled by 3-Way Valve, list the components needed for these experiment and their functions. (3marks)

Question Three

Use the diagram below to answer question 3a and 3b.



Question Three

- a). Identify A, B, C and D (2marks)
- b). With the aid of schematic Diagram, build a Simple Pneumatic Circuit. (5marks)
- c). Define the following CNC CODES : M4, M5, G0, G1, S, F. (3marks)
- d). The following are parts of a lathe machine, state the functions of these part:
 - i. Spindle (with chuck), ii. Tail stock, iii. Rails, iv. Tool post. (3marks)
- e). List any two precautionary measures when Operating a single acting cylinder controlled by 3-Way Valve. (2marks)

Question Four

- a). What is a motor? (1/2mark)
- b). Explain using not more than 150 words how a Motor works. (2marks)

- c). List the components of a motor and describe the function of each component. (10marks)
- d). What is a Generator? (1/2mark)
- e). How can a dynamo be converted into an alternator? (2marks)