

Self-Study **Sheet-3** Part-2, **on Chapter-3: Actuators**

1- Select True (✓) or False (x) for each statement:

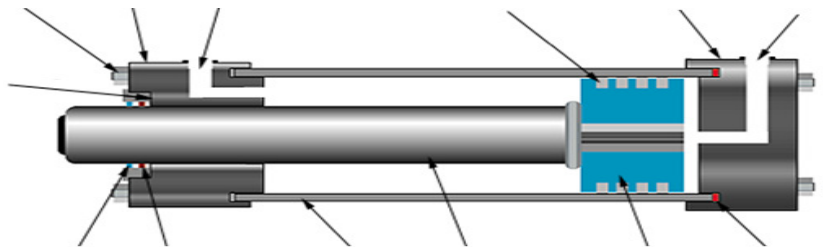
#	True	False	statement
1			The actuator is the end point of hydraulic circuit that converts mechanical horsepower into hydraulic horsepower
2			Actuators may do linear motion such as hydraulic motors or do rotating motion such as hydraulic cylinders
3			Hydraulic cylinders are linear type actuators and their output force, or motion, is along a circular line.
4			The function of hydraulic cylinders are to convert hydraulic horsepower into mechanical torque
5			Work applications may include pushing, pulling, tilting, and pressing.
6			A ram cylinder is the most simple actuator. It has two fluid chambers and exerts force in only one direction
7			A ram cylinder may not be used in applications where stability is needed on non-heavy loads.
8			A double rod ram cylinder is single acting type which is pressurized on one end only
9			A ram cylinder is designed so that the load or an internal spring, retracts the cylinder.

2- What is the purpose of an actuator. Give some examples for the most commonly used actuators.

3-Compare the main parts, characteristics & differences between the Ram Cylinder, single acting, and double acting or differential cylinder. Compare between spring-loaded and unloaded cylinders.

4-Select from the list below and Write name of each part of the **Double acting cylinder** on the right place on the next figure:

*Rod end head, piston seals, rod wiper, cap end port, the rod, barrel, static seals, Rod end port, cap end head, rod bearing, rod seal, piston, piston rod*



5-At same pressure, cylinder will produce more force on extend stroke than on retract stroke. a)True b)False

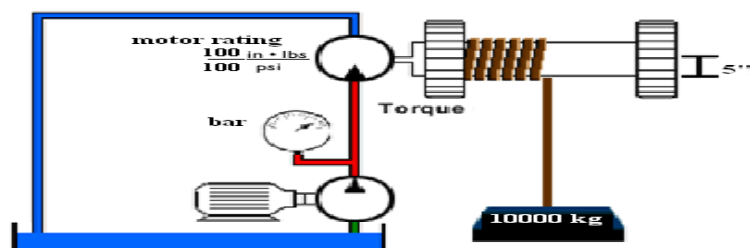
6- Select True (✓) or False (x) for each statement:

#	True	False	statement
1			Double acting cylinders apply pressure to either side or either port, giving torque power in both directions
2			Double acting cylinders are classified as differential cylinders due to unequal exposed areas during extend&retract
3			In double acting cylinders, extension is faster than retraction due to difference in effective area caused by the rod.
4			In double acting cylinders, more force is generated on extension stroke because of the greater effective area
5			In double acting cylinders, more force is generated on retraction stroke because of the greater effective area
6			The double-rod cylinder is a single acting, non-differential type cylinder as both sides of the piston are equal
7			In double-rod cylinder both expansion and retraction strokes move with the same speed in both directions
8			Tie rod hydraulic cylinders are more robust than the Mill type hydraulic cylinders.
9			Hydraulic motors are classified as linear and non-rotary type actuators that resemble pumps in construction.
10			Hydraulic motors are rotary type actuators that converts hydraulic energy into axial linear force.
11			In hydraulic motors, both inlet and outlet ports may be pressurized and thus most motors are externally drained.
12			Most common types of hydraulic motors are gear, vane, piston, and swash-plate type motors.
13			Hydraulic motors are rated according to displacement, torque, and the stroke

7- How can hydraulic motors be rated. Give some examples based on the rpm or on the torque.

8-Compare the main parts, characteristics & differences between the hydraulic-Gear motor, the hydraulic-Vane motor, and the hydraulic-Piston motor. Give typical examples with sketches.

9-In the figure below, find the required pressure output of the pump to run the specified hydraulic motor.



----- End of Actuators -----