

Self-Study **Sheet-9 Part-2, on Chapter-9: Accessory Components**

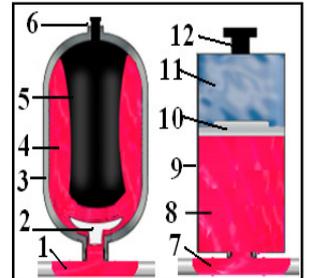
1- Select True (✓) or False (x) for each statement:

#	True	False	statement
1			Accessory components include accumulators, pressure switches, gauges, flow meters, and manifolds.
2			Accumulators do not store excess energy in form of pressurized fluid & release it when needed for improving efficiency
3			Industrial hydraulic accumulators are hydro-pneumatic devices that do not apply force to liquid by a compressed gas.
4			Two types of hydro-pneumatic accumulators are used. The bladder type accumulators and piston type accumulators.
5			The Bladder accumulator is charged with compressed gas through a check valve at the top of the accumulator, while a poppet valve at the bottom prevents bladder from extruding into the pressure line.
6			Poppet valve at bottom of bladder accumulator, is sized so that maximum volume metric flow can not be exceeded.
7			Bladder accumulator is pre-charged with gas to pre-specified pressure less than system pressure in the pressure line.
8			If system pressure does not exceed the gas pre-charged pressure, poppet valve opens & oil enters bladder accumulator
9			Changing or decrease in gas volume in the bladder does not determine useful fluid capacity of a bladder accumulator
10			Accumulators store excess energy to be used during power failure or when more energy is needed to improve efficiency
11			An accumulator can not be used to supplement the flow rate of a pump.
12			Safety and caution must be considered in working with accumulators and not to overcharge the accumulator.
13			Accumulator circuit must include safety unloading valve to isolate & discharge accumulator before system maintenance
14			Pressure switches are used to open or close electrical circuit when a predetermined pressure has not been reached.
15			Bourdon tube pressure gauges measure pressure in system and display it on calibrated dial in units of psi, bar & psia.
16			Bourdon tube pressure gauges are not accurate in the center range of the scale.
17			Even with the gauge properly sized, shock loading or pressure spikes will not damage the gear mechanism.
18			Dampening devices prevent shock loading or pressure spikes from damaging gear mechanism of bourdon tube gauge.
19			Flow meters are not bi-directional devices and act as a check valve blocking flow in the reverse direction.
20			Manifolds reduce number of needed external connections to reduce possibility of leakage from connections & fittings
21			Manifolds are used for modular valve stacking incorporate a common pressure and return port. With individual A & B work ports for each valve station
22			Manifolds are not specified according to system pressure, total flow, number of work stations, valve size or pattern.
23			A flow meter controls both the maximum pressure and amount of flow in a hydraulic circuit
24			Manifolds increase both number of connections and the number of potential leak points.

2-Make table in your answer book as that shown below. Write name of each part of the accessories on the next fig. You may select from the list below:

Gas charging and safety valve, Pressure line, compressed gas compartment, Poppet valve, Fluid compartment, piston accumulator body, Bladder accumulator body, Gas charging and safety valve, Pressure line, Piston separator, Fluid compartment, Bladder containing compressed gas

#	Part name	#	Part name	#	Part name	#	Part name	#	Part name
1		2		3		4		5	
6		7		8		9		10	
11		12							



3-Discuss (use sketches & symbols) main types, characteristics, & usage of **Accumulators**.

4-Compare between the **Bladder type** and **Piston type Accumulators**.

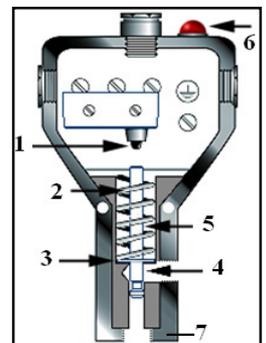
And describe the usage of **safety unloading valve** in the accumulator circuits.

5-Discuss the function, method of operation, and characteristics of the **Pressure Switch**.

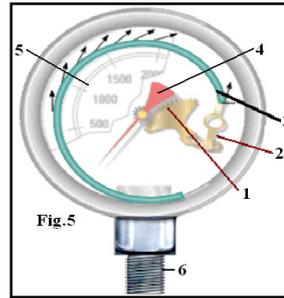
6-Write name of each part of the pressure switch on the fig. You may select from below:

Switch Push rod, Micro electric switch, Connection to the system pressure line, Switch light indicator, spring, piston actuator, mechanical stop

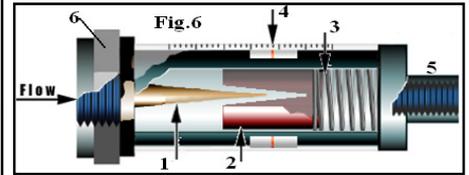
#	Part name								
1		2		3		4		5	
6		7							



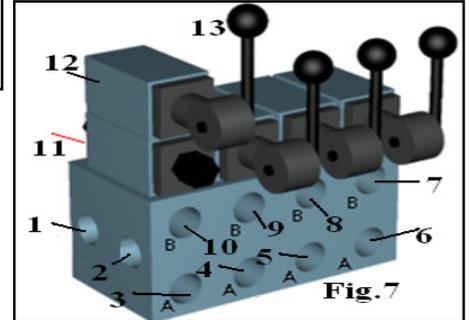
7-Discuss the function, method of operation, and characteristics of the **Bourdon Tube Pressure Gauge**. State the name of each part shown on Fig.5.



8-Discuss the function, method of operation, and characteristics of the **Flow Meter**. State the name of each part shown on Fig.6.



9-Discuss the function, method of operation, and the characteristics of the **Manifolds**. State the name of each part shown on Fig.7.



10-State true or false and why? “Manifolds reduce the number of connections, but increase the number of potential leak points.”

\*\*\*\*\* End of Accessory Components \*\*\*\*\*