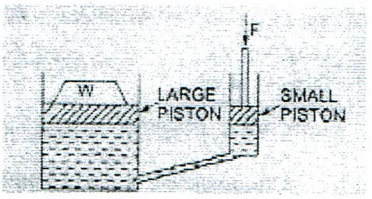
Technical College - Baghdad **Dept.: Mechatronics** **Class: Second Year** **Date: 5 /6/2018**	**2017-2018**	**Final Exam.** **Subject: Hydraulic Systems** **Time: 3-Houres** **Examiner: Dr. Kifah H. Hilal** **(A)**

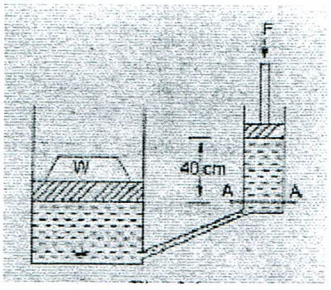
Note: Answer only Five questions. Each question has equal marks.

Q1/ The diameter of small piston and a large piston of a hydraulic jack are (3 cm) and (10 cm) respectively. A force of (80 N) is applied on the small piston. Find the load lifted by the large piston when. :

a- The pistons are at the same level.

b- Small piston is (40 cm) above the large piston.

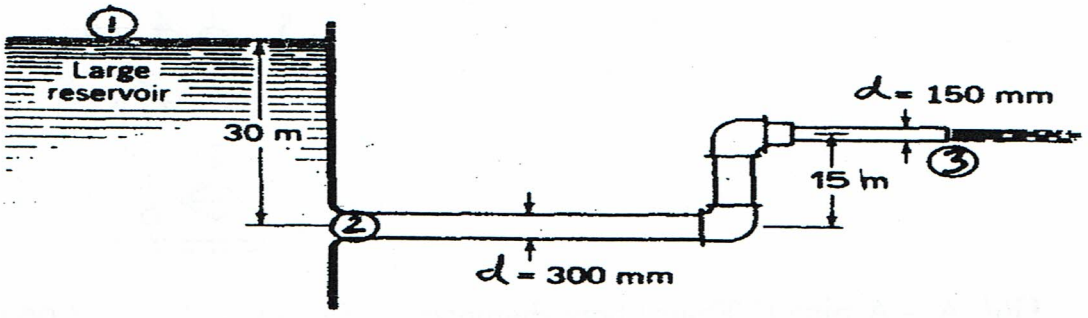




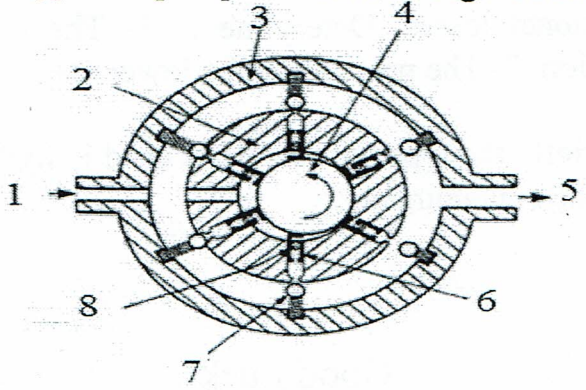
The density of the liquid in the jack is given as 1000 kg/m^3.

(20Marks)

Q2/ If (140 L/s) of water flows through the system shown in Fig. Calculate the total heat loss between 2 &3. **(20Marks)**



Q3/ A – Which types of pump illustrate in Fig.? Identify by name the parts of it as shown.



B – A gear pump has a (75 mm) outside diameter, a (50mm) and a 25mm width. If the volumetric efficiency is (90%), what is the actual flow rate ? The pump speed is (1000 rpm) .

(20Marks)

Q4/ .A- What is the function of basic components of a hydraulic system.

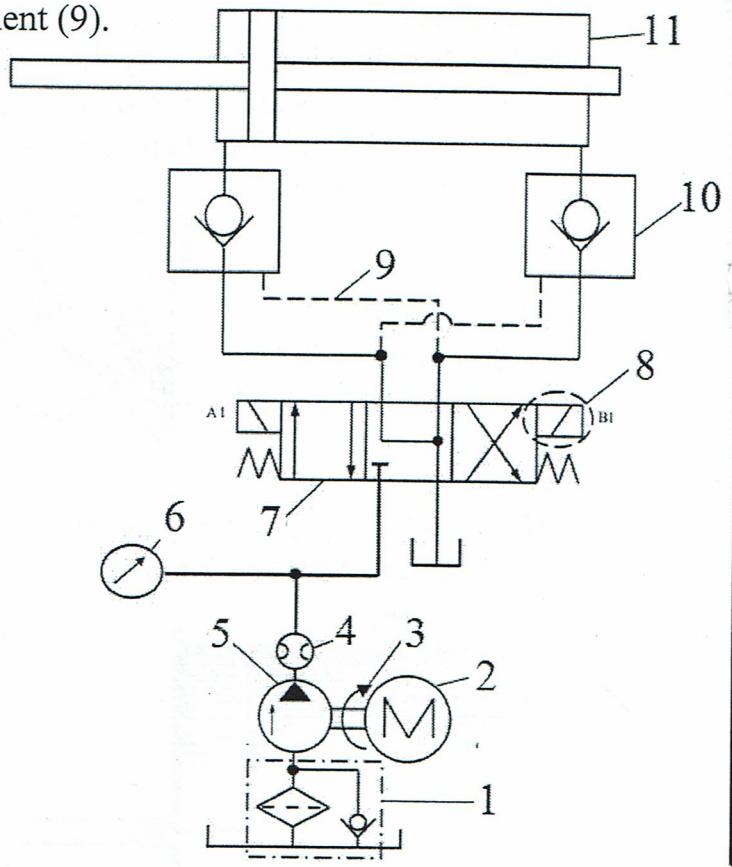
B- Define the actuators and name the basic type.

(20Marks)

Q5/. Answer the following questions based on the circuit diagram shown:

1- Name the component of the circuit.
2- State the function of component (9).
3- Describe briefly the operation of component (7).

(20Marks)



Q6/ A – A pipe (100mm) bore diameter carries oil of density (900 kg/m^3) at the rate of (4 kg/s). The pipe reduces to (60 mm) bore diameter and rises (120 m) in altitude . The pressure at this point is atmospheric (zero gauge) . Assuming no frictional losses .Determine : 1- The oil discharge. 2- The velocity at each section. 3- The pressure at the lower end.

B – Explain briefly the types of materials used in hydraulic filters and list down five of the contaminants.

(20Marks)

Good Luck

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