

INDIAN MARITIME UNIVERSITY
(A Central University, Government of India)

ADVANCED HYDRAULICS & HYDRAULIC MACHINERY
SEMESTER – VIII, B.TECH(MARINE ENGINEERING): DEC/JAN 2013-14
SUBJECT CODE: E 1801
(AY 2009-10 to 2012-13 batches only)

Date: 11.01.2014

Time: 3 Hrs
Maximum Marks:100
(Weightage 70%)

SECTION – A
Compulsory Questions

(3X 10 = 30 Marks)

1. a) Why a Positive Displacement Pump is used in a hydraulic system?
- b) Classify different types of vane pumps.
- c) What should be the functions of hydraulic oil?
- d) Why filtration is needed in a hydraulic circuit?
- e) Explain the principle of operation of a poppet valve.
- f) Why dynamic pumps are not used in fluid power system?.
- g) How does a hydraulic press work ?
- h) Where can the check valves be applied?
- i) Explain the working principle of a fluid coupling .
- j) How does a screw pump operate ?

SECTION – B

(5x14=70 Marks)

Answer any **five** of the followings.

2. a) Describe the advantages of a Hydraulic System.
- b) What are the major components of a basic hydraulic system?
Give a short description of each component.

(7+7)

3. a) How does an External Gear Pump work ?
- b) A gear pump has a 75 mm outside diameter, a 50 mm inside diameter, and a 25 mm width. If the volumetric efficiency is 90% at rated pressure, what is the corresponding actual flow rate? The pump speed is 1000 rpm.
- (7+7)
4. a) Explain the principle of operation of a pressure reducing valve.
- b) How does a pressure relief valve work ?
- (7+7)
- 5 a) Explain the physical principle of flow in a throttling aperture. Derive an expression for the pressure drop across the throttling aperture.
- b) Derive an expression for the flow rate through an aperture.
- (7+7)
6. a) what are the important properties of a good hydraulic fluid?
- b) Narrate how a by-pass filter work .
- (7+7)
7. a) How does a single acting and a double acting cylinder work ?
- b) Calculate the breakway force and the force required to bring a hydraulic cylinder to its operating force and speed when the table load is 1000 kgf and the operating acceleration is 20 m/sec^2 .
- (7+7)
8. a) Narrate the working principle of a torque convertor with the help of a neat sketch
- b). How does a hydraulic crane work?
- (7+7)
