

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

B.TECH (MARINE ENGINEERING)
Semester – VIII –September 2015 Examination

ADVANCED HYDRAULICS & HYDRAULIC MACHINERY
Subject Code: UG11E1801

Time: 3 Hours

Max Marks: 100

Date: 30.9.2015

Pass Marks: 50

SECTION - A

(3 X 10 = 30 Marks)

Compulsory Questions

1. a) Why dynamic pumps are not much used in hydraulic system
- b) Explain the working principle of an external gear pump.
- c) What should be the functions of a hydraulic oil ?
- d) Why filtration is needed in a hydraulic circuit ?
- e) Explain the principle of operation of a poppet valve.
- f) What are the different types of vane pumps ?
- g) How does a fluid coupling work ?
- h) Where can the check valves be applied ?
- i) Explain the working principle of a torque converter .
- j) What do you mean by single and double acting cylinder ?

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 Marks)

3. a) Explain the working principle of a Gear Pump .
- b) How can you calculate volumetric displacement of a gear pump?
- c) 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 r.p.m. (5+4+5 Marks)
4. a) Explain the principle of operation of a pressure reducing valve.
- b) How does a pressure relief valve work ? (7+7 Marks)
- 5.a) How can the fluid flowing to an actuator be varied ?
- b) Explain the physical principle of flow in a throttling aperture. In this connection derive an expression for the pressure drop across the device.
- c) Derive the expression for the flow rate through an aperture. (5+6+3 Marks)
6. a) Write about five important properties of a good hydraulic fluid.
- b) What is by-pass filter ? How does it work ?
- c) What are the advantages of a by-pass filter? . (5+6+3 Marks)
7. a) Explain the construction and principle of operation of a Torque Converter.
- b) What are the advantages of a torque converter.
- c) State its applications.
- ((4+ 4)+ 4 +2 Marks)
8. a) Explain the working principle of a Hydraulic Jack.
- b) A hydraulic press has a ram of 15 cm diameter plunger of 20 cm diameter. The stroke of the plunger is 20 cm and weight lifted is 800 kgf. If the distance moved by the weight is 1.0 m in 20 minutes, determine : (i) the force applied on the plunger, (ii) number of strokes performed by the plunger. (6 + 8 Marks)
