

**INDIAN MARITIME UNIVERSITY, CHENNAI**  
(A Central University, Government of India)  
**END SEMESTER EXAMINATION DECEMBER 2018**  
**B. Tech (MARINE ENGINEERING)**  
**SEMESTER-VII**  
**ADVANCED HYDRAULICS & HYDRAULIC MACHINERY**  
**(UG11E2701)**

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Date: 08.01.2019  
Time: 03 Hrs.

Max Marks: 100  
Pass Marks: 50

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**Part A**

**Compulsory Questions** (10 X 3 = 30 Marks)

1. a) Write three disadvantages of a hydraulic system?
- b) Explain the working principle of a radial piston pump.
- c) What should be the basic components of a Hydraulic system?
- d) What are the different types of valves used in fluid power?
- e) Explain the principle of operation of a pressure relief valve.
- f) Explain the operation of a hydraulic accumulator.
- g) How does a hydraulic jack work?
- h) What are the different types of Hydraulic Motor?
- i) Explain the working principle of a Hydraulic Crane.
- j) How does a screw pump operate?

**Part B**

Answer any **five** of the followings. (5X14=70 Marks)

2. a) How can you classify vane pump. Explain the construction and principle of operation of an unbalanced type vane pump with diagram. (8 Marks)
- b) Why dynamic pumps are not used in hydraulic power system. (6 Marks)
- 3.a) What are the different types of a Gear Pump? Explain the working principle of an external gear pump. (8 Marks)
- b) Explain with the help of a neat sketch the working principle of a swash plate type pump. (6 Marks)

4. a) Describe the working principle of a Hydraulic Coupling with a neat sketch. (7 Marks)
- b) Explain the function of a Torque Converter with diagram. (7 Marks)
5. a) Explain the working principle of a Hydraulic Press. (6 Marks)
- b) A hydraulic press has a ram of 15 cm diameter plunger of 2 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. (8 Marks)
6. a) What are the different types of filters and their characteristics? (7 Marks)
- b) Calculate the breakaway 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  $20 \text{ m / sec}^2$ . (7 Marks)
7. a) How does gear motor work- explain with the help of a diagram. (7 Marks)
- b) Explain the construction of a unbalanced vane motor. (7 Marks)
8. a) Explain the working principle (with diagrams) of a Piston type Accumulator work. (7 Marks)
- b) Explain the operation of a Diaphragm accumulator with the help of a neat sketch. (7 Marks)

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