

Date: 23/11/2016.

Exam No: \_\_\_\_\_

**GANPAT UNIVERSITY**  
**B. TECH SEM- III (Marine) REGULAR EXAMINATION- NOV-DEC 2016**  
**2MR304 - APPLIED THERMODYNAMICS**

TIME: 3 HRS

TOTAL MARKS: 60

**Instructions:** (1) This Question paper has two sections. Attempt each section in separate answer book.

(2) Figures on right indicate marks.

(3) Be precise and to the point in answering the descriptive questions.

**SECTION: I**

**Q.1** (a) What is indicated power? Determine the indicator power for single acting and double acting cylinder (05)

(b) Explain the tandem compounding method of compounding steam engine with net diagram (05)

**OR**

**Q.1** (a) Equivalence of Kelvin and Clausius Statement (05)

(b) What is the advantage of compounding steam engine? (05)

**Q.2** (a) Calculate the thermal efficiency and the rate of heat rejection of a heat engine which receives heat at the rate of 2000 kJ/min and develops 9.6KW. (05)

(b) Explain the Modified Rankin cycle for steam Engines. (05)

**OR**

**Q.2** (a) Explain the cross compounding method of compounding steam engine with net diagram (05)

(b) A steam engine has a stroke equal to 1.3 times the diameter and a diagram factor of 0.80. Dry and saturated steam is supplied at 10 bar and exhaust at 1.05 bar. If the speed is 250rpm and ratio of expansion 2.5, indicated power 185 KW, calculate the dimension of the cylinder (05)

**Q.3** (a) Explain the Reheat cycle steam power plant? Find the efficiency of Reheat cycle with use of P-v, T-s, and h-s diagram. (10)



## SECTION: II

- Q.4 A Steam turbine working on Rankine cycle is supplied with dry saturated steam at 25 bar and (10)  
exhaust takes place at 0.2 bar. For a steam flow rate of 10kg/s.

Determine 1) Quality steam at end of expansion 2) turbine shaft work 3) power required to drive the pump 4) work ratio 5) Rankine efficiency, and 6) heat flow in the condenser

OR

- Q.4 Explain in brief - Types of Compressor with classification (10)

- Q.5 (a) Define – Compressor. (02)

- (b) List out the uses of compressor? (04)

- (c) Explain – Laws of thermodynamics. (04)

OR

- Q.5 Explain the working principle of Single Stage Reciprocating Air Compressor with neat sketch. (10)

- Q.6 A single-cylinder, single acting reciprocating air compressor has a cylinder of 24cm diameter (10)  
and liner piston speed of 100 meters per minute. It takes in air at 100 KPa (KN/m<sup>2</sup>) and delivers at 1. MPa (1MN/m<sup>2</sup>). Determine the indicated power of the compressor. Assume the law of compression to be  $p v^{1.25} = \text{constant}$ .

----- END OF PAPER -----