

INDIAN MARITIME UNIVERSITY
(A Central University, Government of India)
End Semester Examination Dec 2019/Jan 2020
B.Sc. (Nautical Science)
Semester -I
UG21T3103 - Nautical Physics

Date: 14.12.2019
Time: 3 Hours

Max Marks: 70
Pass Marks: 35

PART-A
QUESTION NO.1 IS COMPULSORY

(5×2=10 Marks)

1. a) What's the difference between latent heat and sensible heat?
- b) State the condition of TIR
- c) Define one decibel
- d) Define Relative humidity
- e) What do you understand by the term Elasticity?

PART-B
ATTEMPT ANY 6 QUESTIONS FROM THE FOLLOWING 8 QUESTIONS

(6×10=60 Marks)

2. a) Explain the different modes of heat transfer (5 Marks)
- b) A Carnot heat engine receives heat from 600°C source.
The efficiency of the engine is 59%.find the amount of heat
supplied and heat rejected per kW of work output. (5 Marks)
3. a) Explain with neat diagram, construction and working of Periscope (5 Marks)
- b) Explain with neat diagram, construction and working of sextant (5 Marks)
4. a) How does a ship echo sounder works? (5 Marks)
- b) An automobile moving at 30 m/s is approaching a factory
whistle that has a frequency 500 Hz. If the speed of sound is

340 m/s, find the apparent frequency of the whistle as heard by the driver. (5 Marks)

5. a) Explain with neat diagram, construction and working of Weston differential pulley and derive an expression for its efficiency (5 Marks)
b) State and prove Bernoulli's equation for the flow of liquid (5 Marks)
6. a) Explain the term "Gyro inertia". (5 Marks)
b) Discuss earth as a magnet. (5 Marks)
7. a) Define surface tension. Derive an expression for the excess pressure inside a spherical liquid drop of radius r . (5 Marks)
b) A steel wire 4m in length and $2.4 \times 10^{-7} \text{ m}^2$ in cross sectional area is stretched by a force of 36 N. calculate a) Stress b) Strain
c) increase in length d) work done in stretching the wire.
Given $Y = 1.8 \times 10^{12} \text{ N/m}^2$. (5 Marks)
8. a) Define Mechanical advantage, velocity ratio and efficiency as applied to Machines. (5 Marks)
b) Explain with neat diagram, construction and working of He-Ne laser (5 Marks)
9. a) Explain Gyrocompass in detail. (5 Marks)
b) What are the elements of the earth's magnetic field. (5 Marks)
