INDIAN MARITIME UNIVERSITY

(A Central University, Government of India)

END SEMESTER EXAMINATIONS-JUNE/JULY 2019

B.Sc (Nautical Science)

Semester-I

Nautical Physics (UG21T4103)

Date: 13.07.2019 **Max.Marks : 70**

Time: 3 Hrs **Pass Marks : 35**

Note: Question No. 1 is compulsory

Answer any 6 Questions from remaining 8 questions (each of 10 marks)

Scientific calculator is permitted if required.

PART-A

1. Give Short Answers. (5×2=10 Marks)
   a) Explain dry and wet hygrometer.
   b) Define Critical angle.
   c) Why windows of wheelhouse to be inclined.
   d) Define and explain the term: Angular momentum.
   e) State and explain Newton's law of gravitation.

PART-B (6X10=60 Marks)

2.
   a) Describe Different modes of heat transfer such as conduction, convection and radiation with example. (5)
   b) What is Fourier Law of Heat Conduction? Hot air at 160^{o}C flows over a flat plate maintained at 60^{o}C. The forced convection heat transfer is 75 W/m^{2}K. Calculate the heat gain rate in kW by the plate through an area of 4m^{2} (5)

3.
   a) State and Explain principle of sextant. (5)
   b) An object of 2cm high is placed at a distance of 16cm from a concave mirror which produces a real image 3cm high (5)
   1)What is focal length of mirror.

2) Find position of image.

4.

a) Differentiate Longitudinal and Transvers wave. (5)

b) Explain the different parameters which affect the velocity of sound in sea water. (5)

5. With the help of neat sketch, explain the differential wheel and axle derive the expression for its efficiency. (10)

6.

a) State and prove Bernoulli's equation for fluid flow (5)

b) Explain streamline and turbulent flow. (5)

7.

a) State first and second law of thermodynamics. (5)

b) Explain Total Internal Reflection with its example Mirage. (5)

8.

a) Explain Barometer to measure atmospheric pressure. (5)

b) Calculate capillary rise in a glass tube of 2.5mm diameter when immersed vertically in a) water b) mercury. Take surface tension 0.0725N/m for water and 0.52N/m for mercury in contact with air The specific gravity for mercury is given as 13.6 and angle of contact 130^{o}. (5)

9.

a) Define following terms: (5)

1) Magnetic Variation

2) Angle of Dip

b) Explain Gyro compass in detail. (5)

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