INDIAN MARITIME UNIVERSITY

(A Central University, Government of India)

December 2016 End Semester Examinations
B.Sc. (Nautical Science)- First Semester (2016-17 batch onwards)

Nautical Physics (UG21T3103)

Date : 19.12.2016 **Maximum Marks: 70**
Time: 3 Hrs **Pass Marks : 35**

Note: Answer any seven questions.
All questions carry equal marks. (7× 10= 70)

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1. a) Explain the different modes of heat transfer.

   b) In a submarine fitted with a SONAR, the time delay between generation of a signal and reception of its echo after reflection from an enemy ship is observed to be 73 seconds. if the speed of sound in water is 1450 m/s ,then calculate the distance of the enemy ship.

2 a) State first and second law of thermodynamics.

   b) Give the applications of optical fibre in medical field.

3. a) Explain with neat diagram, construction and working of prism binoculars.

   b) Two trains travelling in opposite directions on parallel tracks at 100 kmpheach, cross each other.one of them is whistling a note of frequency 800 Hz.find the apparent pitch as heard by the passenger in the other train a)before they cross each other b)after they cross each other.velocity of sound is 340 m/s.

4. a) Explain the phenomenon of Total internal reflection.

   b) A wave of length 0.60 cm is produced in ear and travels with a velocity of 340 m/s. will it be audible to human ear?

5. a) Discuss the characteristics of sound and define one decibel.

   b) Explain with neat block diagram, the working of echo sounder.

6. a) Define Mechanical advantage, velocity ratio and efficiency as applied to machines. Derive the relation between them.

   b) In an oscillating simple pendulum,the amplitude is 0.02 m and the time period is 10 S. Calculate the maximum velocity.

7. a) State and prove the Bernoullis equation for the flow of liquid.

   b) A steel wire 4m in length and 2.4×10^{-7} m^2in cross sectional area is stretched by a force of 36 N. given $Y = 1.8 \times 10^{12}$ N/m^2.calculate a)stress b)strain c)increase in length.

8. a) Define the following

   i) Reynolds number ii) Viscosity iii)Angle of contact.

   b) Determine the height to which water will rise in a capillary tube of 0.5×10^{-3} m diameter. Given for water, surface tension is 0.074 Nm^{-1}

9. a) Explain Gyro compass.

   b) Distinguish between soft and hard magnetic material.

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