QINDIAN MARITIME UNIVERSITY
(A Central University, Government of India)

June 2017 End Semester Examinations
B. SC (Nautical Science – First Semester

(Nautical Physics – UG21T 3103)
(AY 2016 - 17 batch onwards)

Date: 07.06.2017	Maximum Marks : 70
Time: 3 Hrs	Pass Marks : 35

Note: Attempt any Seven questions out of Nine questions.

All questions carry equal marks. (7 X 10 = 70 marks)

Q.1 a) What is refrigerator? Explain in detail. (5 Marks)

b) The wall of furnace is constructed from 18 cm thick fire brick having constant thermal conductivity of 1.7 W/m.K. The two sides of the wall are maintained at 1200K and 950K, respectively. What is the rate of heat loss through the wall which is 0.6 m x 4 m on side? (5 Marks)

Q.2 a) State and prove the principle of Sextant with the help of ray diagram. (5 Marks)

b) Find the critical angle for a ray of light at glass-water interface if refractive indices for glass is 1.62 and for water is 1.32. (5 Marks)

Q.3 a) Explain the Doppler effect and discuss the following cases (5 Marks)

i) Source is approaching a stationary listener.
ii) Source receding from stationary listener.

b) An observer travels with constant velocity of 30m/s towards a distant source of sound which has a frequency of 1000Hz. Calculate the apparent frequency of the sound heard by the observer. What frequency is heard after passing the source of sound? (Velocity of sound in air = 340m/s) (5 Marks)

Q.4 a) Explain convection with example. (5 Marks)

b) Hot air at 180 ^{o}C flows over a flat plate maintained at 55 ^{o}C .The forced convection heat transfer coefficient is 75 W/m^2.K. Calculate the heat gain rate by the plate through an area of 3.5m^2 (5 Marks)

Q.5 a) Explain the working of Optical fibre with the help of diagram. (5 Marks)

b) An object is placed at a distance of 20cm from the pole of a concave mirror. If the focal length of the mirror is 10cm, find the nature and position of the image. (5 Marks)

Q.6 a) Explain with neat diagram, construction and working of Weston differential pulley block and derive an expression for its efficiency.(5 Marks)

b) Define Relative velocity. Two ships A and B leave a port at the same time. The ship A is travelling north-west at 32kmph and ship B, south 50^0 west, at 24kmph.Determine the speed of the ship B relative to ship A. (5 Marks)

Q.7 a) Two ball of masses 2kg and 3 kg are moving with velocities 2m/s and 3m/s towards each other. If the coefficient of restitution is 0.5, find the velocity of the two balls after impact. (5 Marks)

b) Define Total pressure. A rectangular plane surface is 2m wide and 3m deep. It lies in vertical plane in water. Determine the total pressure on the plane surface when its upper edge is horizontal and coincides with water surface. (5 Marks)

Q.8 a) Explain Archimedes principle and buoyancy. (5 Marks)

b) Explain centre of mass , centre of gravity and centroid. (5 Marks)

Q.9 a) Explain the purpose and importance of magnetic compass on a ship. (5 Marks)

b) What is dip needle? Explain with a neat diagram. (5 Marks)

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