INDIAN MARITIME UNIVERSITY

(A Central University, Government of India)

END SEMESTER EXAMINATIONS-JUNE/JULY 2019

B.Sc (Nautical Science)

Semester-I

Nautical Physics (UG21T3103)

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 (5x2=10 Marks)

Q1.a) State Newtons Law of gravitation

b) Define critical angle

c) Define one decibel

d) Define angle of contact

e) Define angle of dip

PART-B (6x10=60 Marks)

Q2. a) What is Carnot cycle? Deduce the work done in its one cycle. (5)

b) How much heat is given up when 20 g of steam at 100°C is condensed and cooled to 20°C ? (5)

Q3.a) State and prove the principle of sextant with the help of a ray diagram. (5)

b) Calculate the frequency and wavelength of a radiation whose photon has energy of 64.24 eV. Also find its velocity. (5)

Q4.a) What is Doppler's Effect? Discuss the cases when both listener and source are in motion. (5)

b) The intensity at a point due to a single source is 3.5×10^{-9} Wm^{-2}. Determine the sound level at a point due to four such identical sound sources, each generating sound at the same level. (5)

Q5.a) Define relative humidity. Discuss in detail any one hygrometer to measure it, with diagram. (5)

b) What is total internal reflection? State conditions for its occurrence. Discuss any one application in detail. (5)

Q6.a) Explain principle, construction and working of a periscope. (5)

b) A monochromatic light of wavelength 600nm is incident from air on glass surface. Find the wavelength, frequency and speed of the refracted ray of $\mu_g = 1.5$. (5)

Q7.a) State and prove Bernoullis theorem. (5)

b) Explain and derive the expression for efficiency of Weston differential pulley.

Q8.a) Define surface tension and determine the excess pressure inside *a* spherical liquid drop. (5)

b) A metal wire 75cm long and 0.13cm in diameter, stretches 0.035cm when a load of 8kg is hung on its end. Find stress, strain and Young's modulus of the material of the wire*.* (5)

Q9. a) Write a note on ship's magnetism*.* (5)

b) Differentiate between hard and soft magnetic materials*.* (5)