INDIAN MARITIME UNIVERSITY
(A Central University Government of India)
END SEMESTER EXAMINATIONS- JUNE 2019
DIPLOMA IN NAUTICAL SCIENCE
SEMESTER - I
APPLIED SCIENCES (UD11T3102)

Date: 25-06-2019 Max. Marks: 70
Time: 02 hours Pass Marks: 35

SECTION A (Physics) (4 x 10=40)

Answer any four questions from the following

1.

(a) Explain the concept of Gyroinertia. (5 Marks)

(b) A constant force acting on a body of mass 6 kg changes its speed from 2 m/s to 3.5 m/s in 20 seconds. The direction of the body remains unchanged. What is the magnitude and direction of the force? (5 Marks)

2.

(a) What is anomalous expansion of water? How it is useful? (5 Marks)

(b) A piece of metal 400 g is heated to 100°C and then quickly transferred to a copper calorimeter of mass 200 g and of specific heat capacity 380 J/kg°C containing 250 g of water at 25°C. The final temperature if found to be 40°C. Find the specific heat capacity of the metal. Specific heat capacity for water is 4200 J/kg°C.

3.

(a) What do you mean by oscillation? Differentiate between damped and undamped oscillation. (5 Marks)

(b) A mass of 6 kg is suspended from a vertically mounted spring. The static deflection is 6 mm. A further load of 12 kg is hung from the spring, pulled 10 mm below the equilibrium position and released. Find the period of the resulting oscillation. (5 Marks)

4.

(a) Discuss the different characteristics of musical sound. (5 Marks)

(b) A speaker produces an intensity level of 70 dB. A person speaking normally produces a sound level of 40 dB. Compare their intensities. (5 Marks)

5.

(a) Define Critical angle and explain the phenomenon of (TIR) Total Internal Reflection. (5 Marks)

(b) When an object is kept at a distance of 30 cm from a convex mirror, image is formed at 10 cm from the mirror. If the object distance is doubled where will the image be? (5 Marks)

SECTION B (Electricity & Electronics) (3 x 10=30)

Answer any three questions from the following

6.

(a) What do you mean by resistance? How does temperature affect the resistance? (5 Marks)

(b) If a copper wire is stretched to make it 0.1% longer, what is the percentage change in its resistance? (5 Marks)

7.

(a) Explain principle, construction and basic working of AC generator. (5 Marks)

(b) A single phase transformer has 400 primary and 1000 secondary turns. The net cross-sectional area of the core is $60cm^2$. If the primary binding be connected at 50 Hz, 500V supply, calculate:

(i) The peak value of the flux density in the core.

(ii) The voltage induced in the secondary winding. (5 Marks)

8.

(a) Explain the concept of basic RADAR With neat diagram. (5 Marks)

(b) List down five safe working practices while working with any electrical circuit. (5 Marks)

9. Write short notes with diagram if necessary **(any two)**:

(a) Super-heterodyne radio receiver. (5 Marks)

(b) Yagi-Uda antenna. (5 Marks)

(c) Sensors and Transducers. (5 Marks)