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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 is 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)
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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 winding 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)