

INDIAN MARITIME UNIVERSITY
(A Central University, Govt. of India)
May/June 2018 End Semester Examinations
DNS (Diploma in Nautical Science)
Semester I
Applied Science (UD11T2102)

Date: 05.06.2018

Max.Marks: 70

Time: 2 Hrs

Pass Marks: 25

SECTION-A

Answer any four questions

(4×10=40)

1. a) State and explain Newtons law of gravitation. (5)

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. (5)

2. a) State and prove theorem of perpendicular axis. (5)

b) compute the rotational kinetic energy of a 2 kg wheel rotating at 6 revolutions per second .if the radius of gyration of the wheel is 0.22 m.(5)

3. a) Explain the different modes of heat transfer. (5)

b) calculate the amount of heat required to raise the temperature of 50 g of copper from 10°C to 60°C .The specific heat capacity of copper is 0.39 j/g°C. (5)

4. a) Explain anomalous expansion of water. (5)

b) Explain the term "Gyro inertia". (5)

5.a) Define the following terms.

i) Damped oscillations ii) resonance. (5)

b) Determine the following parameters for a simple pendulum at the mean surface of the earth

Length of 1m pendulum.

Period of 1s pendulum.

If these pendulums are taken to the mean surface of the moon where $g=1.67 \text{ m/s}^2$, determine the corresponding periods. (5)

SECTION-B

Answer any three questions

(3×10=30)

6. a) List the differences between transverse waves and longitudinal waves. (5)

b) Give the relation between Kelvin scale and Fahrenheit scale. (5)

7.a) A sound intensity of about 1.2 W/m^2 can produce pain in the ear. What is its equivalent in decibels? (5)

b) Discuss the characteristics of sound. (5)

8. a) Explain with neat diagram, construction and working of prism binoculars. (5)

b) A ray of light is incident from glass on the interface separating it from air at an angle of 40° and is deviated through 15° . Calculate the critical angle for the glass-air surface. (5)

9. a) Explain with neat diagram, the propagation of light in optical fiber. (5)

b) An object of 2 cm high is placed at a distance of 16 cm from a concave mirror which produces a real image 3 cm high.

i) What is the focal length of the mirror.

ii) Find the position of the image. (5)
