

Indian Maritime University
(A Central University, Govt of India)
End Semester Examinations – December 2022
Programme Name: B Sc (NS)
Semester: First
Subject Code: UG21T5103
Subject Name: Physics

Date: 27.12.2022

Max Marks: 70

Duration: 03 Hrs

Pass Marks: 35

General Instructions

- (i) All Sections (A, B & C) are to be attempted.
- (ii) Options, if any, are specified in respective section.
- (iii) Scientific Calculator is permitted.

Section A

Answer all the questions

(10 x 1 = 10)

1. Soft magnetic materials have:
 - a) Low retentivity and high coercivity
 - b) Low retentivity and low coercivity
 - c) High retentivity and high coercivity
 - d) High retentivity and low coercivity
2. The no. of stages / sequences in one Carnot cycle are:
 - a) 2 b) 3 c) 4 d) 5
3. SONAR stands for:
 - a) Sound Navigation & Research
 - b) Surface Navigation & Ranging
 - c) Solar Navigation & Ranging
 - d) Sound Navigation & Ranging
4. The type of Lens(s) present in the prism binoculars are:
 - a) Objective lens
 - b) Eyepiece lens
 - c) Both (a) & (b)
 - d) None of these

5. Which of the following statement(s) are true for "Reynolds numbers" in fluid dynamics.
 - a) It helps to categorise between laminar flow and turbulent flow, and it is a dimensionless no.
 - b) It helps to categorise between laminar flow and turbulent flow, and its unit is Pascal
 - c) It helps to categorise between Fluid of different density and its unit is Poise
 - d) Both (a) & (c) are correct

6. Hydraulic works on the principle of:
 - a) Bernoulli`s Principle
 - b) Pascal`s Law
 - c) Archimedes Principle
 - d) Viscosity of Liquid

7. Two Lenses of Power – 5D and +5D are in contact with each other. The focal length of the combination is:
 - a) -20cm
 - b) -10cm
 - c) +20cm
 - d) +10cm

8. The angle between the compass needle and the magnetic needle to the presence of iron within the ship is known as:
 - a) Induced Magnetism
 - b) Magnetising Force
 - c) Magnetic Deviation
 - d) Magnetic Variation

9. Identify the correct statement:
 - a) The Pressure in a fluid at rest is same at all points
 - b) The Pressure in a fluid varies with depth
 - c) The Pressure in a fluid depends on the density
 - d) All of these

10. S I Unit of specific heat Capacity is

a) $J K^{-1}$	b) $J kg^{-1} K^{-1}$
c) $Cal g^{-1} K^{-1}$	d) $J kg^{-1}$

Section B
Answer all the questions
(5 x 2 = 10)

11. State Pascal`s Law.
12. What is cargo sweat?
13. What do we mean by angle of Repose of granular substances/objects?
14. What is magnetic permeability?
15. What is venturi meter?

Section C
Answer any five out of seven questions.
(5 x 10 = 50)

16. (a) Write three differences between transverse wave and longitudinal wave?
(b) Explain Eco-sounder along with its working principle. [6+4=10]
17. (a) What is a hygrometer?
(b) Calculate the heat required to convert 3 kg of ice at -12 degrees Celsius kept in a calorimeter to steam at 100 degrees Celsius. [2+8=10]
Given
Specific heat capacity of ice = $2100 \text{ J kg}^{-1} \text{ }^{\circ}\text{C}^{-1}$
Specific heat capacity of water = $4186 \text{ J kg}^{-1} \text{ }^{\circ}\text{C}^{-1}$
Latent heat of fusion of ice = $3.35 \times 10^5 \text{ J kg}^{-1}$
Latent heat of fusion of steam = $2.5 \times 10^6 \text{ J kg}^{-1}$
18. (a) What is sextant?
(b) What is the working principle of sextant? Explain it with proper schematic diagram. [2+8=10]
19. (a) What do you mean by magnetic Declination and Dip or Inclination?
(b) Calculate the earth's total magnetic field at a place where the angle of Dip is 45° horizontal component of earth's magnetic field 0.8 Gauss. [4+6=10]
20. (a) Draw the schematic diagram of a Weston's differential pulley block.
(b) Derive the equation for mechanical advantage of the differential pulley block. [4+6=10]
21. (a) State Hooke's Law and define Young's Modulus of elasticity.
(b) The elastic limit of brass is 379 MPa . What should be minimum diameter of brass rod if it is to support a 400 N load without exceeding the elastic limit? [5+5=10]
22. (a) Define conduction, convection and radiation.
(b) A factory siren whistles a note of frequency 680 Hz . A man travelling in a car at 108 km/h moving towards the factory hears the whistle. What is the apparent frequency of the sound as heard by him? Speed of air = 340 m/s . [6+4=10]

