

Indian Maritime University
(A Central University, Govt of India)
End Semester Examinations – June 2025

Programme Name: DNS

Semester: I

Subject Code: UD11T6103

Subject Name: PHYSICS

Date: 12.06.2025

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.

Section A

Ten MCQs of 01 Mark each – Choose the correct answer as applicable.

1. The rate of change of angular displacement with time is -----.
 - a) angular velocity
 - b) angular acceleration
 - c) angular momentum
 - d) moment of inertia
2. The energy due to motion of the liquid is -----.
 - a) potential energy
 - b) kinetic energy
 - c) pressure energy
 - d) vibrational energy
3. Pick out the unit of loudness.
 - a) bel
 - b) decibel
 - c) volt
 - d) no unit
4. Find out the property of gas.
 - a) low density
 - b) highly compressible
 - c) high expansion on heating
 - d) all the above
5. The radio wave transmission by ionospheric reflection takes place in
 - a) groundwave propagation
 - b) sky wave propagation
 - c) space wave propagation
 - d) all the above
6. The optical instrument used in submarines and by the soldiers in trenches
 - a) telescope
 - b) periscope
 - c) binocular
 - d) all the above

7. Which of the following law provides the direction of induced emf?

- a) Lenz's law
- b) Coulomb's law
- c) Ohm's law
- d) Kirchhoff's law

8. The branch that deals with the phenomena associated with electricity at rest

- a) electrostatics
- b) electromagnetics
- c) electro mechanics
- d) nano electronics

9. The process which involves the variation of one of the characteristics of a signal in accordance with message signal is -----.

- a) amplification
- b) radiation
- c) modulation
- d) demodulation

10. The device which converts one form of signal into another form is -----.

- a) transmitter
- b) receiver
- c) transducer
- d) amplifier

Section B

Answer all Questions.

(2 X 5 Marks = 10 Marks)

- 11. State Archimedes principle.
- 12. Define Boyle's law.
- 13. Write the phenomenon of total internal reflection in light.
- 14. What is mutual induction?
- 15. State the purpose of reflector in Yagi uda antenna.

Section C

Answer any 05 questions out of 07 questions. (10X5 Marks = 50 Marks)

- 16. a) With neat sketch explain the working of gyroscope in detail. **(7 Marks)**
b) A harmonic motion is of amplitude 100 cm and time period 2 seconds. Find the maximum value of velocity and acceleration. **(3 Marks)**
- 17. a) State Pascal's Law and explain how the hydraulic brake works. **(7 Marks)**
b) What is echo sounder? Derive the relationship to find the depth of water in sea. **(3 marks)**
- 18. a) Explain various heat transfer mechanism. **(7 Marks)**
b) How much heat is gained by 60g of mercury when its temperature rises by 27°C to 60°C? Given that specific heat capacity of mercury is 1.39 J /g°C. **(3 Marks)**

19. a) Sketch a sextant showing the arrangement of the mirrors, the path of rays to the observer's eye and how the angle between the two objects is measured. **(7 Marks)**
- b) A light ray travels from water into air. Calculate the critical angle for the total internal reflection at the water-air interface. Refractive indices of water and air are given as 1.33 and 1.00 respectively. **(3 Marks)**
20. a) Describe Kirchhoff's current law and voltage law with neat sketch. **(7 Marks)**
- b) Two resistors $R_1=40\Omega$ and $R_2=25\Omega$ are connected in parallel across 20V DC supply. Find the total power dissipated in the circuit. **(3 Marks)**
21. a) An electric lamp consumes 100 watts of power. If the supply voltage is 220V, determine the current through the filament, its resistance and the energy consumed in 30 minutes. **(3 Marks)**
- b) Elaborate the working of RADAR with neat block diagram. **(7 Marks)**
22. a) Explain the process of flow rate measurement of liquid using venturimeter. **(7 Marks)**
- b) Lis out various applications of thermistor. **(3 Marks)**

