

Indian Maritime University
(A Central University, Govt of India)
End Semester Examinations – June 2026
Programme Name: DNS
Semester: I
Subject Code: UD11T6103
Subject Name: Physics

Date: 03.06.2026

Max Marks: 70

Duration: 03 Hrs

Pass Marks: 35

General Instructions

- (i) All Sections (A, B & C) are to be attempted.
(ii) Attempt any five questions from section C.

Section A

Ten MCQs/Fill in the Blanks of 01 Mark each – Choose the correct answer as applicable.

1. The axis of precession is
 - a. parallel to the spin axis
 - b. perpendicular to the spin axis
 - c. spherical around the spin axis
 - d. same as the spin axis
2. For incompressible fluid flow, if area reduces then what is the effect on the velocity?
 - a. increases
 - b. decreases
 - c. first increases then decreases
 - d. first decreases then increases
3. A train emits a sound of frequency 'f'. What will be the frequency heard by a person sitting in the train? The speed of the train is 'v'.
 - a. f
 - b. $f(330+v)/330$
 - c. $fv/(330-v)$
 - d. $fv/(330+v)$
4. A person prefers to sit by a fire during cold winter months. Which of the following heat transfer types provides him with the most heat?
 - a. Convection and radiation together
 - b. Radiation will provide quick warmth
 - c. If it is near the fire, convection is effective
 - d. Conduction from the fire
5. A periscope operates
 - a. on the law of refraction
 - b. on the law of reflection
 - c. dispersion of light
 - d. scattering of light

6. Identify the electromagnetic wave which is also known as heat waves.
a. Radio Waves b. Gamma Waves c. X-Rays d. Infrared Waves
7. What is the primary hazard of static electricity on a chemical or gas tanker?
a. Electrocution of personnel
b. Damage to sensitive electronic cargo monitoring equipment
c. Spark ignition of flammable gas/vapour mixtures
d. Rapid oxidation of steel plates
8. The potential difference across the terminals of a cell is maximum when:
a. the circuit is open
b. maximum current flows
c. the circuit is short circuited
d. internal resistance is high
9. The height of receiving antenna is
a. $\lambda/2$ b. $\lambda/4$ c. 2λ d. 4λ
10. In radar, the device that allows a single antenna to be used for both transmission and reception is:
a. Modulator b. Waveguide c. Mixer d. Duplexer

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Section B

Five Questions of 02 Marks each

11. What are streamline and turbulent flow?
12. Define conduction and convection.
13. How does the ionosphere help in communication?
14. State Kirchhoff's laws.
15. What is flow rate?

Section C

Seven Questions of 10 Marks each of which any 05 questions to be answered.

16. a) Explain the properties of gyroscope with diagram. (6)
b) A solid sphere of mass 3.5kg and radius 8cm rotates about a diameter at the rate of 7rev/s. If the sphere translates at a speed of 2.7m/s, determine the total kinetic energy of the sphere. (4)
17. a) State Pascal's law. Explain the working of hydraulic lift with diagram. (6)
b) Air enters a compressor with density 1.29kg/m³ and a mean velocity of 4m/s in 6cm x 6cm square inlet duct. Air is discharged from the compressor with a mean velocity of 3m/s in a 5cm diameter circular pipe. Determine the mass flowrate and the density of the air at the outlet. (4)
18. a) Describe with diagram the instrument used for the measurement of depth of sea by sound to avoid grounding. (7)
b) Define and explain specific heat capacity and sensible heat. (3)

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19. a) Explain the bending of EM waves by ionosphere. (5)
b) What is total internal reflection of light? Discuss any one application. (5)
20. a) What is static electricity? State its hazards. (5)
b) Differentiate between self-inductance and mutual-inductance. (5)
21. Explain the working of radio receiver and transmitter with block diagram. (10)
22. a) Discuss the measurement of the flowrate of a liquid with a diagram. (6)
b) A monochromatic light of wavelength 600nm is incident from air on glass surface. Find the wavelength, frequency and speed of the refracted ray if μ of glass is 1.5. (4)
