
Indian Maritime University
(A Central University, Govt of India)

Mar/Apr'26 SE

Programme Name: B Sc (NS)

Semester: I

Subject Code: UG21T6103

Subject Name: PHYSICS

Date: 12.03.2026

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

Choose the correct answer as applicable.

1. The SI unit of power is _____.
a) Joule
b) Ampere
c) Watt
d) Ohm
 2. In which type of flow, streamline or turbulent, is the concept of Reynolds number most applicable?
a) Streamline flow
b) Turbulent flow
c) Both
d) Neither
 3. SI 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
 4. Which of the following is not part of the electromagnetic spectrum?
a) Ultraviolet
b) Infrared
c) Sound waves
d) X-rays
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5. An Ultrasonic wave is sent from a ship towards the bottom of the sea. It is found that the time interval between the sending and receiving of the wave is 3.2 sec. What is the depth of the sea, if the velocity of sound in the seawater is 1400 m/sec?

- (a) 1400 m
- (b) 2240 m
- (c) 1420m
- (d)2000 m

6. An engine uses 20A of current. The resistance offered is 20Ω . Calculate the power consumed by the engine

- a) 8000W
- b) 800 W
- c)4000W
- d)400W

7. What does emf stand for?

- a) Electronic magnetic force
- b) Electromotive force
- c) Electromagnetic force
- d) Electromated force

8. The direction of induced e.m.f. can be found by

- a) Laplace's law
- b) Lenz's law
- c) Fleming's right hand rule
- d) All of the above

9. A device that can both transmit and receive is called?

- A. transreceiver
- B. transducer
- C. Duplexer
- D. Radar

10. What is the role of transmitter in the communication system?

- A. To decode a signal to be transmitted.
- B. To convert one form of energy into another.
- C. To detect and amplify information signal from the carrier.
- D. To produce the radio waves to transmit data.

Section B

Five Questions of 02 Marks each

11. State Pascal's Law?

12. Define Potential difference

13. Difference between Sensible heat and Latent heat

14. A sound source produces a sound intensity of $1 \times 10^{-4} \text{ W/m}^2$. calculate the sound intensity level in decibels.

15. Draw the block diagram of a radio receiver

Section C

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

16. a) Explain Gyro compass. (5 Marks)
- b) State and prove the Bernoulli's equation for the flow of liquid. (5 Marks)
17. a) Explain with neat diagram, construction and working of Prism binoculars (7 Marks)
- b) An optical fiber made up of the glass with refractive index $n_1 = 1.5$ which is surrounded by another glass of refractive index n_2 . Find the refractive index n_2 of the cladding such that the critical angle between the two claddings is 80° . (3 Marks)
18. a) A hospital uses an ultrasonic scanner to locate tumours in a tissue. What is the wavelength of sound in a tissue, in which the speed of sound is 1.7×10^3 m/s and the operating frequency of the scanner is 4.2 MHz. (3 Marks)
- b) Explain with neat block diagram, the working of echo sounder. (7 Marks)
19. a) Explain the different modes of heat transfer (7 Marks)
- b) Calculate the coil inductance when a current of 4 A in a coil of 800 turns produces a flux of 5 mWb linking with the coil. (3 marks)
20. a) State the principle and explain the working of Sextant. (7 marks)
- b) A train is moving towards a stationary observer at a speed of 20 m/s. The frequency of the sound produced by the train whistle is 500 Hz. If the speed of sound in air is 340 m/s. Calculate the frequency heard by the observer. (3 Marks)
21. a) What is meant by static electricity? Explain the various causes of Static Electricity (5 Marks)
- b) Derive an expression for self and Mutual Inductance? (5 Marks)
22. a) How do Radar transmitters and receiver coordinate their operation in a Radar system. (7 Marks)
- b) What are some applications of Thermistors in everyday devices and industrial applications. (3 Marks)
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