

Final Exam
DPHYS – II: PHYSICS – 2
Spring 2026

Points of attention:

- For each question, the maximum earned points are specified in the question.
- Write clearly! Answers that are not readable are not marked and don't earn marks!
- All answers should be written in English using **blue or black pens** only.
- Use the pencil only for diagrams and graphs.
- Show all the calculation steps in the given space.
- When finished, submit the question paper, together with the answer scripts and the signed cover page to the invigilator.
- Any cheating/copying may result in an instant failing of the examination.

Exam Duration: 2 hours
Instructor's Name: JAHANZEB KHAN BAHADUR &
RANJITH VASUDEVAN
Exam Date: 12/05/2026
Program: DO

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	10

Student Information

Name:

ID:

Signature:

Invigilator

Initials:

Time received:

☐ Student ID checked

Question 1**[05 marks]**

Circle the correct answer/ Fill in the blank/ True or False wherever required for each question given below:

- (i) To hear an echo, the minimum distance between the person and the obstacle must be (1/2 mark)
(a) 34 meter (b) 34 m and above
(c) 17 m (d) less than 17 m
- (ii) Direction of magnetic field around a current carrying conductor can be determined by (1/2 mark)
(a) Faraday's Law (b) Maxwell's Right Hand Rule
(c) Fleming's Left Hand Rule (d) Lenz's Law
- (iii) The wavelength of FM radio with frequency 89MHz is _____. (1/2 mark)
- (iv) If we place a current carrying coil inside the uniform magnetic field in perpendicular direction, (1/2 mark)
(a) the magnetic field will produce and induce emf in the coil.
(b) the magnetic field will produce a turning effect in the coil.
(c) the magnetic field will produce self-induction in the coil.
(d) the magnetic field will produce mutual induction in the coil.
- (v) To receive the force in a current carrying conductor inside the magnetic field the conductor should be placed _____. (1/2 mark)
(a) In the direction of magnetic field
(b) Opposite the magnetic field
(c) In the direction of passing current
(d) In perpendicular direction of the magnetic field
- (vi) The range of audible frequency for human ear is _____. (1/2 mark)
(a) 20KHz to 20,000KHz (b) 20 Hz to 20kHz
(c) 10Hz to 20 Hz (d) 20 Hz to 20MHz
- (vii) The split ring used in DC motor is also called _____ (1/2 mark)

- (viii) Select the correct statement: (1/2 mark)
- (a) Ultrasound waves are used in SONAR because they can easily reflect from water surface.
 - (b) Ultrasound waves are used in SONAR because they can easily do the refraction inside the water.
 - (c) Ultrasound waves are used in SONAR because they can travel many kilometers deep into the sea water.
 - (d) Ultrasound waves are used in SONAR because they can easily do the diffraction inside the water.
- (ix) Select the correct statement: (1/2 mark)
- (a) Convex lens produces virtual and inverted images.
 - (b) Convex lens produces real and erect images.
 - (c) Convex lens can produce only real images.
 - (d) Concave lens can produce virtual and erect image only.
- (x) Select the correct statement: (1/2 mark)
- (a) Low pitch, small frequency, shrill sound
 - (b) Low pitch, large frequency, grave sound
 - (c) High pitch, large frequency, shrill sound
 - (d) High pitch, small frequency, grave sound

Question 2**[9 marks]**

- (a) Write the formula of pressure exerted by the liquid at the base of the containers and discuss the factors upon which the pressure due to liquids depends.

(3 marks)

- (b) Convert the given pressure 1900000 N/m^2 into:

(3 marks)

- (i) kN/m^2 (ii) MPa (iii) bar

- (c) A submarine descends to a depth of 460m below the surface of the sea. (3 marks)

Given that the density of sea water is 1.03 g/cm^3 , calculate the absolute pressure acting on the submarine at this depth.

(Take atmospheric pressure as $1.01 \times 10^5 \text{ Pa}$).

Question 3

[9 marks]

- (a) State Pascal's Principle and explain its practical application in hydraulic lift system with the help of clearly labelled diagram. (5 marks)

- (b) A force of 200 N is applied inward on a piston of a hydraulic jack having a cross-section area of 2.8 cm^2 . The space between the force piston and the load piston is filled by unspecified fluid. The area of the opposite piston where the load is lifted is 4.8 cm^2 .

(i) What type of fluid is used in hydraulic systems to transmit force between pistons, and state why is it suitable? (1 marks)

(ii) Calculate the force received at the end of load piston. (3 marks)

Question 4**[9 marks]**

- (a) Discuss wave motion and differentiate between mechanical waves and electromagnetic waves with their examples.

(4 marks)

- (b) Draw a wave pattern of transverse wave with frequency 3.5 Hz and represent the following terminology over the wave.

(3 marks)

(i) Crest (ii) Amplitude (iii) Wave-length (iv) Time-period

- (c) In the MW medium wavelength band, waves are transmitted for BBC World Service at 460 m. Calculate the frequency used.

(2 marks)

Question 5**[9 marks]**

- (a) Explain Snell's law with a ray diagram according to change of direction and speed of the light when light ray enters from rare to denser medium.

(3 marks)

(b) A signal of laser light is sent into the fiber optic at an angle of 32° . If the angle of refraction is 79° calculate:

(i) The refractive index of fiber core.

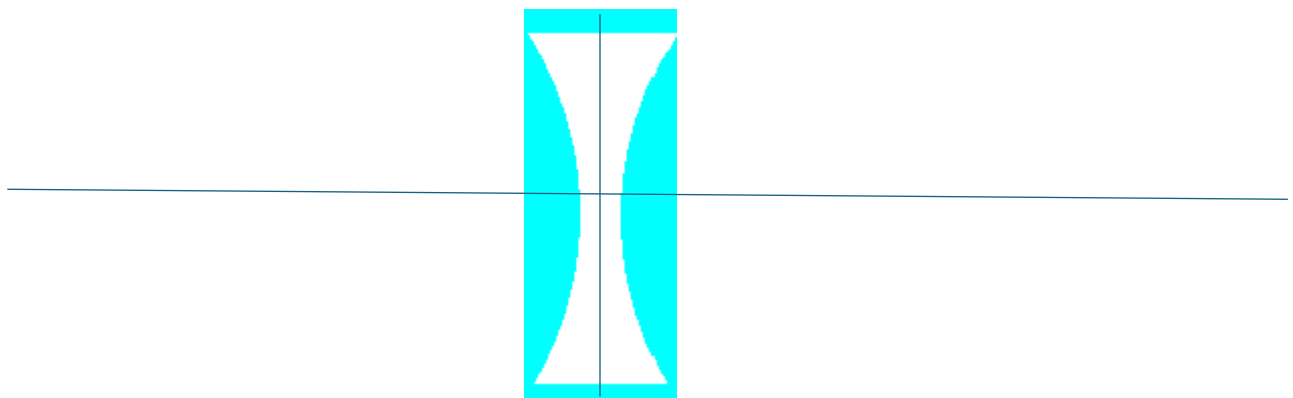
(2 marks)

(ii) Estimate the speed of laser light in the core of the fiber optics.

(2 marks)

(c) Draw a ray diagram for image formation when object is placed between $2F$ and F in front of a concave lens.

(2 marks)



Question 6**[9 marks]**

- (a) Write the effect of magnetic field on a current carrying coil when placed perpendicular inside the uniform magnetic field.

(3 marks)

- (b) State and explain Fleming's Left Hand Rule.

(2 marks)

- (c) Draw a labelled diagram of DC motor and write working principle and discuss (4 marks)
the factors upon which the speed of motor depends.

Formula Sheet

1. Pressure on the surface area: $P = \frac{F}{A}$
2. Pressure due to liquids: $P = \rho \times g \times h$
3. Refractive index with reference to direction is given by;

$$(\eta) = \frac{\sin \angle i}{\sin \angle r} \qquad (\eta) = \frac{\sin \angle r}{\sin \angle i}$$
4. Refractive index with reference to speed of light in different mediums

$$n = \frac{\text{Speed of light in air}}{\text{Speed of light in medium}}$$
5. Velocity of the waves $v = f \times \lambda$
6. (Speed of laser light, all electromagnetic waves = speed of the light)

CONVERSION OF PHYSICAL QUANTITIES

Conversion of Length		Conversion of Mass		Conversion of Time	
1 km	10^3 m	1 Kg	10^3 g	1 year	365 days
1 m	10^{-3} km	1 g	10^{-3} Kg	1 month	30 days
1 m	10^2 cm			1 day	24 hours
1 cm	10^{-2} m	1 g	10^3 mg	1 hour	60 minutes
1 m	10^3 mm	1 mg	10^{-3} g	1 minute	60 seconds
1 mm	10^{-3} m				
1 m	10^6 μ m	1 Kg	10^6 mg	1 second	10^3 ms
1 μ m	10^{-6} m	1 mg	10^{-6} Kg	1 ms	10^{-3} seconds
1 m	10^9 nm				
1 nm	10^{-9} m	1 g	10^6 μ g	1 second	10^6 μ s
1 m	10^{12} pm	1 μ g	10^{-6} g	1 μ s	10^{-6} seconds
1 mile	1.60934 Km	1 Kg	10^9 μ g	1 second	10^9 ns
1 Km	0.621371 miles	1 μ g	10^{-9} Kg	1 ns	10^{-9} seconds
1 nautical mile	1.15078 miles				
1 mile	0.868976 nautical miles	1 Tonne	10^3 Kg	1 second	10^{12} ps
1 nautical mile	1.852 Km	1 Kg	10^{-3} Tonne	1 ps	10^{-12} seconds
1 Km	0.5399 nautical mile				