

AGA KHAN UNIVERSITY EXAMINATION BOARD

HIGHER SECONDARY SCHOOL CERTIFICATE

CLASS XI

ANNUAL EXAMINATIONS (THEORY) 2024

Physics Paper II

Time: 1 hour 30 minutes Marks: 35

INSTRUCTIONS

Please read the following instructions carefully.

1. Check your name and school information. Sign if it is accurate.

**I agree that this is my name and school.
Candidate's Signature**

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2. There are TEN questions. Answer ALL questions. Questions 9 & 10 each offer TWO choices. Attempt any ONE choice from each.
3. When answering the questions:

Read each question carefully.
Use a black pointer to write your answers. DO NOT write your answers in pencil.
Use a black pencil for diagrams. DO NOT use coloured pencils.
DO NOT use staples, paper clips, glue correcting fluid, or ink erasers.
Complete your answer in the allocated space only. DO NOT write outside the answer box.
4. The marks for the questions are shown in brackets ().
5. You may use a scientific calculator if you wish.

Q.1. (Total 3 Marks)

The weight of a student on a certain weighing scale measures about 55 kg.

If the least count of the machine is 0.5 kg, then calculate the percentage uncertainty in the measurement.

Q.2. (Total 2 Marks)

Write any TWO physical quantities that exemplify each of the following.

S. No.	Scalar Product	S. No.	Vector Product
1		1	
2		2	

Q.3. (Total 3 Marks)

During a practice session of long jump, a coach trains an athlete to take off the jump at an angle of 45° .

Derive a mathematical expression for the maximum range of the athlete.

Q.4.

(Total 2 Marks)

A solid disc with 0.125 kg.m^2 of moment of inertia is rotating about its central axis with an angular velocity of 10 rad/s .

Calculate the rotational kinetic energy of the disc.

Q.5.

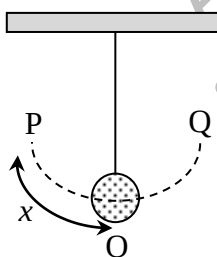
(Total 3 Marks)

State any THREE conditions for the generation of turbulent flow.

Q.6.

(Total 2 Marks)

Rameen observes a simple pendulum oscillating between P and Q, over the mean position O as shown in the given diagram.



She claims that in one complete vibration, the distance covered by the bob is $2x$ units.

Do you agree with Rameen's claim? Justify your stance with a reason.

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Q.7. (Total 3 Marks)

Explain how stationary waves are produced in an air column organ pipes.

Q.8. (Total 3 Marks)

The wavelength of light in the air is 4.0×10^{-4} m that is incident perpendicularly on a double slit and passes through the slits. The distance between the slits is 2.0×10^{-2} m and bright and dark fringes are observed on a screen 2 m away from the slits.

Calculate the distance between the two adjacent bright fringes on the screen.

Q.9.

(Total 7 Marks)

EITHER

- a. Derive an expression for the energy required to escape a body from the Earth's gravitational field.

OR

- b. When a net force acts on an object, the work done on the object equals the change in its kinetic energy.

Based on the given principle, derive work-energy equation in the presence of friction.

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EITHER

- OR**

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