

AGA KHAN UNIVERSITY EXAMINATION BOARD

HIGHER SECONDARY SCHOOL CERTIFICATE

CLASS XI

ANNUAL EXAMINATIONS (THEORY) 2025

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

RUBRIC

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)

Show that $F = G \frac{m_1 m_2}{r^2}$ is dimensionally correct.

Q.2. (Total 2 Marks)

In head to tail rule, can vectors be placed in any order of succession? Justify your answer.

Q.3. (Total 3 Marks)

A projectile is thrown at an angle of 30° with a velocity of 100 m/s. Find its maximum height.

(Note: Take the value of acceleration due to gravity 'g' as 10 m/s^2 .)

Q.4.

(Total 2 Marks)

Astronauts feel weightlessness in the satellite orbiting the Earth.

State TWO reasons for this.

Q.5.

(Total 3 Marks)

In a juice factory, juice flows through a horizontal pipe with varying velocities at two ends. At point 1, the velocity of the juice is 3 m/s and pressure is 120000 Pa. At point 2, the velocity of the juice is 7 m/s, find the pressure at point 2.

(Note: Assuming the density of the juice is 1050 kg/m^3 .)

Q.6.

(Total 2 Marks)

The acceleration of a body vibrating on a smooth surface under elastic restoring force does not remain constant during its motion.

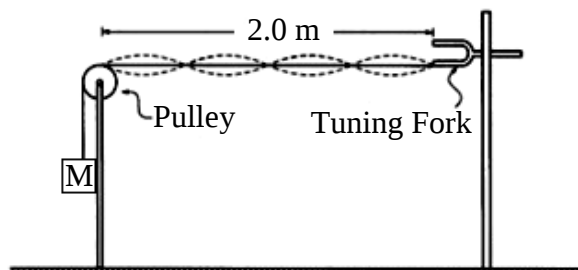
Explain your answer in terms of SHM and write the relevant mathematical expression.

PLEASE TURN OVER THE PAGE

Q.7.

(Total 3 Marks)

In the given diagram, one end of a string is attached to a tuning fork with frequency 120 Hz, while the other end of the string passes over a frictionless pulley and is connected to a suspended mass **M**. The value of **M** is such that the standing wave pattern has four loops. The length of the string from the tuning fork to the point where the string touches the top of the pulley is 2.0 m.



- a. Determine the wavelength of the standing wave. (1 Mark)

- b. Determine the speed of transverse waves along the string. (1 Mark)

- c. Explain the effect of increasing the number of loops on velocity and frequency of the standing waves. (1 Mark)

Q.8.

(Total 3 Marks)

In Young's double slit experiment, the distance between two consecutive fringes (y) is affected by the separation between the slits (d).

Explain the given statement with the help of mathematical formula.

AKU-EB
Annual Examinations 2025
for Teaching & Learning only

PLEASE TURN OVER THE PAGE

Q.9.

(Total 7 Marks)

EITHER

- a. A marathon runner weighing 60 kg runs up the stairs to the top of 440 m tall building. If he lifts himself to the top in 15 minutes, then what will be his average output power?

OR

- b. The escape velocity from the Earth is about 11.2 km/s. Calculate the escape velocity from the Saturn whose mass is about 100 times the Earth's mass and radius is about 10 times the Earth's radius.

EITHER

-
- The diagram illustrates two experimental setups, A and B, for measuring the specific heat of a solid. In setup A, a solid block is placed in a cylinder of water, and an arrow points to the water labeled C_v . In setup B, a solid block is placed in a cylinder of water, and an arrow points to the block labeled C_p . Both setups are heated by a flame at the bottom.

OR

- Should you invest in this new engine? Why or why not? Justify your answer using calculations.

H2501-1711120

Please use this page for rough work

AKU-EB
Annual Examinations 2025
for Teaching & Learning only