

GREENLAWNS HIGH SCHOOL
PHYSICS TERMINAL EXAMINATION 2024-25

STD.10

TIME: 2 HR.

DATE: 07/10/2024

MARKS: 80

NOTE:

- 1] Answer to this paper must be written on the paper provided separately.
- 2] You will not be allowed to write during the first 10 minutes. This time is to be spent in reading the paper.
- 3] The time given at the head of this paper is the time allowed for writing the answers. This paper has 4 pages (8 sides)
- 4] Section A is compulsory. Attempt any 4 questions from Section B.
- 5] The intended marks for a question or parts of questions are given in the brackets [].

SECTION A [40 MARKS]

ALL QUESTIONSS IN THIS SECTION ARE COMPULSORY.

QUESTION 1

Choose the most correct answers to the questions from the given options:[1

- i) A machine is 80% efficient, what does it imply?
- a) 80% of the total energy supplied to the machine at the load point is obtained as useful energy at the effort point.
 - b) 80% of the total energy supplied to the machine at the effort point is obtained as useful energy at the load point.
 - c) $\eta \geq 1$
 - d) M.A. = V.R.
- ii) You are given kerosene, turpentine and water. In which of these the light travels the fastest. The absolute refractive index for kerosene is 1.44, turpentine is 1.47 and water is 1.33.
- a) Turpentine
 - b) Water
 - c) Kerosene
 - d) data given is insufficient
- iii) A string is stretched in air between two nails fixed in the opposite walls and plucked in the middle. The vibrations produced in the string are
- a) Resonant vibrations
 - b) Damped vibrations
 - c) Natural vibrations
 - d) Free vibrations

Contd.....

Page 2

iv) If the drier in the washing machine throws out water from the wet clothes, then the force acting on water is

- a) Gravitational force b) Centripetal force
c) Inter molecular force d) Centrifugal force

v) The waves which can travel only in solids and the surface of the liquids are

- a) longitudinal waves b) electromagnetic waves
c) mechanical waves d) transverse waves

vi) Two unequal forces in opposite direction but not in the same line act upon a body, then the body will have

- a) only translational motion b) only rotational motion
c) neither rotational motion nor translational motion
d) rotational motion as well as translational motion

vii) With respect to the given table, which substance will have the highest critical angle with respect to air?

- a) Water b) Glass c) Turpentine d) Diamond

Substance	Refractive index
Water	1.33
Glass	1.5
Turpentine	1.47
Diamond	2.41

viii) The magnification of a lens is +2.5

- a) The lens is convex and $u < f$ b) The lens is concave and $u < f$
c) The lens is concave and $u > f$ d) The lens is convex and $u > f$

ix) Choose the option where the example does not belong to the given class of lever.

- a) Claw hammer – Class I b) A fishing rod – Class I
c) Wheel barrow – Class II d) Foot treadle – Class III

x) The minimum number of vibrations produced per second by a vibrating body for sound to be audible for human beings are

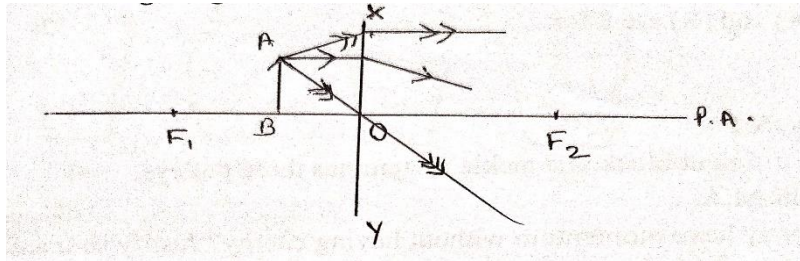
- a) 10 vibrations b) 20 vibrations c) 30 vibrations d) 80 vibrations

Page 3

xi) Which of the following phenomenon contributes significantly to the bluish appearance of sky?

- a) Dispersion of light
- b) Scattering of light
- c) reflection of light from the earth
- d) Total internal reflection of light

xii) Refer to the diagram given below of a convex lens



The characteristic of the image formed would be:

- a) real, inverted and magnified
- b) real, upright and magnified
- c) virtual, upright and diminished
- d) virtual, upright and magnified

xiii) Which characteristic of sound helps to differentiate a known person's voice from an unknown person's voice without seeing them?

- a) loudness
- b) pitch
- c) quality
- d) amplitude

xiv) Assertion (A): Infrared radiations are used in photography at night and also, in mist and fog.

Reason (R): Infrared radiations are the electromagnetic waves with long wavelength.

- a) Both (A) and (R) are true and (R) is the correct explanation of (A)
- b) Both (A) and (R) are true and (R) is not the correct explanation of (A)
- c) (A) is true but (R) is false
- d) Both (A) and (R) are false

xv) Assertion (A): In real and ideal conditions, work done by a mass tied at the end of a string, rotating uniformly in a circle, is zero.

Reason (R): Work done is never zero in vacuum conditions.

- a) Both (A) and (R) are true and (R) is the correct explanation of (A)
- b) Both (A) and (R) are true and (R) is not the correct explanation of (A)
- c) (A) is true but (R) is false
- d) Both (A) and (R) are false.

Contd....

QUESTION 2

A] A 75% efficient block and tackle system has three pulleys. [2]

Calculate its M.A.

B] Can a body have momentum without having energy? Justify your answer. [2]

C] i) Which physical quantity is the product of F and v , where F represents the force acting on a body and v represents the velocity with which the body moves? [2]

ii) Give the SI unit of the quantity mentioned by you in the answer of Q.2 C-i.

D] i) What is the sign assigned to the power of a lens that deviates a ray of light away from the centre of the lens? [2]

ii) Can the above lens give an image three times the size of an object?

E] A lever of length 16 cm has its load arm 5cm long and its effort arm 16cm long. [2]

i) Calculate the value of its mechanical advantage ii) What will be its Velocity ratio if the efficiency is 100%

F] Two transparent media X and Y have refractive index 1.5 and 2.4 respectively then, [2]

i) State what happens to the wavelength of light ray as it travels from medium Y to medium X.

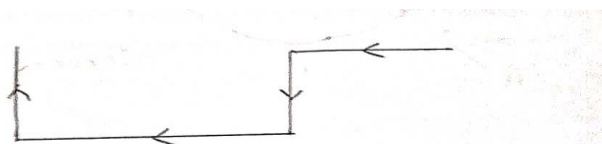
ii) What happens to the direction of light when it travels from medium X to medium Y?

G] A uniform metre rod 5m in length and weight 90N is suspended horizontally by two vertical wires attached at 50cm and 3.5m respectively from the end of the rod. Find the tension in each wire. [3]

QUESTION 3

A] State two conditions under which a lever acts as a speed gainer. [2]

B] By using only two right angled isosceles prisms, show how a ray of light can be deviated as shown below. [2]



Contd....

C] Study the figure given below. Each glass is partially filled with water is [2]
hit with the same wooden spoon with the same intensity. Which glass will
produce a note of highest frequency and why?



D] i) The refractive index of medium A with respect to medium B is 0.8. [2]
The ray is incident obliquely at the interface of two media. Will the ray bends
towards the normal or away from the normal?

ii) What will happen to the focal length of a lens if it is partially covered
with a paper.

E] Write the energy conversion in each of the following cases when they are in
working condition. [2]

i) Thermocouple ii) Nuclear reactor

SECTION B (40 MARKS)

ATTEMPT ANY 4 COMPLETE QUESTIONS FROM THIS SECTION

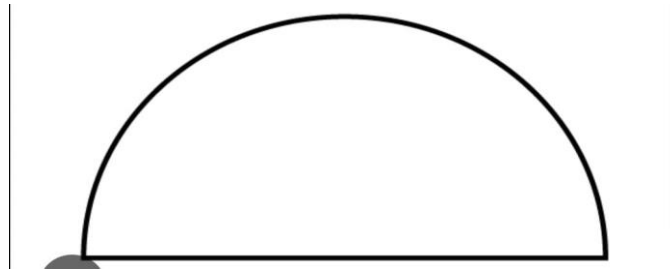
QUESTION 4

A] i) Name the force which is responsible for an electron to move around [3]
the nucleus of an atom in a circular path. From where does this force be
obtained?

ii) State the direction of the force mentioned by you in Q.4 A-i

Contd.....

B] The diagram below shows a ray of blue light passing through a semicircular glass block along path AB. The ray gets refracted along surface XY and strikes at the point R on the screen. [3]



- i) What is the special name given to the angle marked by P?
- ii) Name the phenomenon that takes place if angle P is further increased.
- iii) If the blue light is replaced by green light along the same path AB, the ray will strike at point Q on the screen as shown in the figure. Explain why green light does not trace the same path as blue light.

- C]** i) Name the radiations of an electromagnetic spectrum having the wavelength 100 Å to 4000 Å. [4]
- ii) Name the material of the prism required for obtaining spectrum of radiations mentioned by you in Q.4 C- i
 - iii) Give two uses of the radiations mentioned by you in Q.4 C- i

QUESTION 5

A] Draw a diagram to illustrate the position of fulcrum, load and effort a knife. To which type of lever does it belong to? Will it act as a force multiplier, a speed gainer or direction changer? [3]

- B]** i) Define centre of gravity. [3]
- ii) Where is the centre of gravity located in a) an empty ice cream cone
b) a dandiya stick

- C]** i) The focal length of a camera lens is 30cm. Find how far away from the film must the lens be set in order to photograph an object located at a distance 120cm from the lens. [4]
- ii) Will the photograph be magnified or diminished in the above case (Q.5 C-i)? Justify your answer with the help of calculations.

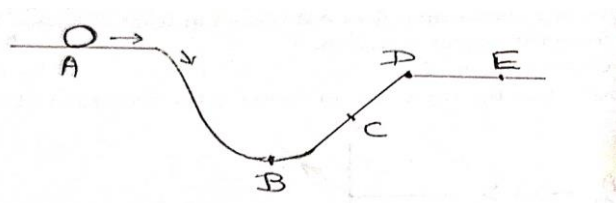
Contd.....

QUESTION 6

A] Define [3]

i) Scattering of light ii) Refractive index iii) Dynamic equilibrium

B] The diagram below shows an object at A which travel to various positions B, C, D and E. Observe the diagram and answer the questions that follow: [3]



- i) How does the sum of the gravitational potential energy and kinetic energy get affected when the object moves from Point A to Point D across the surface?
- ii) At which position the object will have a minimum gravitational potential energy?
- iii) The object's kinetic energy at position C is less than its kinetic energy at position _____. (Fill in the blank)

C] Which type of vibrations are produced when an artist plays on the strings of the guitar by his fingers? Name the type of force/s which act on the vibrating body in such type of vibrations. [4]

QUESTION 7

A] Calculate the work done by a force which increases the speed of a 1kg object from 4ms^{-1} to 8ms^{-1} while moving in a particular direction. [3]

State the fact which you have taken into consideration while calculating the work done using the given information.

B] i) Can the absolute refractive of a medium be less than one? [3]

ii) A coin placed at the bottom of a beaker appears to be raised by 4.0cm. If the refractive index of water is $4/3$, find the depth of water in the beaker.

C] i) Draw a neat labelled diagram of a block and tackle system of velocity ratio 4 showing the point of application and direction of load, effort and tension. [4]

- ii) What will be its velocity ratio if the weight of the movable block is doubled?
- iii) What change can be made in the movable pulley to increase the efficiency of this system?

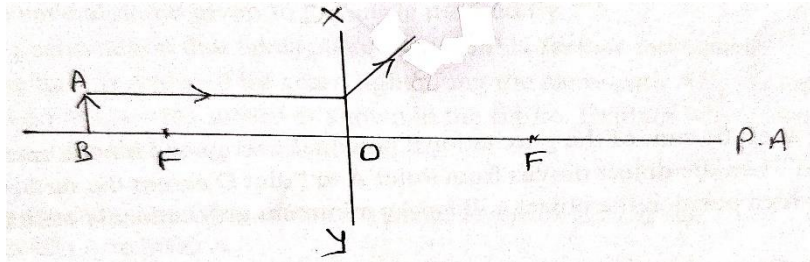
Contd....

QUESTION 8

A] The diagram below shows an object AB placed in front of a lens. The path of one ray coming from the object is shown. [3]

i) State the type of the lens used.

ii) Redraw and complete the ray diagram showing the formation of image.



B] A man standing in front of a vertical cliff fires a gun. He hears the echo after 4 s. On moving closer to the cliff by 84.5 m, he fires again and hears the echo after 3.5 s. Find the distance of the cliff from the initial position of the man. [3]

C] i) State two conditions which confirm the minimum angle of deviation is produced by the prism. [2]

ii) What should be the angle of incidence for a ray of light which suffers minimum deviation of 36° through an equilateral prism? [2]

QUESTION 9

A] Nisha heard a rattling sound of a vehicle on the road. Name the phenomenon responsible for this sound. Define it and also write how to prevent it. [3]

B] Draw a neat labelled diagram using a suitable lens which finds its application in a slide projector. [3]

C] A body is acted upon by two forces each of magnitude F, but in opposite directions. State the effect of force in terms of resultant force and motion if, [4]

a) both forces act at the same point of the body.

b) the two forces act at two different points of the body at separation d.