

GREENLAWNS HIGH SCHOOL
PRELIMINARY EXAMINATION YEAR 2020

SUBJECT : PHYSICS
TIME : 2 HRS

CLASS : X
MARKS :80

Note:

Answer to this paper must be written on the paper provided separately. You will not be allowed to write during the first 10 minutes. This time is to be spent in reading the Question paper.

The time given at the head of this Paper is the time allowed for writing the answers.

Section I is compulsory

Attempt any 4 complete questions from Section II. The intended marks for questions or parts of questions are given in [].

SECTION I – 40 MARKS

All questions in this section are compulsory.

Question 1.

- a) It is said that work done by a machine is less than the work done on the machine, then what is the use of the machine? [2]
- b) A boat is rowing through water at the rate of 5 ms^{-1} . Its engine has a power of 25kW. Find the resistance overcome in moving the boat through water. [2]
- c) Name the rule to determine the direction of [2]
 - i) Current induced in a circuit by the changing magnetic flux due to motion of a magnet.
 - ii) Magnetic field produced around a current carrying conductor
- d) Whose voice among men and women is grave? Give reason to your answer. [2]
- e) Which type of prism is used instead of glass prism to obtain an infrared spectrum? Why? [2]

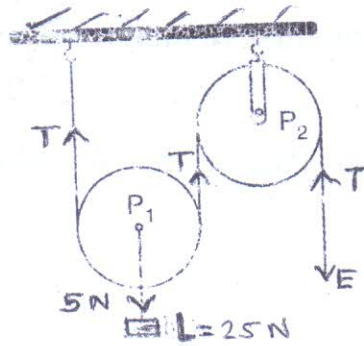
Question 2.

- a) Name the material which is used for making wires for heating coils. Give a reason for your choice. [2]
- b) What do you mean by resistivity of a conductor? What happens to the resistivity of semiconductors with the increase in temperature? [2]
- c) Why a transformer cannot be used with the direct current source? [2]

- d) Draw a graph of displacement from mean position with time for a body executing free vibrations in i) vacuum ii) in a medium. [2]
- e) Why ultrasound is used in SONAR? (Give two points) [2]

Question 3.

- a) Look at the figure given below and calculate the magnitude of effort 'E' & the value of the tension in the string. [2]



- b) Identify the type of equilibrium observed in each of the following cases [2]
- i) Motion of a satellite around the planet.
- ii) A beam balance with equal masses in both pans.
- c) Plot a graph of work done by a body when – i) a constant force is applied [2]
- ii) a variable force is applied.
- d) On oxidising a radioactive substance what changes would you expect to take place in the nature of its radioactivity? Why? [2]
- e) Why a miniature circuit breaker is more convenient than a fuse? [2]
- (Give two points)

Question 4.

- a) A bulb is joined to a battery of emf 6V. A steady current of 0.5 A flows through the circuit. Calculate the total energy provided by the battery in 5 minutes. [2]
- b) What are mechanical waves? Name one property of a wave that does not change when the wave passes from one medium into another medium. [2]
- c) State the chief energy changes in the following cases while in use [2]
- i) Loudspeaker ii) dynamo
- d) The kinetic energy of a body changes from 1.5 J to 3.8 J when the force is applied on it. Calculate the work done by the force. Give a reason for your answer. [2]
- e) If you are asked to select a magnifying glass from the following- [2]
- A magnifying glass with a focal length 10 cm or a magnifying glass of focal length 20 cm.
- Which one you will select? Why?

SECTION - II

Select any Four complete questions from this section.

Question 5.

- a) Which colour is used as a sign of danger? Why? [3]
- b) If two thin lenses, one concave & the other convex having a power of 2D each, are kept in contact with each other then calculate the power of such combination. What will the combination behave like? [3]
- c) By using a block & tackle system of pulleys, a man can raise a load of 72 kgf by an effort of 2×10^7 dyne. Find [4]
 - i) The mechanical advantage
 - ii) The man's useful power output if he raises the load through 20 m in 1.5 minutes. [$g = 10 \text{ N/kg}$]

Question 6

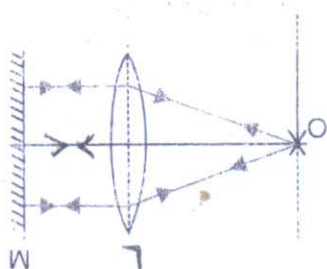
- a) State any three factors affecting the internal resistance of a cell. Also write how they affect the internal resistance of a cell. [3]
- b) Give one use of radio isotopes in each of the following field - [3]
 - i) Medical ii) Scientific iii) Industrial
- c) Two men 1.02 km apart stand at the same distance from a vertical hillock. One of them fires a shot & other hears the echo 2 seconds after hearing the direct sound. Find the distance of the man from the hillock assuming the velocity of sound in air to be 340 ms^{-1} [4]

Question 7

- a) Water at 15°C is falling from a height of 50 m from a waterfall. If all the energy of falling water is absorbed by it on striking the base of waterfall. Calculate the change in temperature of water. ($g = 10 \text{ ms}^{-2}$) [3]
- b) Give one similarity & two dissimilarities between a d.c. motor and an a.c. generator [3]
- c) Define [4]
 - i) Torque ii) Critical angle iii) Scattering of light iv) Isotones

Question 8

- a) Study the diagram given below & answer the questions that follow. [3]



O - Object
L - Lens
M - Plane Mirror

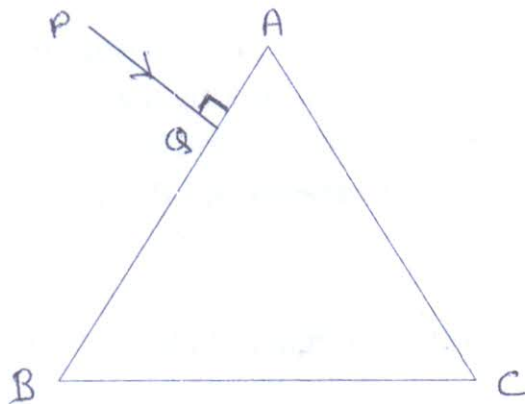
- i) State the magnification of the image formed. Give reason to your answer
 - ii) Write the nature of the image formed
 - iii) What is the name given to the distance between the object & optical centre of the lens in the above diagram?
- b) Draw a neat labelled diagram of a block & tackle system of pulleys with four pulleys & mechanical advantage = 5 [3]
Justify mechanical advantage = 5 by showing a proper calculation.
- c) A water pump can raise 20 kg of water through a height of 10 m in 10 seconds. What is the total work done by the pump? What is its power? [4]
($g = 10 \text{ms}^{-2}$)

Question 9.

- a) In winter, the weather forecast for a certain day is 'severe frost'. What should a wise farmer do in order to protect the crops? Why? [3]
- b) Give three differences between the radioactive decay & nuclear fission. [3]
- c) Give any two properties and two uses of the electromagnetic waves having wave length from 10 nm to 400 nm [4]

Question 10.

- a) ΔABC is an equilateral triangle prism. A ray of light PQ is an incident ray. Complete the ray diagram showing its emergence into the air after passing through the prism. (Show all the necessary angles) [3]



- b) What is a superconductor? Give one example of it. How can it be useful to us? [3]
- c) An electric heater is rated 1000W – 200 V. Calculate: [4]
 - i) the resistance of the heating element
 - ii) the current flowing through it.