

GREENLAWNS HIGH SCHOOL
PRELIMINARY EXAMINATION YEAR 2017-2018

SUBJECT : PHYSICS
TIME : 2 HOURS

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 15 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 all questions from this section.

Section II – Attempt any four complete questions from this section.

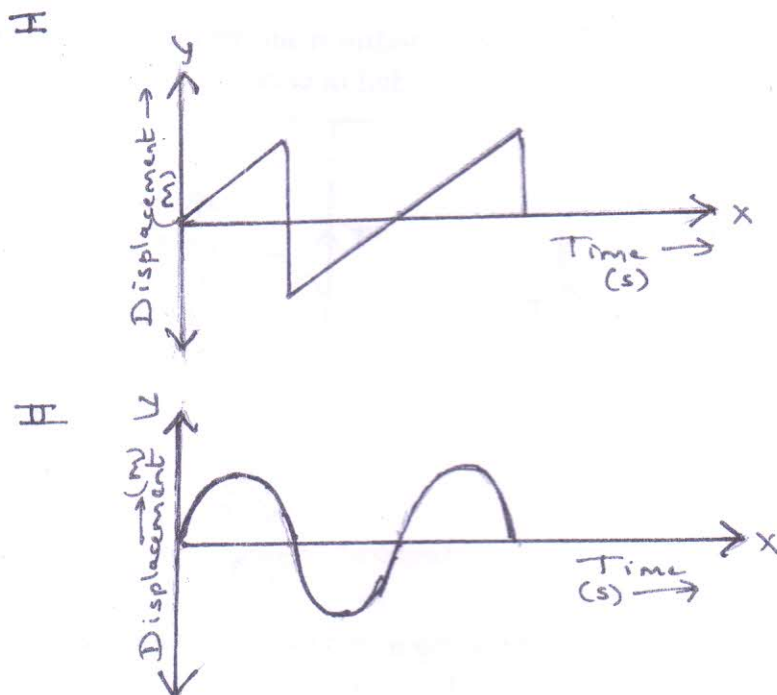
The intended marks for questions are given in brackets.

Section I (40 marks)

All questions in this section are compulsory.

- Q.1 A) Write the energy conversion in each of the following cases. [2]
 a) When the match stick is burnt.
 b) Dynamo

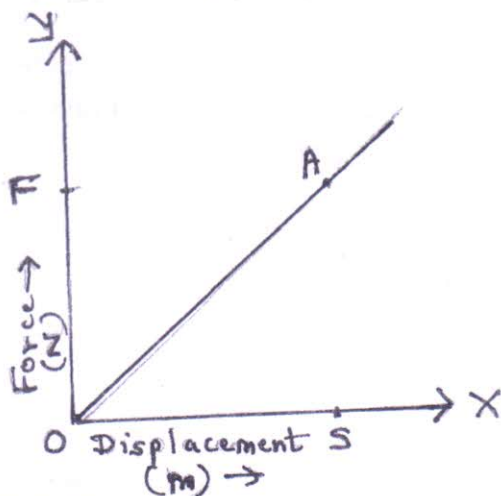
- B) Two musical notes of the same pitch & loudness are shown in the figure given [2]
 below. Observe the figure & write your observation (other than given in the
 question). Also give reason for the same.



- C) The absolute refractive index of glass is $\frac{3}{2}$ and that of water is $\frac{4}{3}$. Find the [2]
 refractive index of water with respect to glass.

D) The force – displacement graph in which force varies with displacement is given below. Using this graph [2]

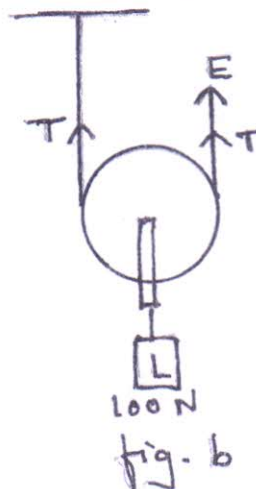
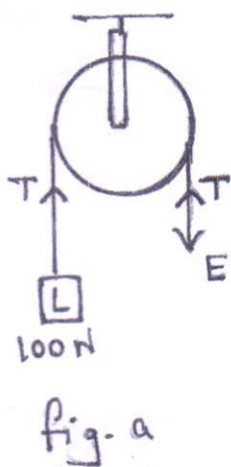
- i) How will you find the work done (in the direction of force) by the force 'F' in displacement 'S'.
- ii) Write the nature of force – displacement graph if the force is constant with displacement. (Do not draw the graph)



E) Name & state the law which determines the direction of force acting on the current carrying conductor. [2]

Q.2.

A) Two single pulley systems under ideal condition shown below are to be used to lift a load of 100N. Find the effort needed in each case. [2]



B) A man is pushing a box of weight along a horizontal surface. Name with reason- [2]

- i) One force which does zero work on the box
- ii) One force which does negative work on the box.

C) How would you connect the four resistors in order to reduce the equivalent resistance of the combination even less than the smallest resistance connected in the circuit? Give mathematical expression for the same. [2]

D) Give one example of each - [2]
i) the internal source & ii) the external source of background radiations.

E) In a SONAR, ultrasonic waves are sent into the sea water & the reflected waves from a sunken ship are received after 2.0 sec. Find the depth of the sunken ship. (Given - velocity of sound in air 340 ms^{-1} & in sea water 1450 ms^{-1}) [2]

Q.3.

A) Why are alloys used to make standard resistors? (Give two points) [2]

B) A particle is emitted from the nucleus of a parent radioactive element. If after emission the daughter nucleus formed is an isobar of the parent element then [2]

i) Name the particle emitted from the parent nucleus.

ii) Where will be the position of daughter nucleus with respect to its parent nucleus in the periodic table?

C) How does the presence of medium affect the amplitude of free vibrations of a body? Give reason to support your answer. [2]

D) Two bulbs are marked 100 W 220V & 60 W 110V. Compare their resistances [2]

E) In the figure i & ii a beam of light consisting of three colours blue, red & yellow is incident on a prism & on a rectangular glass block respectively. Redraw the diagrams in your answer booklet & complete them by drawing the refracted & emergent rays. [2]

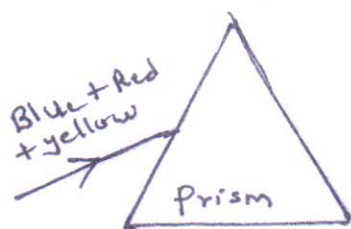


fig. i

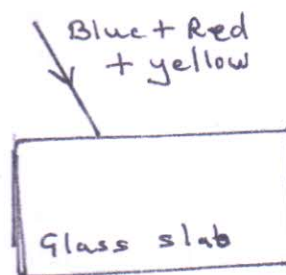


fig. ii

Q.4.

A) A transformer's primary & secondary coils have 200 & 4000 turns respectively. Name the type of transformer & state its function. [2]

B) State two factors which affect lateral displacement of light. [2]

C) The heart of a normal person beats 72 times in a minute & does a work of one joule per beat. What is the power of the heart? [2]

D) What will be the colour of the sky if there was no atmosphere? [2]
Justify your answer.

E) Why does a current carrying, freely suspended solenoid rest along a particular direction? State the direction in which it rests. [2]

Section II

Attempt any 4 complete questions from this section.

Q.5.

- A) If there is a convex lens of focal length 75 cm & a concave lens of focal length 40 cm then calculate their combined power and combined focal length. [4]
- B) State three actions that a total reflecting prism can produce. [3]
- C) What is the colour code used in a household circuit according to the new international conventions? [3]

Q.6.

- A) Differentiate between the following pairs on the basis of what is given in the brackets. [4]
- i) Actual machine – Ideal machine (comparison between output energy & input energy in each case)
 - ii) Convex lens – Concave lens (Nature of focus)
 - iii) Forced vibrations – Resonant vibrations (Time period of vibrations after the periodic force has ceased to act)
 - iv) Direct current – Alternating current (source)
- B) Name the radiations given out from a radioactive element during its decay whose properties are similar to the properties of X – rays. Also give two properties of the radiations stated by you. [3]
- C) Draw a neat labelled diagram of an apparatus which is used to measure the heat exchanged between two bodies when they are mixed together. State the principle on which it works. [3]

Q.7.

- A) A consumer uses 4 lamps of 60 W, 2 lamps of 40 W & 2 lamps of 100 W. All these are used for 6 hours daily. Find the total bill for 30 days when the rate of energy is 75 paise per unit & the meter rent is Rs.1. [4]
- B) Draw a neat labelled ray diagram using a suitable lens to correct the short sightedness in human eye. [3]
- C) Define [3]
- i) Critical angle
 - ii) Timbre
 - iii) Internal resistance of a cell

Q.8.

- A) Give scientific reasons- [4]
- i) Alpha particles are not used in radiotherapy
 - ii) Echos cannot be heard in a small room.
 - iii) A piece of diamond sparkles when viewed from certain directions.
 - iv) To obtain an ultraviolet spectrum from its source, a quartz prism is used instead of a glass prism.

B) A convex lens forms an image 16 cm long of an object 4 cm long kept at a distance 6 cm from the lens. The object & the image are on the same side of lens then [3]

- i) What is the nature of image?
- ii) Find a – the position of image
b – the focal length of lens

C) Name two factors on which the specific resistance of a metallic wire depends. [3]
Also state SI unit of specific resistance.

Q.9

A) i) Find the minimum angle of deviation for an equilateral prism when the angle of incidence is 48° . [4]
ii) What will be the angle of emergence?
iii) If the angle of incidence is changed to a) 30° & b) 60° state whether the angle of deviation will be equal to, less than or greater than the angle of deviation found by you in Q9 A – i.

B) A block & tackle has two pulleys in each block, with the tackle tied to the hook of the lower block & the effort being applied upwards. [3]
Draw a neat labelled diagram.

C) Give one example of each class of lever as found in the human body. [3]

Q.10

A) Write the Einstein's Mass energy equivalence relation & calculate the nuclear energy in MeV released due to loss of mass by 1 a.m.u [4]
(1 a.m.u = 1.655×10^{-27} kg)

B) Give one use of each. [3]
i) Ultraviolet radiations
ii) Radio Sodium chloride
iii) Gamma radiations

C) On a see saw two children of masses 30 kg & 50 kg are sitting on one side of it at distances 2m & 2.5 m respectively from its middle. Where should a man of mass 74 kg sit to balance it? [3]