GREEN LAWNS HIGH SCHOOL

PRELIMINARY EXAMINATION 2020-21

SUBJECT: PHYSICS   **CLASS: X**
TIME: 1 ½ HOURS   **MARKS: 60**

Note:
- All answers for this paper to be written on the composition sheet.
- You will not be allowed to write during the first 10 minutes. Use this time to read the paper carefully.
- The time given at the head of this paper is the time allowed for writing the answers.
- Write concise answers using scientific terms.
- **All** the questions are **Compulsory**.
- Write your **Roll No., Name and Class-Div on the right hand side top corner on every page** of your composition-sheet.
- Leave a line after answering every question.
- After you finish writing the paper, number all the pages, click bright and clear pictures, include all the pictures into **one PDF**, **rename** that PDF with your **Roll No., Name, Class-Div and Phy** and upload it under assignment. Do not forget to turn-in/ hand-in.

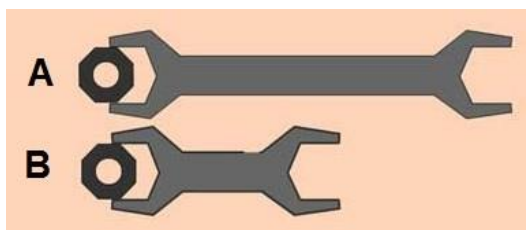## Question: 1   (10)

1) In modern buses, the luggage compartments are situated in the lower part of the bus. Explain this fact with reference to centre of gravity of the bus.   (2)

2) i) Reena had two spanners as shown in the following picture, for which   (3) spanner she will have to apply greater force to loosen the nut ? Why?
ii) If the length of the spanner is 10 cm and force applied is 3 N. Calculate the moment of force needed to loosen the nut.

3) Establish the relationship between S.I. and C.G.S. unit of work.   (2)

4) i) State the work-energy theorem.   (3)
ii) Calculate the kinetic energy of a body mass 0.3 kg and momentum 12 kg m s^{-1}.

Question: 2 (10)

1) Differentiate between the following based on the points given in the brackets:
Single fixed pulley and Single movable pulley. (Velocity ratio, Use) (2)

2) i) Draw a neat labelled diagram of block and tackle system of pulleys (3)
having velocity ratio 4. In your diagram clearly indicate the points of
application and direction of load and effort.
ii) The lower block of a block and tackle pulley system must be of negligible
weight. Why?

3) i) What is a total reflecting prism? (2)
ii) Why total reflecting prism is preferred over plane mirror in periscope?

4) Light of a single colour is passed through a liquid having a piece of glass (3)
suspended in it. On changing the temperature of liquid, at a particular
temperature the glass piece is not seen.
i) Why do you think, the glass piece is not seen?
ii) Why is the light of single colour used?
iii) For which colour refractive index of a medium is maximum?

Question: 3 (10)

1) i) What is power of a lens? (2)
ii) If the focal length of a lens is increased, how will it affect the power of the
lens?

2) A convex lens forms an image of an object equal to the size of the object. (3)
Draw a neat labelled ray diagram to show formation of image. State two more
characteristics of this image.

3) i) What is invisible spectrum? (2)
ii) List the electromagnetic radiations in the order of their decreasing frequency.

4) The wavelength of for the light of red and green colours is 800 nm and (3)
500 nm respectively.
i) Which colour has least speed in vacuum?
ii) Which colour has least speed in glass?
iii) Find the frequency of green colour. (Speed of light $= 3 \times 10^8$ ms^{-1})

Question: 4   **(10)**

1) When a troop crosses a suspension bridge, the soldiers are asked to break (2)
their steps. Give reason.

2) i) Name the characteristic of sound which enable one to distinguish two   (3)
sounds of the same loudness, but different frequencies given by the same
instrument.
ii) Define the unit used to measure the sound level.
iii) What is the unit of intensity of sound?

3) Calculate the resistance of 100 m long copper wire of radius 1mm.   (2)
Specific resistance of copper $= 1.72 \times 10^{-8}$ Ω m.

4) State how are the two resistors connected with a battery in each of the   (3)
following cases when:
i) Equivalent resistance is more than either of the two resistances.
ii) Potential difference is same across each resistor.
iii) Potential difference across the circuit is equal to the sum of the potential
differences across the individual resistors.

Question: 5   **(10)**

1) What are the two factors affecting rise in temperature of a fuse wire?   (2)

2) Why do we need high tension wires? What are the two characteristics of   (3)
high tension wire?

3) Rewrite and complete the following sentences: (2)
i) Decrease in pressure _____ the boiling point of water.
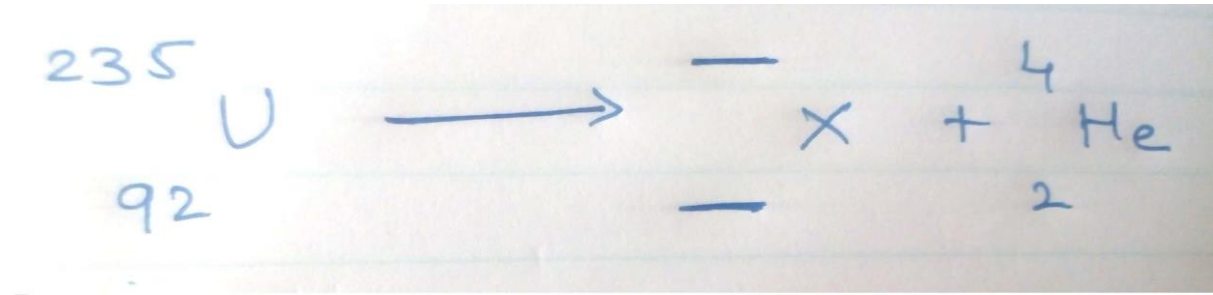ii) Decrease in pressure _____ the melting point of ice.

4) An electric heater of power 1kW raises the temperature of 8 kg of a liquid (3)
from 20ºC to 29ºC in 3 minutes. Calculate:
i) The heat capacity.
ii) The specific heat capacity.

Question: 6   (10)

1) Rewrite and complete the following nuclear reaction: (2)

$$^{235}_{92}\text{U} \longrightarrow \ ^{-}_{-}\text{X} + \ ^{4}_{2}\text{He}$$

2) i) Which particle or radiation has least penetrating power? Why?   (3)

   ii) Also compare the ionising power of above mentioned particle/radiation
       with other two particles/radiation.

3) A light ray suffers from reflection and refraction at the interface while   (2)
passing from air to glass. Draw a neat labelled ray diagram to show this.

4) A man of mass 60 kg climbs up the stair case of 20 steps each of 15 cm   (3)
high in 3 minutes. Calculate:

i) Force of gravity acting on the man.

ii) The work done by him against the force of gravity.

iii) The power spent by the man.

$(g = 10 \text{ ms}^{-2})$