THE SCHOLAR HIGH SCHOOL M. MARKS 80

PRELIMINARY EXAMINATION 2018-19 TIME- 2HRS

SUBJECT – PHYSICS

General Instructions:

1. Answers to this paper must be written on the paper provided separately.

2. You will not be allowed to write during the first 15 minutes. This time is to be spent in reading the question paper.

3. The time given at the head of paper is the time allotted for writing the answers.

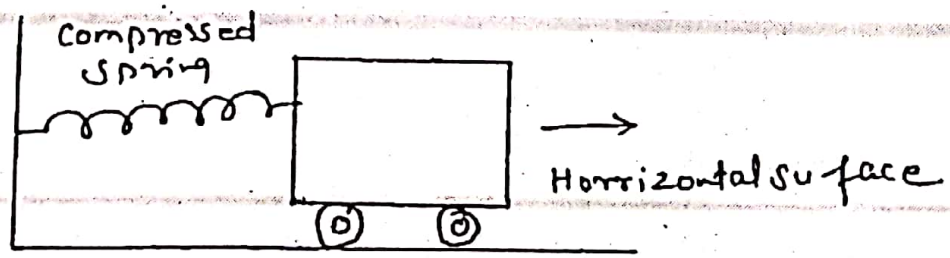
. Attempt all questions from Section I and any four questions from Section II.

5. The intended marks of questions or parts of questions are given in brackets [ ].

Section 1 (40 Marks) Attempt all questions from this section

Question 1

(a) A spring is kept compressed by a small trolley of mass 0.5 kg lying on a smooth horizontal surface as shown in the figure given below:



When the trolley is released, it is found to move at a speed of 2 ms^{-1}

i. What type of potential energy did the spring possess when compressed?

ii. ii. Find its value. [2]

(b) State the energy changes which occur in the following when they are in use:

i. i. A photovoltaic cell ii. An electromagnet [2]

(c) Draw a ray diagram to illustrate the determination of the focal length of a convex lens using an auxiliary plane mirror. [2]

(d) i. Sketch a graph to show the change in potential difference across the ends of an ohmic resistor and the current flowing in it. Label the axes of your graph.

ii. What does the slope of the graph represent? [2]

(e) i. Which radiation produces maximum biological damage?

ii. What happens to the atomic number of an element when the radiation named by you in part (i) above is emitted? [2]

Question 2

(a) i. Why is the mechanical advantage of a lever of the second order always greater than one?

ii. Name the type of single pulley which can have a mechanical advantage greater than one. [2]

(b) We can burn a piece of paper by focusing the sun rays on it using a particular type of lens.

i. Name the type of lens used for the above purpose.

ii. Draw a ray diagram to support your answer. [2]

(c) Name the SI unit of

i. Linear momentum ii. Rate of change of momentum [2]

(d) Why do pieces of ice added to a drink cool it much faster than ice cold water added to it? [2]

(e) How many alpha and beta particles are emitted when the uranium nucleus $^{238}_{92}U$ decays to lead $^{206}_{82}Pb$? [2]

Question 3

(a) In a three pin plug, why is the earth pin made longer and thicker than the other two pins? [2]

(b) State the condition for each of the following: i. A symmetrical biconvex lens has both its focal lengths equal. ii. A ray passes undeviated through the lens . [2]

(c) Where is the fuse placed in an electrical circuit? Name a material suitable for making fuse wire. [2]

(d) Two balls of mass ratio 1:2 are dropped from the same height. i. What is the ratio of their velocities when they strike the ground? ii. Find the ratio of the forces acting on them during motion. [2]

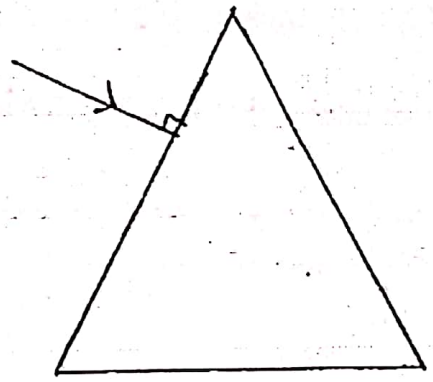
(e) State two limitation of solar energy. [2]

Question 4

(a) Why is the efficiency of a single movable pulley system not 100%? Give two reasons. [2]

(b) The ratio of the amplitudes of two waves is 5:7. What is the ratio of their intensity? [2]

(c) Complete the ray diagram showing its emergence into air after passing through an equilateral prism. [2]



(d) A family uses a light bulb of 100 W, a fan of 100 W and a heater of 1000 W, each for 8 hours a day. If the cost of electricity is Rs 2 per unit, what is the expenditure for the family per month of 30 days on electricity? [2]

(e) Radio waves of speed 3×10^8 m/s are reflected off the moon and received back on the earth. The time elapsed between the sending of the signal and receiving it back on the earth station is 2.5 seconds. What is the distance of the moon from the earth? [2]