

# HALF YEARLY EXAMINATION

2019-20

PHYSICS

Class- X

*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 to Questions Paper.*

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

*Section I is compulsory. Attempt any for questions from Section II*

*The intended marks for question of the parts of questions given in brackets [ ]*

## SECTION – I (40 Marks)

### Questions -1

- (a) The energy of an electron is  $4.0 \times 10^{-18}$  J. Express it into eV. [2]
- (b) A light mass and a heavy mass have equal momentum. Which will have more kinetic energy and why? [2]
- (c) Express 5 kilowatt hour into joule. [2]
- (d) Write down the difference between work and power. [2]
- (e) Name any two different units of energy (other than SI Unite and its multiples subunits). [2]

### Question-2

- (a) Define principle of moments. [2]
- (b) What is the effect on the following quantities when a wave travels from one medium to other? (i) wavelength (ii) velocity (iii) frequency. [2]
- (c) When a ray of light is going from denser to rarer medium such that its angle of refraction is  $90^\circ$ , name the corresponding angle of incidence. [2]
- (d) A mass exerts a force of 200N in pulling a cart at a constant speed of 16m/s. Calculate the power spent by man. [2]
- (e) Define Centre of gravity. [2]

### Question -3

- (a) At which point the Centre of gravity situated in:  
i) Triangular Lamina                      ii) A Circular Lamina [2]

- (b) A crane pulls up a car of mass 500 kg to a vertical height of 4 meters Calculate the work done by the crane. [2]
- (c) Name two examples in which the mechanical energy of a system remains constant. [2]
- (d) A boy of mass 50 kg runs upstairs and reaches the 8 m high first floor in five seconds. Calculate: [2]
- (i) The force of gravity acting on the boy.
- (ii) The work done by him against gravity.
- (e) What is single movable pulley what is its mechanical advantage in ideal case? [2]

#### Question-4

- (a) Define Refraction of light? [2]
- (b) State any two differences between total internal reflection from a prism and Reflection from plane mirror. [2]
- (c) Define term angle of deviation. [2]
- (d) Name the colour of white light which is deviated:  
i) The most ii) The least  
on passing through a prism. [2]
- (e) Define critical angle. [2]

### SECTION - II (40 Marks)

*Attempt any four question from this section*

#### Question -5

- (a) State principle of conservation of energy. [3]
- (b) A ray of light falls normally on one face of a prism at an angle  $45^\circ$ . if critical angles for the material of the prism is  $45^\circ$ , trace the path of rays.? [3]
- (c) A coin kept inside water ( $\mu = 4/3$ ) when viewed from air in a vertical direction, Appears to be raised by 2.0mm. Find the depth of coin in water. [4]

#### Question -6

- (a) The moment of a force of 10N about a fixed point O is 5Nm. Calculate the distance of the point O from the line of action of the force. [3]
- (b) Define Real and Apparent depth with diagram. [3]
- (c) Define Mechanical advantage , velocity ratio and efficiency. [4]

#### Question-7

- (a) Draw a properly labeled ray diagram showing the real and apparent position of a coin in a tank filled with water [3]
- (b) A body is acted upon by a force state the two conditions when the work done is Zero. [3]
- (c) Draw a diagram of refraction of light through a prism and prove that:
- $$\delta = (i_1 + i_2) - (r_1 + r_2) \quad [4]$$

### Question -8

- (a) What is the effect of kinetic energy of a moving car if: [3]
- (i) its mass is doubled.
- (ii) its velocity is halved
- (b) A concave lens can be regarded as a combination of a glass slab and two triangular glass prisms., Use this fact to show how it refracts two parallel incident rays. [3]
- (c) Calculate the ideal mechanical advantage of a lever in which the effort arm is 60 cm and load arm is 4 cm. [4]

### Question- 9

- (a) Why is the longer handle of water pump preferred ? [3]
- (b) Define Dispersion of white light. [3]
- (c) Write down the difference between single fixed pulley and single movable pulley. [4]