

**Green lawns High School**

**Preliminary Examination 2018-19**

STD – X

TIME – 2 HOURS

SUB. - PHYSICS

MARKS - 80

*Answer to this paper must be written on the paper provided separately.*

*You will not be allowed to write during first 15 minutes.*

*This time is to be spent in reading the Question Paper.*

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

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

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

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**SECTION I (40 Marks)**

*Attempt all questions from this section*

**Question 1**

- a) i) What is centre of gravity of a body? [2]  
ii) Extra passengers are not allowed on the upper deck of a crowded double-decker bus, why? Explain the statement with reference to centre of gravity.
- b) i) Name the force required for circular motion. And define it. [2]
- c) A ball of mass 350 g slows down from speed  $9 \text{ ms}^{-1}$  to  $5 \text{ ms}^{-1}$ . [2]  
Calculate the change in kinetic energy of the ball.
- d) Draw a diagram to illustrate the position of fulcrum, load, and effort in wheel barrow. State which class of lever it is. [2]
- e) i) State the energy change in microphone when it is in use. [2]  
ii) If Mechanical advantage of a machine is 1, it acts as a force multiplier; Is this statement correct?

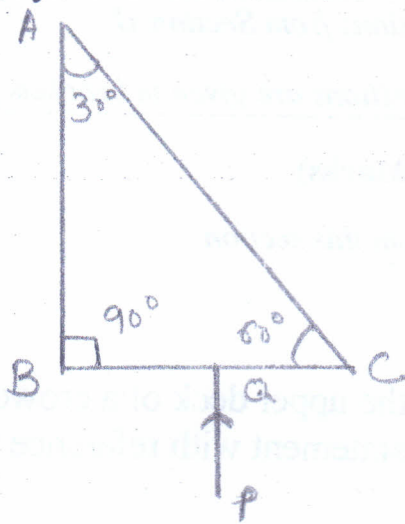
**Question 2**

- a) The speed of light in alcohol is  $2.20 \times 10^8 \text{ ms}^{-1}$ . What is its refractive index? (Speed of light in air =  $3 \times 10^8 \text{ ms}^{-1}$ ) [2]

b) How does material of prism and colour of the light affect the angle of deviation? [2]

c) A coin kept in a vessel and not visible when seen from just below the edge of the vessel, can be viewed from the same position when water is poured into the vessel. Explain why? [2]

d) A ray of light PQ incident normally on face BC of prism ABC ( $30^\circ, 90^\circ, 60^\circ$  prism) Complete the path of the ray PQ till it emerges out from prism. Mark the angles in the diagram wherever necessary. [2]



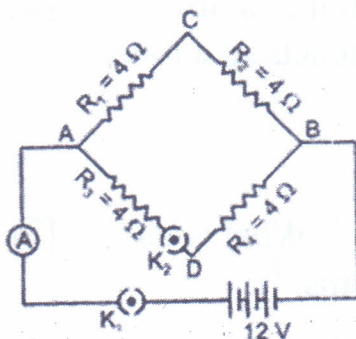
e) i) What is scattering of light? [2]

ii) How does the intensity of scattered light depends on the wavelength of incident light?

### Question 3

a) State Ohm's law. Give two examples of non-ohmic resistors. [2]

b) Calculate the electric current passing through the following circuit. [2]



- c) i) What is pole fuse? [2]  
ii) What is the advantage of using main switch in the wiring?
- d) Differentiate between A.C. generator and D.C. motor based on the points given in brackets. (Energy conversion, Principle) [2]
- e) i) State the law which is used to determine the direction of force on current carrying conductor placed in a magnetic field. [2]  
ii) What is the S.I. unit of magnetic field?

#### Question 4

- a) i) What is radioactivity? [2]  
ii) How does chemical change differ from nuclear change?
- b) Water is used as an effective coolant. Give reason [2]
- c) i) Define: latent heat [2]  
ii) Why is cooking difficult at higher altitudes?
- d) State any two conditions necessary for an echo to be heard distinctly. [2]
- e) i) What should be the sound level to categorize the particular sound as noise? [2]  
ii) What do you mean by reverberation?

#### SECTION II (40 Marks)

*Attempt any four questions from this section*

#### Question 5

- a) A uniform metre scale can be balanced at the 55.0 cm mark [3]  
when a mass 0.05 kg is hung from the 62.0 cm mark.  
i) Draw a diagram of the arrangement.  
ii) Find the mass of the metre scale

b) i) Define : 1 Joule of work. [3]

ii) If a body is acted upon by a force. State two conditions when the work done is zero.

c) i) Draw a diagram to show a block and tackle pulley system [4] having a velocity ratio of 5 marking the direction of load (L), effort (E), and tension(T).

ii) If this block and tackle system has an efficiency of 75% and is used to raise a load of 95 N, Calculate its M.A. and the effort required to raise the load.

### Question 6

a) i) Explain the meaning of the statement ‘ the specific heat capacity of iron is  $483 \text{ J kg}^{-1} \text{ K}^{-1}$  . [3]

ii) You have a choice of three metals A, B, and C, of specific heat capacities  $882 \text{ J kg}^{-1} \text{ K}^{-1}$  ,  $390 \text{ J kg}^{-1} \text{ K}^{-1}$  and  $460 \text{ J kg}^{-1} \text{ K}^{-1}$  respectively, to make a calorimeter. Which metal will you select? Why?

b) i) Why does the heat supplied to a substance during its change of state not cause any rise in its temperature? [3]

ii) How is the melting of ice affected when some salt is added to it?

iii) Convert the following in its S.I. unit:

Specific latent heat of fusion of copper =  $43 \text{ cal g}^{-1}$

c) 2 kg of ice at  $-5^{\circ}\text{C}$  is heated until the whole of it vaporises. [4]  
How much heat is required?

(Specific latent heat of fusion of ice =  $336 \times 10^3 \text{ J kg}^{-1}$

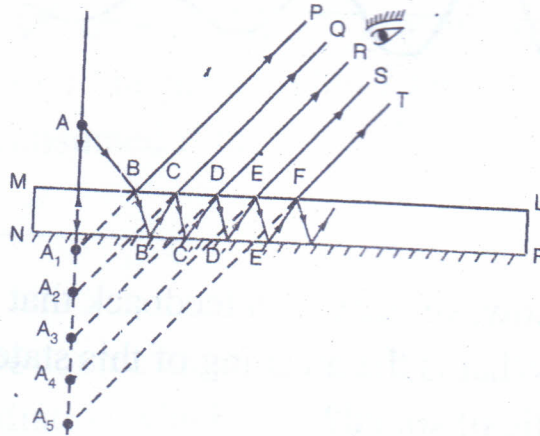
Specific latent heat of steam =  $2268 \times 10^3 \text{ J kg}^{-1}$

Specific heat capacity of ice =  $2.1 \times 10^3 \text{ J kg}^{-1} \text{ K}^{-1}$

Specific heat capacity of water =  $4.2 \times 10^3 \text{ J kg}^{-1} \text{ K}^{-1}$ )

### Question 7

- a) i) A ray of light falls normally on a glass. Draw a ray diagram showing the path of the ray till it emerges out of the glass. Mark how much will be the angle of incidence and angle of refraction at each surface of glass, on the diagram? [3]
- ii) An illuminated object A is held in front of a thick plane glass mirror, several images are seen. Which image will be brightest? Why?

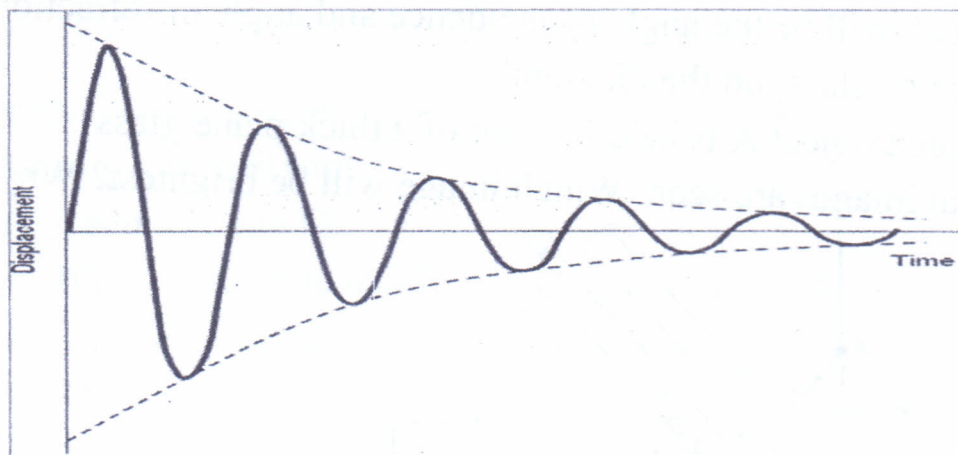


- b) An object AB is placed between  $F_1$  and  $2F_1$  on the principal axis of a converging lens. Using 3 standard rays starting from point A, obtain an image of the object AB. State the position and characteristics of image. [3]
- c) Name the prism used for obtaining spectrum of- [2]
- i) Ultraviolet radiations ii) Infrared radiations.
- d) i) Arrange the following radiations in the order of their increasing frequency: Infrared rays, Gamma rays, Radio waves, Micro waves, X-rays, Ultra-violet rays. [2]
- ii) Name the radiation which is used for studying atomic arrangement in crystals.

### Question 8

- a) i) Sometimes any odd piece of cutlery (glassware) starts vibrating violently, when particular note of some musical instrument is struck. Give reason. [3]

- ii) Name the above phenomenon.  
iii) Identify the type of vibration from the given displacement-time graph.



b) i) In the musical show, singer gets a feedback that his singing was completely flat. What is the meaning of this statement with respect to characteristic of sound? [3]

ii) What is the unit of loudness?

iii) State the factor that determines the quality of the note.

c) i) Two waves of the same pitch have amplitudes in the ratio 3:4. What will be the ratio of their loudness and frequencies? [4]

ii) In a SONAR, ultrasonic waves are sent into sea water and the reflected waves from a submarine are received after 0.5 s. If the velocity of waves in sea water is  $1450 \text{ ms}^{-1}$ . Find the depth of the submarine.

### Question 9

a) i) What is transformer? [3]

ii) Name the coil of which the wire is thicker in step up and step down transformer. Give reason for your answer.

b) i) The earthing of an electrical appliance is useful only if the fuse is connected to live wire. Give reason.

ii) Explain two characteristics of high tension wire. [3]

c) A geyser is rated '240 V, 2 kW'. Under normal working conditions, find: [4]

i) The resistance of its heating element

ii) The amount of current that will flow through the element

iii) The heat that will be produced in 2 minutes

iv) The power consumed if the line voltage falls to 220V.

### Question 10

a) A radioactive source emits 3 types of radiations: [3]

i) Name the radiation which has highest ionising power.

ii) A certain nucleus X (mass number 238 and atomic number 92) loses a particle mentioned by you in the above question and becomes nucleus Y. Represent this change in the form of an equation.

iii) Comment about the deflection of the above particle mentioned by you in an electric field.

b) i) What do you mean by the chain reaction in nuclear fission? [3]

ii) How is it controlled?

iii) Write any one use of nuclear fission.

c) Two resistors are connected with a battery such that [4]

i) Same current flows in each resistor

ii) Potential difference is same across each resistor

iii) Equivalent resistance is less than either of two resistances.

iv) Equivalent resistance is more than either of two resistances.

State how are the resistors connected in each of the above cases.