

PRELIMINARY EXAMINATION : 2024 - 2025

CLASS : X

SUBJECT : PHYSICS

NAME OF STUDENT :

MAX. MARKS : 80

DATE :

TIME : 2 HOURS

NOTE: 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 any four questions from Section II.

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

All subparts of the question attempted must be answered in the correct serial order.

SECTION – A

(Attempt all questions from this section.)

Q.1:-

[1X15]

(i) 5 kgf force is equal to:

- a) 9.8 N
- b) 98 N
- c) 4.9 N
- d) 49 N

(ii) If displacement of load is equal to displacement of effort, machine acts as:

- a) speed multiplier
- b) force multiplier
- c) to change the direction of effort
- d) an ideal machine

(iii) Two bodies of equal masses are placed at height h and $3h$ then ratio of their gravitational potential energies is:

- a) 5:3
- b) 1:3
- c) 2:3
- d) 3:5

(iv) To invert a image without loss of energy a total internal reflecting prism is used in:

- a) binocular
- b) telescope
- c) microscope
- d) periscope

(v) If a lens is made thin then its focal length:

- a) increases
- b) decreases
- c) remains same
- d) becomes infinite

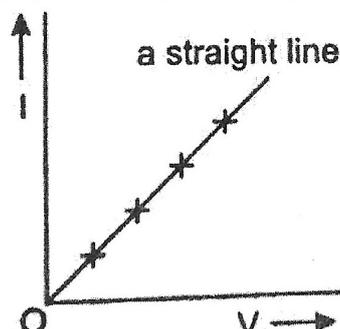
(vi) Ultraviolet bulbs are made with an envelope of quartz but not of glass because:

- a) quartz is very strong and protects the bulb
- b) quartz can absorb ultraviolet radiation
- c) quartz produces spectrum of ultraviolet radiation but glass absorbs it
- d) all above statements are correct

(vii) To detect obstacles in their path, bats produce:

- a) infrasonic waves
- b) ultrasonic waves
- c) electromagnetic waves
- d) radio waves

(viii) In given current-voltage graph straight line represents:



- a) resistivity of conductor
- b) conductance of conductor
- c) resistance of conductor
- d) conductivity of conductor

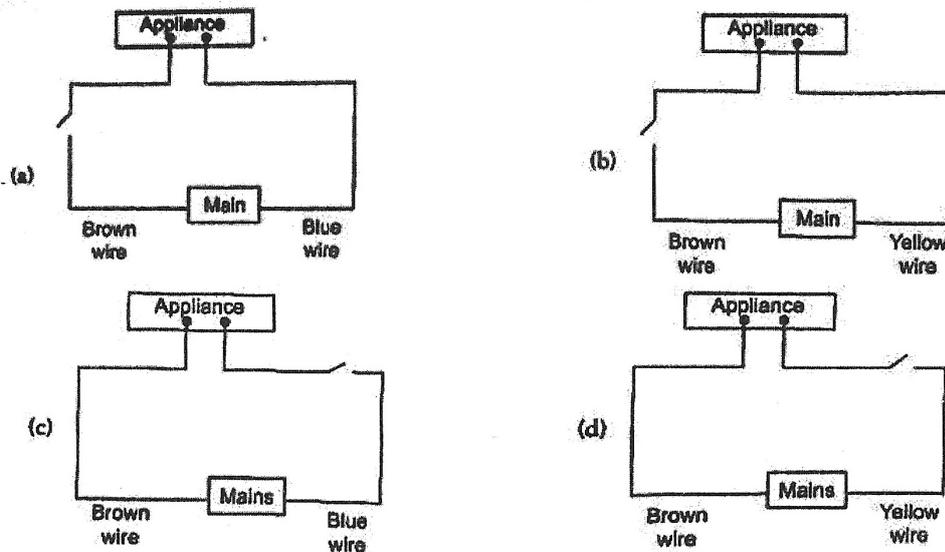
(ix) In parallel combination of resistances:

- a) p.d. is same across each resistance
- b) total resistance is increased
- c) current is same in each resistance
- d) all above are true.

(x) Voltage cannot be step up or step down in:

- a) alternating current
- b) direct current
- c) current at power station
- d) current produced in transformers

(xi) Identify the option that displays the correct wiring with correct colour code:



(xii) Assertion(A) : The property that is characteristic of a substance in relation to heat is specific heat capacity.

Reason (R) : $C = \frac{\text{Amount of heat supplied}}{\text{rise in temperature}}$ is the expression for thermal capacity.

- (a) Both A and R are true and R is the correct explanation of A.
- (b) Both A and R are true but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) A is false but R is true.

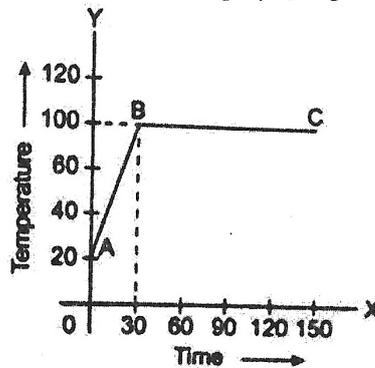
(xiii) When current is passing in wire in downward direction, the direction of magnetic field line will be:

- a) anticlockwise
- b) clockwise
- c) parallel to the direction of current in wire
- d) normal to the direction of current in wire

(xiv) During the decay of beta particles from a radioactive element, the product formed is:

- a) isotopes
- b) isotones
- c) isobars
- d) none of these.

(xv) Given is a heating curve for water. In the graph, region BC represents the state of:



- a) evaporation
- b) melting
- c) condensation
- d) vaporization

Q.2:-

(i) Complete the following by choosing the correct answers from the bracket: [6]

- a) The conversion of part of energy into an undesirable form is called _____ [loss / drop/ degradation] of energy.
- b) MA of class III lever is always _____ [equal to/less than/ greater than] 1.

c) If radius of conductor is double keeping the length same then its resistance will become _____ [double /one fourth /half] of original.

d) Prism that is used to obtain spectrum of _____ [ultra violet radiation / infrared radiation/ visible light] is rock-salt prism.

e) A switch is connected in _____ [parallel/series] with appliance.

f) If an atom undergoes a _____ [nuclear /chemical / physical] change then there is a change in number of nucleon.

(ii) Where does the position of centre of gravity lie in:

- a) a circular lamina, and
- b) a triangular lamina?

[2]

(iii) What should be the angle between the force and displacement to get the:

- a) zero work, and 180
- b) maximum work? 0

[2]

Q.3:-

(i) In the given picture a lady is trying to cook some food in an appliance, which use some electromagnetic waves for its working.

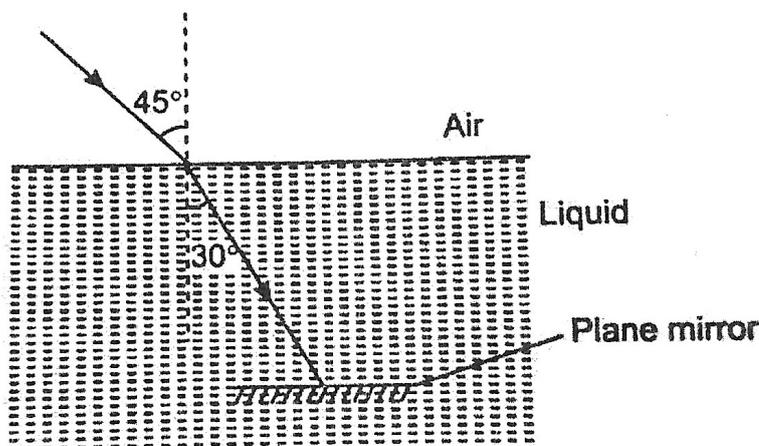
[3]



- a) Name this appliance and the electromagnetic wave used in it.
- b) Write one other use of these waves.

(ii) A ray of monochromatic light enters a liquid from air as shown in the diagram given below.

[2]



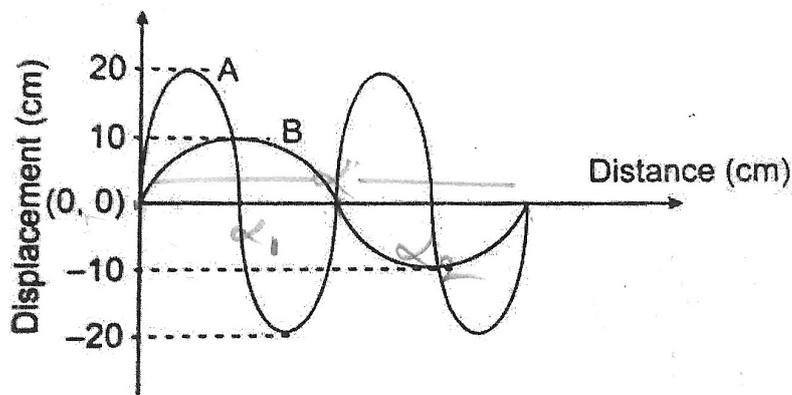
- a) Copy the above diagram and show in the diagram the path of ray of light after it strikes the mirror and re-enters the medium of air.
- b) Mark in your diagram the angles on the surface of separation.

(iii) Calculate the wavelength of an electromagnetic wave of frequency 15 MHz.

[2]

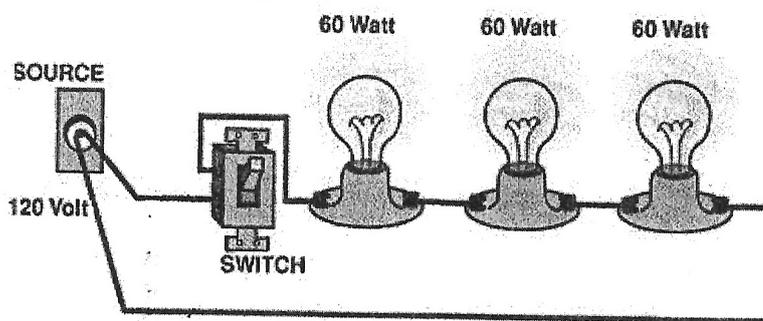
(iv) Displacement distance graph of two sound waves A and B, travelling in a medium, are as shown in the given diagram.

[2]



Study the two sound waves and compare their :

- amplitude,
 - wavelength.
- (v) Define heat capacity and state its unit. [2]
- (vi) A radioactive particle is positive in nature. Name the particle and name the atom whose nucleus is similar to this particle. [2]
- (vii) In the given picture, three bulbs have been connected to glow simultaneously when the switch is turned ON. [2]



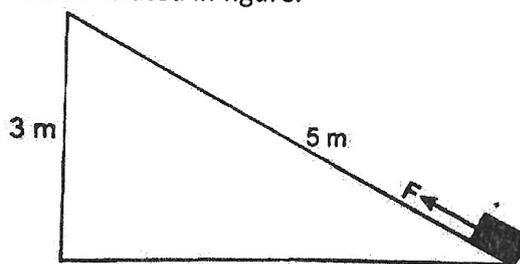
- What type of connection has been shown?
- What is the disadvantage of this connection?

SECTION – B

(Attempt any four questions from this section.)

Q.4:-

- (i) A block, whose weight is 200 N, is pulled up a slope of length 5 m by means of a constant force 150 N as illustrated in figure. [3]



- What is the work done by the force F in moving the block, 5 m along the slope?
 - By how much has the potential energy of the block increased?
 - Account for the difference in work done by the force and the increase in potential energy of the block.
- (ii) Energy can exist in several forms and may change from one form to another. For each of the following, state the energy changes that occur in: [3]
- photosynthesis in green leaves,
 - explosion of crackers,
 - the unwinding of a watch spring.
- (iii) [4]
- What physical quantity does the electron volt (eV) measure? How is it related to the S.I. unit of that quantity?
 - Calculate the power spent by crane while lifting a load of mass 2000 kg, at velocity of 1.5 m/s ($g=10\text{m/s}^2$).

Q.5:-

(i) A stone of mass 500 g is thrown vertically upwards with a velocity of 15 m/s.

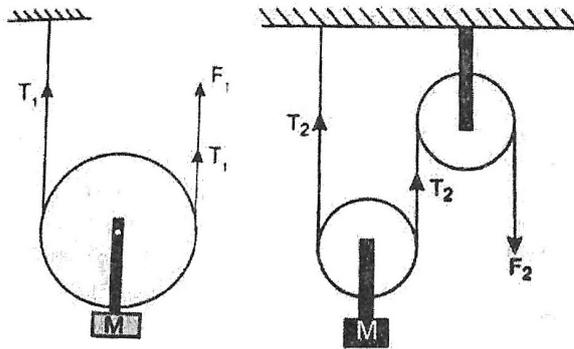
Calculate:

- the potential energy at the greatest height,
- the kinetic energy on reaching the ground,
- the total energy at its half-way point.

[3]

(ii) A load $M = 200$ kg is supported in two different ways shown in the given figure. F_1 and F_2 are the forces needed in two cases. Calculate F_1/F_2 .

[3]



Both arrangement are example of single movable pulley. What is the advantage of second arrangement of pulleys over the first?

(iii) Name a machine for each of the following use:

[4]

- To multiply force.
- To change the point of application of force.
- To change the direction of effort.
- To obtain gain in speed.

Q.6:-

(i)

[3]

- What will happen on power of lens if a part of lens is covered?
- State two uses of magnifying glass.

(ii) In electromagnetic radiation one of the radiation is ultraviolet radiation:

[3]

- What happens when these rays strike over the dust particles of atmosphere?
- Why these rays can affect a photographic plate?
- When these rays become harmful for human beings and what effect these rays produce?

(iii) An erect magnified and virtual images is formed, when an object is placed between the optical centre and principal focus of a lens.

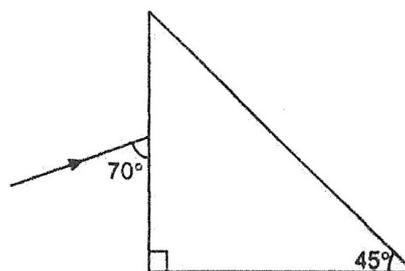
[4]

- Name the lens.
- Draw the diagram to show the formation of the image.
- Mention one case where we can use this lens.

Q.7:-

(i) Complete the figure to show the path of a ray of single colour as it enters the prism and emerges out of it. Critical angle of prism is 42° .

[3]



What happens to critical angle, when temperature of prism increases?

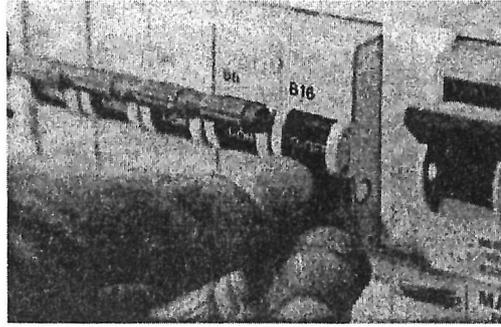
(ii) A lens forms the image of an object placed at a distance of 45 cm from it on a screen placed at a distance 90 cm on the other side of it.

Find:

[3]

- the focal length of the lens, and
- the magnification of the image.

- (iii) In the given picture, a very useful and important electrical component has been shown. [4]



- Name this component.
- What is the use of component stated by you in electrical circuit?
- To which wire is the above electrical component connected?
- Why this component is used instead of fuse?

Q.8:-

- [3]
 - Heat supplied to a solid changes it into liquid. What is this change in the phase called?
 - During the phase change, does the average kinetic energy of molecules of the substance increase?
 - What is the energy absorbed during the phase change called?
- (ii) How many α and β particles are emitted when uranium nucleus ${}_{92}\text{U}^{238}$ decays to lead ${}_{82}\text{Pb}^{206}$? Compare the penetrating power range of α and β in air. [3]
- (iii) A battery of e.m.f. 15 V and internal resistance 3 ohm is connected to two resistors 3 ohm and 6 ohm connected in parallel. Draw a circuit diagram and Find: [4]
 - the current through the battery,
 - the potential difference between the terminals of the battery,
 - the current in 6 ohm resistor.

Q.9:-

- (i) A copper vessel of mass 100 g contains 150 g of water at 50°C . How much ice is needed to cool it to 5°C ? [3]
- (ii) One isotope of uranium has a mass number 235 and atomic number 92. [3]
 - What is the number of electrons in the neutral atom of this isotope?
 - What is the number of protons and number of neutrons in its nucleus?
 - Do all isotopes have the same number of neutrons?
- (iii)
 - Draw a labelled diagram of a device you would use to transform 200 V a.c. to 15 V a.c. Name the device. [2]
 - State Faraday's laws of electromagnetic induction. [2]