

**Aga Khan University Examination Board**  
**Notes from E-Marking Centre on SSC I Physics Examination May 2016**

### **Introduction**

This document has been produced for the teachers and candidates of SSC Part I (Class IX) Physics. It contains comments on candidates' responses to the 2016 Secondary School Certificate (SSC-I) Examination, indicating the quality of the responses and highlighting their relative strengths and weaknesses.

### **E-Marking Notes**

This includes overall comments on candidates' performance on every question and some specific examples of candidates' responses which support the mentioned comments. Please note that the descriptive comments represent an overall perception of the better and weaker responses as gathered from the e-marking session. However, the candidates' responses shared in this document represent some specific example(s) of the mentioned comments.

Teachers and candidates should be aware that examiners may ask questions that address the Student Learning Outcomes (SLOs) in a manner that requires candidates to respond by integrating knowledge, understanding and application skills they have developed during the course of study. Candidates are advised to read and comprehend each question carefully before writing the response to fulfil the demand of the question.

Candidates need to be aware that the marks allocated to the questions are related to the answer space provided on the examination paper as a guide to the length of the required response. A longer response will not in itself lead to higher marks. Candidates need to be familiar with the command words in the Student Learning Outcomes which contain terms commonly used in examination questions. However, candidates should also be aware that not all questions will start with or contain one of the command words. Words such as 'how', 'why' or 'what' may also be used.

**Question 1**

Match the physical quantities in column **A** with the SI units in column **B** using arrows (  $\longrightarrow$  ).

Column A	Column B
Intensity of light	Ampere
Temperature	Mole
Amount of substance	Kelvin
	Candela

*Better responses* correctly matched all three physical quantities in column **A** with the SI units in column **B**. Candidates matched Intensity of light with Candela, Temperature with Kelvin and Amount of substance with Mole.

**Example:**

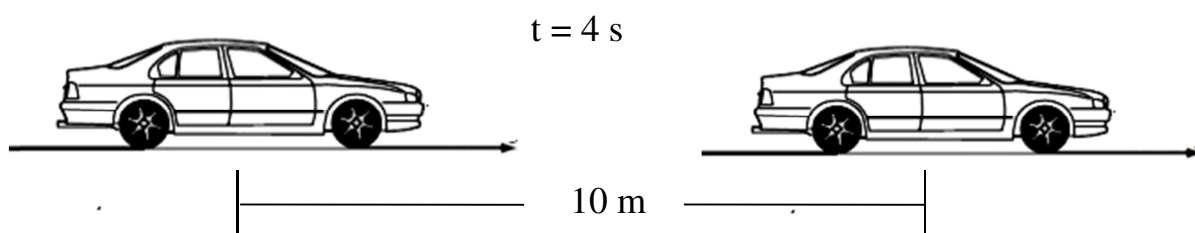
Column A	Column B
Intensity of light	Ampere
Temperature	Mole
Amount of substance	Kelvin
	Candela

*Weaker responses* matched only one physical quantity with the correct SI unit. In some responses, candidates wrote *Electric Current* in the blank space provided in column **A** and matched it with *Ampere*. Few of the responses, incorrectly matched intensity of light with Ampere, Temperature with Candela and Amount of substance with Candela/ Ampere.

**Example:**

Column A	Column B
Intensity of light	Ampere
Temperature	Mole
Amount of substance	Kelvin
	Candela

### Question 2



In the above diagram, a car starts from rest and after time  $t = 4$  s covers a distance of 10 m. Calculate the acceleration of the car.

*Better responses* correctly wrote the second equation of motion, i.e.  $S = v_i t + \frac{1}{2} a t^2$  and identified and inserted all the values at the right position. There by, they were able to calculate the acceleration of the car and used the correct SI unit ( $\text{m/s}^2$ )/( $\text{ms}^{-2}$ ) in the answers.

### Example:

$v_i = 0$	$10\text{m} = 0(4) + \frac{1}{2} a (4)^2$
$v_f = ?$	$10\text{m} = 0 + \frac{1}{2} a 16$
$a = ?$	$10\text{m} = 16a / 2$
$t = 4\text{s}$	$20 = 16a$
$S = 10\text{m}$	$20/16 = a$
$\therefore S = v_i t + \frac{1}{2} a t^2$	$1.25 \text{ms}^{-2}$

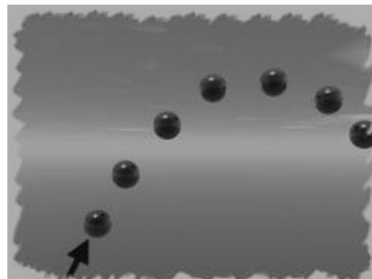
Weaker responses mostly failed to write the correct equation of motion and answer with the correct SI unit. Some of the candidates wrote the formula of average velocity/ third equation of motion. In few of responses, candidates wrongly placed the values in the second equation of motion. Most of these responses did not mention any SI unit with the answer.

**Example:**

$t = 4s$	$10m = 0 + 16a$
$D = 10m$	$10 = 16a$
$v_i = 0$	$\frac{10}{16} = a$
$S = vit + at^2$	$\frac{5}{8} = a$
$10m = 0(4) + (a)(4)^2$	
$10m = 0 + a(16)$	

**Question 3a**

Describe the force which causes a ball to return back to the ground in TWO points.



*Better responses* correctly described the force causes a ball to return back to the ground in two points. For example,

- (i) The force of gravity (gravitational force) causes the ball to come back to the ground.
- (ii) Air resistance opposes the upward motion of the ball.

**Example:**

1) Gravitational force cause the ball to land on the ground and weight come vertically downward  
2) The ball has its weight and it is ~~have~~ heavier than the friction of air so the ball fall dow after some time.

*Weaker responses* misunderstood the demands of the question and mentioned wrongly identified the force to be incorrect and irrelevant causes. Such candidates wrote intermolecular forces, pressure, area, density and other unrelated terms.

**Example:**

Intermolecure force causes ball to return back to the ground beasuse when the pressure of ball is so fast collide with ground and back together. Intermoleculer forces are very strong force that were push or pull of an object is called intermolecula force.

**Question 3b**

What is the difference between mass and weight?

Mass	Weight

*Better responses* correctly differentiated between mass and weight. Candidates wrote their answers as follows:

- The unit of mass is 'kg'.
- Mass is a scalar quantity.
- Quantity of matter contain in a body is called mass.
- Mass is always constant everywhere in the universe.
- Mass is measured by beam balance/ physical balance.
  
- Weight is a vector quantity.
- The SI unit of weight is Newton (N).
- Weight is measured by spring balance.
- Force of gravity acting on a body is called weight/  $W = mg$ .
- Weight varies depending upon the value of acceleration due to gravity (g).

**Example:**

Mass	Weight
Mass remains same at every place in universe. SI unit is kg.	Weight varies place by place. SI unit is N.

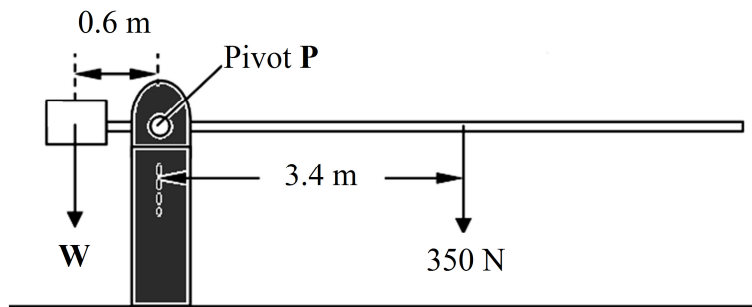
Weaker responses showed complete misunderstanding regarding the difference between mass and weight. Some candidates discussed the mass and weight of objects on the surface of earth and moon. In few responses, candidates wrote the difference between mass and volume/ speed and velocity/ gravity and weight/ uniform and variable acceleration.

**Example:**

Mass	Weight
<p><del>Mass is weight of object.</del></p> <ul style="list-style-type: none"> <li>* Mass is a uniform velocity of an object.</li> <li>* In moon mass of body is decrease.</li> </ul>	<ul style="list-style-type: none"> <li>* Weight is uniform acceleration of object having some weigh.</li> <li>* In moon weight of body is remain at a same.</li> </ul>

**Question 4a**

An automatic barrier is shown in the given diagram. The barrier arm is balanced by the block of weight **W**.



Using the data given in the above diagram, calculate the weight **W** of the block.

*Better responses* correctly showed candidates' understanding of the principle of moment and calculated the weight  $W$  of the block by using the principle "Clockwise moments = Anticlockwise moments". They also correctly placed all the values at the right position in the above mentioned formula.

**Example:**

$\sum \curvearrowright = \sum \curvearrowleft$	$W = \frac{1190 \text{ Nm}}{0.6 \text{ m}}$
$F_1 \times d_1 = F_2 \times d_2$	
$W \times 0.6 \text{ m} = 350 \text{ N} \times 3.4 \text{ m}$	$W = 1983.33 \text{ N}$
$W \times 0.6 \text{ m} = 1190 \text{ Nm}$	

*Weaker responses* indicated that candidates did not understand the concept of principle of moment and hence, were unable to place the correct relation and substitute the values. Most of the response showed confusion between principle of moment and concept of weight. Some of the candidates wrote the definition of principle of moment in their answers. In few responses, candidate tried to calculate the weight of the block of weight  $W$ .

**Example:**

$m_1 g = m_2 g$	$m_1 = 350 \text{ N}$
$m_1 = ? \quad m_2 = 350 \quad g = 10 \text{ m/s}^2$	
$m_1 (10) = 350 (10)$	
$m_1 = \frac{350(10)}{10}$	

**Question 4b**

State the principle which is applied to solve the above problem.

*Better responses* correctly stated the principle of moments, i.e. if a body is in equilibrium under the action of many forces, then the net moment due to forces about any point is equal to zero/ the sum of all the clockwise moments must be equal to the sum of all the anti-clockwise moments.

**Example:**

The principle of moment is applied to solve the above problem which states that sum of clockwise torque is equal to sum of anticlockwise torque.

*Weaker responses* failed to state the correct principle used to solve the numerical problem in part (a). Most of the candidates wrote law of inertia/ principle of conservation of momentum/ Archimedes principle.

**Example:**

Momentum.

**Question 5**

Two identical balls of masses  $m_1$  and  $m_2$  whereas ( $m_1 = m_2$ ) are separated by a distance of  $r$ . If the distance between the two balls is doubled, form an equation proving that the gravitational force  $F_G$  between them will be decreased one-fourth of the initial force.

*Better responses* correctly showed candidates' understanding of the gravitational force  $F_G$  between two identical balls of masses  $m_1$  and  $m_2$  which will decrease to one-fourth of the initial force if the distance between the two balls is doubled. Candidates effectively derived the relation and reached the final conclusion.

**Example:**

$F = \frac{G M m}{R^2}$	$F = \frac{G M m}{4R^2}$	so this proof that
		the force between them
If radius is doubled then:	$F = \frac{1}{4} \cdot \frac{G M m}{R^2}$	will decrease one-fourth
$F = \frac{G M m}{(2R)^2}$		of initial force.

*Weaker responses* did not write the correct formula of the gravitational force and, hence, were unable to prove the given statement. They proved law of gravitation ( $F = G \frac{m_1 \cdot m_2}{r^2}$ ) and failed to achieve the question demand.

**Example:**

$F_G \propto m$
$F = m_1 m_2$
$F = G m_1 m_2$
$F \propto \frac{1}{r}$
$F = G \frac{m_1 m_2}{r^2}$
$G$ is constant $= 6.67 \times 10^{-11}$

**Question 6**

A car of mass  $m$  starts moving from rest and covers a distance  $S$ . If the final velocity is  $v$  at time  $t$ , then derive an expression of kinetic energy for the car.

*Better responses* correctly derived the expression of kinetic energy of the car, i.e.  $K.E = \frac{1}{2}mv^2$ . They used Newton's second law,  $F = ma$ , and third equation of motion,  $2aS = v_f^2 - v_i^2$ , to derive the expression.

**Example:**

$K.E = F \cdot S \therefore v_f = v \text{ and } v_i = 0$	$2aS = v_f^2 - v_i^2 \therefore K.E = \text{(kinetic energy)}$
Newton's 2 <sup>nd</sup> Law of motion	$2\left(\frac{F}{m}\right)S = (v)^2 - (0)^2$
$F = ma$	$2\left(\frac{F}{m}\right)S = v^2 - 0$
$a = \frac{F}{m}$	$2(F \cdot S) = mv^2$ as we know that:
Applying 3 <sup>rd</sup> equation of motion	$F \cdot S = \frac{1}{2}mv^2 \quad K.E = F \cdot S$
	$K.E = \frac{1}{2}mv^2$

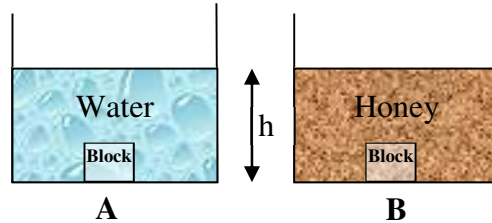
*Weaker responses* showed candidates' inability in deriving the correct expression of kinetic energy. Some of the candidates derived the first, second or third equation of motion instead.

**Example:**

we know that	
$S = Vavt \quad (Vav = \frac{v_f^2 + v_i^2}{2})$	$S = Vav + \text{Put value}$
1 <sup>st</sup> equation of motion	$S = \left(\frac{v_f^2 + v_i^2}{2}\right) \left(\frac{v_f^2 - v_i^2}{a}\right)$
$v_f = v_i + at$	
$v_f - v_i = at$	$S = \frac{v_f^2 - v_i^2}{2a}$
$\frac{v_f - v_i}{a} = t$	
	$2aS = v_f^2 - v_i^2$

**Question 7a**

Given below are two identical beakers containing two different liquids of the same volume. An iron block of equal size is placed in each of the beakers.



Define density.

*Better responses* correctly wrote the definition of density. For example

- Mass per unit volume of a body is known as density.
- Mass per  $m^3/cm^3/dm^3$  in an object is called density.

**Example:**

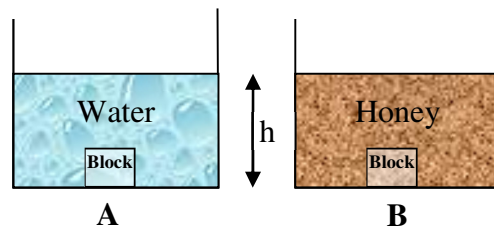
Density is defined as mass per unit volume of an object.

*Weaker responses* incorrectly wrote the definition of density. In few responses candidates wrote mass per unit area/ matter contain in a body/ length  $\times$  breadth  $\times$  height of a body.

**Example:**

The mass per unit area is called density.

**Question 7b**



In which above given figure (A or B) the pressure on the block is greater? Justify your answer with the help of an equation.

*Better responses* correctly identified the block given in the figure which has the greater pressure and also justified their answer in proper and logical words. For instance, pressure on an object at certain depth is given by  $P = \rho gh$ . It shows that pressure of a liquid depends upon its density and density of honey is greater; therefore, it exerts more pressure.

**Example:**

In figure B pressure exerted on block is greater as pressure in liquids =  $\rho gh$ . <sup>The more</sup>  $\rho$  (density) <sup>of liquid</sup> is, the more pressure will be exerted. Here Honey is more dense so it exerts greater pressure.

*Weaker responses* failed to identify the correct block given in the figure. Where they did not identify and unable to justify their answer with the help of the equation  $P = \rho gh$ . They discussed nature of block placed in each of the beakers instead. In few responses, candidates wrote about the volume of water changing when a block is placed inside them.

**Example:**

The pressure is greater in block A because water has highest density than honey. and  $\rho$  as pressure is defined as force acting normally at per unit area so  $P = F/A$  marks that A has more pressure.

**Question 8**

If the celsius thermometer shows the temperature of air as 30 °C at a certain day, then calculate the temperature of air in kelvin and fahrenheit.

*Better responses* correctly calculated the temperature of air in kelvin and fahrenheit, i.e. T =303 K and T = 86 °F after correctly identifying the relations between centigrade and fahrenheit, i.e.  $^{\circ}\text{C}/100 = (^{\circ}\text{F} - 32)/180$  and centigrade and kelvin, i.e.  $T(\text{K}) = T(^{\circ}\text{C}) + 273$ .

**Example:**

For Fahrenheit ;	For kelvin ;
$F = 1.8(c) + 32$	$k = c + 273$
$F = 1.8(30) + 32$	$k = 30^{\circ} + 273$
$F = 54 + 32 = 86$	$k = 303^{\circ}$
$30^{\circ}\text{C} = 86^{\circ}\text{F}$	$30^{\circ}\text{C} = 303^{\circ}\text{K}$

Weaker responses showed candidates' inability to calculate the correct temperatures and relations between centigrade and fahrenheit and centigrade and kelvin. They add up 30 °C into 180 °C or 30 °C into 100 °C. In few responses, candidates wrote a comparison of the differences between centigrade, fahrenheit and kelvin.

**Example:**

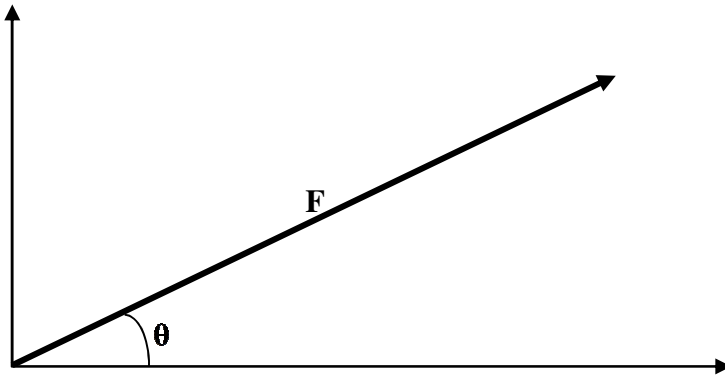
kelvin-	fahrenheit
$K = 120 + 30 = 0$	$f = 360 + 30 = 0$
$K = 120 = 0 - 30$	$f = 360 = 0 - 30$
$K = 120 - 30$	$f = 360 - 30$
$K = 90$	$f = 330$

### Extended Response Questions (ERQs)

These questions offered a choice between part **a** and **b**

#### Question 9a

The given vector **F** is making an angle  $\theta$  with the positive  $x$ -axis. Resolve the given vector **F** into its rectangular components. Also mention a formula for finding out the magnitude of a single vector and direction from its resolved components.



*Better responses* correctly resolved the given vector **F** into two rectangular components  $F_y = F \sin \theta$  and  $F_x = F \cos \theta$  by using the trigonometric ratios. They also mentioned the formula for finding out the magnitude of a single vector,  $F = \sqrt{(F_x)^2 + (F_y)^2}$ , and the direction,  $\theta = \tan^{-1}(F_y/F_x)$ .

**Example:**

Just draw 2 perpendiculars from the head of the vectors onto X and Y we get $F_x$ and $F_y$ respectively.	
Using $\cos\theta$ in the figure:-	$\cos\theta = \frac{F_x}{F}$
$\cos\theta = \frac{\text{Base}}{\text{Hypotenuse}}$	$F_x = F \cos\theta$

Using $\sin\theta$ in the figure:-	
$\sin\theta = \frac{\text{Perpendicular}}{\text{Hypotenuse}}$	Formula for finding the direction from its resolved components:-
$\sin\theta = \frac{F_y}{F}$	
$F_y = F \sin\theta$	Using $\tan\theta$ :-
Formula for finding the magnitude of the single vector.	$\tan\theta = \frac{\text{Perpendicular}}{\text{Base}}$
$F = \sqrt{F_x^2 + F_y^2}$	$\tan\theta = \frac{F_y}{F_x}$
	$\theta = \tan^{-1} \frac{F_y}{F_x}$

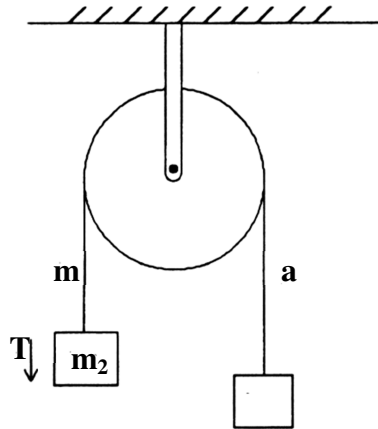
Weaker responses either correctly resolved only the given vector into its rectangular components; or mentioned only one formula for finding the magnitude of single vector or direction from its resolved components; or wrongly equate the formula of the direction of given vector. They mixed up the formulae of magnitude and direction of a vector. Therefore, such responses were unable to get full marks.

**Example:**

$F^2 = F_x^2 + F_y^2$ $\sqrt{F^2} = \sqrt{F_x^2 + F_y^2}$ $F = \sqrt{F_x^2 + F_y^2}$	$\tan\theta = \frac{F_y}{F_x}$ $\theta = \tan^{-1} \frac{F_y}{F_x}$
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### Question 9b

Two masses  $m_1$  and  $m_2$  are attached to the ends of a string that passes over a frictionless pulley.



If  $m_1$  is greater than  $m_2$ , then determine the acceleration of the two masses when released. Show your answer in terms of  $m_1$ ,  $m_2$  and  $g$ . (Where  $g$  = acceleration due to gravity)

Better responses correctly determined the acceleration  $a = g \frac{(m_1 - m_2)}{(m_1 + m_2)}$  of two masses  $m_1$  and  $m_2$

which are attached to the ends of a string that passes over a frictionless pulley and showed the answer in terms of  $m_1$ ,  $m_2$  and  $g$ . Like

$$\begin{aligned}m_1 g - T &= m_1 a \\T - m_2 g &= m_2 a \\T &= m_2 a + m_2 g \\m_1 g - m_2 g &= m_1 a + m_2 a \\a &= g \frac{(m_1 - m_2)}{(m_1 + m_2)}\end{aligned}$$

**Example:**

Forces on body  $m_1 = W - T$   $W = m_1 g$   
 $= m_1 g - T$

According to Newton's second law  $\rightarrow m_1 g - T = m_1 a$  —(i)

Forces on body  $m_2 = T - m_2 g = m_2 a$  —(ii)

Adding both equations to get acceleration:-

$$\begin{aligned}m_1 g - T + T - m_2 g &= m_1 a + m_2 a \\m_1 g - m_2 g &= m_1 a + m_2 a\end{aligned}$$

Taking "g" common here  $\Rightarrow$  Taking "a" common here

$$\begin{aligned}g (m_1 - m_2) &= a (m_1 + m_2) \\g \frac{m_1 - m_2}{m_1 + m_2} &= a\end{aligned}$$

Weaker responses were unable to determine the acceleration of two masses  $m_1$  and  $m_2$  which are attached to the ends of a string that passes over a frictionless pulley. They mixed up the relation of weight  $W$  and tension  $T$ . Candidates derived the relation in the reverse order of the two masses and showed  $m_2$  to be greater than  $m_1$ .

**Example:**

<p>For <math>m_1</math></p> $F = m_1 g$ $a = \frac{F}{m}$ $a = \frac{m_1 g}{m} \quad (F = W = m_1 g)$	$a = \frac{m_1 g}{m_1}$
<p>For <math>m_2 = \frac{m_2 g}{m_2}</math></p> $= \frac{m_1 g}{m_1} + \frac{m_2 g}{m_2} = 2 \frac{(m_1 + m_2) g}{m_1 + m_2}$	
<p>By combining</p> $a = \frac{2(m_1 + m_2)}{m_1 + m_2} g$	$= \frac{2(m_1 + m_2)}{m_1 + m_2} g$

**Question 10a**

A block of ice having volume  $10 \text{ m}^3$  hits the ground with the velocity of  $2 \text{ m/s}$ .

Find its kinetic energy in joules taking the density of ice block as  $920 \text{ kg/m}^3$ .

*Better responses* correctly found the kinetic energy by using the formulae  $\rho = \frac{m}{V}$  and  $\text{K.E} = \frac{1}{2}mv^2$ . Candidates found the mass of ice block  $m = 9200 \text{ kg}$ , and kinetic energy,  $\text{K.E} = 18400 \text{ J}$ .

**Example:**

Volume of ice 'V' = $10 \text{ m}^3$	Now,
Velocity = $2 \text{ m/s}$	$\text{K.E} = \frac{1}{2}mv^2$
Density of block 'P' = $920 \text{ kg/m}^3$	
Kinetic energy 'K.E' = ?	$\text{K.E} = \frac{1}{2} (9200^{\text{kg}}) (2 \text{ m/s})^2$
Mass 'm' = ?	
First of all we calculate the	$\text{K.E} = \frac{36800}{2}$
mass of the block,	(unit are neglected to make it
Mass = Density x Volume	easy)
= $920 \text{ kg/m}^3 \times 10 \text{ m}^3$	
<b>Mass = <math>9200 \text{ kg}</math></b>	<b>K.E = <math>18400 \text{ J}</math></b>

Weaker responses neither used the correct formulae nor calculated the correct value. Candidates intermingle the formulae of kinetic energy and density and were not able to calculate the mass of the ice block. In a few responses, candidates broke down the volume into length and breadth and simply multiply them.

**Example:**

density of ice = $920 \text{ kg/m}^3$	
Volume = $10 \text{ m}^3$	
Velocity = $2 \text{ m/s}$ .	
K.E = $\frac{1}{2} \rho V v^2$	
= $920 \times 10 \times 10 \times 2$	
= $184000 \text{ J}$	
The kinetic energy of ice block is $184000 \text{ J}$	

**Question 10b**

Find the pressure due to the fluid at a depth of 10 cm in still water and in mercury.

(Note: The density of water and mercury is  $1000 \text{ kg/m}^3$  and  $13.6 \text{ g/cm}^3$  respectively.)

Better responses correctly found both the pressure due to the fluid using the formula  $P = \rho g h$  at a depth of 10 cm in still water and in mercury and also correctly converted **cm** into **m** and **g/cm<sup>3</sup>** into **kg/m<sup>3</sup>**. Candidates found the pressure due to the fluid in water as  $P_W = 1000 \text{ pa}$  and pressure due to fluid in mercury as  $P_M = 13600 \text{ pa}$ .

**Example:**

b: $fgh = \text{Pressure in liquids}$	Pressure in mercury
$f = \text{density of the liquid}$	$f = 13.6 \text{ g/cm}^3$
$g = \text{acceleration due to gravity.}$	as $1 \text{ g/cm}^3 = 1000 \text{ kg/m}^3$
$h = \text{depth (of object) in liquid.}$	$13.6 \text{ g/cm}^3 = 1000 \times 13.6 \text{ kg/m}^3$
Pressure in water	$f = 13600 \text{ kg/m}^3$
$f = 1000 \text{ kg/m}^3$	$g = 10 \text{ ms}^{-2}, h = 0.1 \text{ m}$
$g = 10 \text{ ms}^{-2}$	Pressure $P = fgh$
$h = 10 \text{ cm}$ or $\frac{10}{100} = 0.1 \text{ m}$	$= 13600 \times 10 \times 0.1$
Pressure $P = fgh = 1000 \times 10 \times 0.1 = 1000 \text{ Nm}^{-2}$	$= 13600 \text{ Nm}^{-2}$
	As mercury is 13.6 times denser than water, it applies more pressure.

Weaker responses used the correct formula for the density of liquids (water and mercury) but were unable to convert the units from **cm** into **m** and **g/cm<sup>3</sup>** into **kg/m<sup>3</sup>**. Some responses did not even while the formula of pressure and ignored the density of water and mercury.

**Example:**

Water	
density of water = 1000 kg/m <sup>3</sup>	
Pressure = $\rho gh$	
Pressure = (1000)(10)(10)	
Pressure = 100000 <del>100</del> Nm <sup>-2</sup>	
Mercury	
density of mercury = 13.6g/cm <sup>3</sup>	
Pressure = $\rho gh$	
Pressure = (13.6)(10)(10)	
Pressure = 1360 Nm <sup>-2</sup>	

**Question 11a**

Define the term evaporation and write any FOUR factors that affect it.

*Better responses* correctly wrote the definition of evaporation and also wrote all four factors that affect it, like the one below.

**Evaporation:**

The process of changing of liquid into gaseous form is called evaporation.

**Humidity:**

Humidity reduces the rate of surface evaporation.

**Temperature:**

When the temperature rises, it results in increase of surface evaporation.

**Surface Area:**

Greater the surface area, greater will be the rate of evaporation.

**Wind:**

The stronger the wind, the higher is the rate of evaporation.

**Example:**

Evaporation is a process which takes place from the surface of liquid at any given temperature. Evaporation is also a cooling process.

\* **Temperature:** By increasing the temperature of a liquid its k.E energy increase, particles vibrate vigorously and increases the rate of evaporation.

\* **Surface area:** Larger surface provides more number of particles to evaporate easily and rapidly. For eg a saucer is used to make the tea cool rapidly as more no of particles evaporate from the surface of liquid.

\* **Wind:** Wind blowing over the surface of liquid sweeps the away the water particles ~~cause~~ that has just escape but increasing the chance of more particles to evaporate.

\* **Nature of liquid:** ~~Volatile~~ Volatile liquids evaporate rapidly as they have weak intermolecular forces of attraction. For eg alcohol evaporates rapidly as compare to ~~water~~ water because water has strong intermolecular forces of attraction as compare to alcohol.

Weaker responses failed to write either the correct definition of evaporation or all four factors affecting on it. Many responses only wrote the names of factors affecting evaporation. With the consensus of Seeders, Senior E-markers and E-markers, full marks were awarded for all such responses, to facilitate the candidates. However, more specific answers are expected in such questions.

**Example:**

Evaporation :-

The change of water into  
molecu gas molecules without heating it,  
is called evaporation.

Factors that affect evaporation :-

<sup>High</sup> 1. Temperature.

Temperature affect the evaporation, <sup>due</sup> ~~due~~  
to its higher temperature.

2. Lower <sup>Temperature</sup> ~~Temp<sup>erature</sup>~~ :-

Lower temperature affect the evaporation  
due to its lower temperature.

3. Sunlight energy :-

If sunlight energy is not accurance  
then the process of evaporation can  
also be affected.

4. Bad conductors of heat :-

If the bowl in which water is kept is  
the bad conductor of heat then it  
can also affect the process of  
Evaporation.

### Question 11b

Radiation is a method of heat transfer whereby heat energy is transmitted from one hot object to another in the form of infra-red. Write any FIVE applications of radiation.

Candidates did not attempt this part of the question very well and even the better responses were unable to get full marks. Most of the responses got three marks out of five. Some of the responses replicated the same idea and concept again and again. Candidates were expected to write all five application of radiation like the one below.

- The cooling fins on the back of a refrigerator and in a car radiator should be dull black so that they will radiate away energy at a faster rate.
- Brightly polished kettles and teapots do not lose much energy by radiation. They can keep the water inside warm for a longer time.
- The solar panel has a dull black surface to absorb more heat energy from the sun.
- A fire-fighting suit is bright and shiny so that it does not absorb much energy.
- Thermograph is a scan of the body and is a photograph according to intensity of radiation at different places.

*Weaker responses* failed to write all the correct application of radiations. In fact candidates were confused and wrote the examples of radiations instead of applications of radiations. Most of the responses wrote conduction, convection, radiation, a can of water using a burner and vacuum flask as the application of radiation.

Example:

① If we use laptop half <sup>an</sup> hour it will be warm up and emit radiation.

② If we <sup>burning</sup> wood these ~~saditation~~ are warmness is also called radiation.

③ The kettles is also ~~a~~ ~~exmp~~ example of radiation.

④ The ~~rise~~ of the sun is warmed the earth it is also example of radiation.

⑤ If we stand near the fire they warm air it is also example of radiation.