GREENLAWNS HIGH SCHOOL

FIRST TERMINAL EXAMINATION

DATE: 23/09/2024 | **STD. VIII** | **MARKS: 80**

DAY: Monday | **PHYSICS** | **TIME: 2 hours**

[FIGURES TO THE RIGHT INDICATE FULL MARKS]

Section A

(Attempt all questions from this section)

Question – 1 **(15m)**

Choose the correct answer to the questions from the questions given below.
(Rewrite the options along with the alphabet, viz (a),(b),(c), or (d))

i. What is the effect on pressure when a force is applied to a smaller area?
   a) Pressure decreases
   b) Pressure remains the same
   c) Pressure increases
   d) There is no effect on pressure

ii. A nut is opened by a wrench of length 10cm. If the least force required is 5N, then the moment of force needed to turn the nut is _____
   a) 0.5 N m
   b) 50 N m
   c) 2 N m
   d) none of the above

iii. What phenomenon causes a palm to feel cold when a drop of ether (alcohol) is placed on it?
   a) Condensation
   b) Solidification
   c) Evaporation
   d) Melting

iv. Water_____on heating from 0°C to 4°C.
   a) expands
   b) contracts
   c) evaporates
   d) remains the same

v. Work done on a body in changing its state is said to be the _____ possessed by the body
   a) energy
   b) force
   c) power
   d) none of the above

vi. The atmospheric pressure on earth surface is nearly _____ Pa
   a) 10
   b) 10^2
   c) 10^4
   d) 10^5

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vii. Camphor on heating, changes from solid to _____.
   a) vapour
   b) liquid
   c) solid
   d) crystals

viii Which everyday item uses atmospheric pressure to function effectively?
   a) A bicycle pump
   b) A sewing machine
   c) A television remote
   d) A microwave oven

ix. Work is said to be done by a force if the force applied on a body:
   a) Changes its color
   b) Changes its shape and size
   c) Increases its temperature
   d) None of the above

x. When a solid is heated, which dimensions increases?
   a) Length
   b) Breadth
   c) Height
   d) All of the above

xi. More the _____ of the body higher is its kinetic energy.
   a) Speed
   b) Force
   c) Volume
   d) Area

xii. The numerical relationship between coefficient of linear(α), superficial (β) and cubical(γ) expansion is
   a) $\alpha = 2\beta, \gamma = 2\alpha$
   b) $\beta = 2\gamma, \alpha = 2\beta$
   c) $\beta = 2\alpha, \gamma = 3\alpha$
   d) $\beta = 2\alpha, \alpha = 3\beta$

xiii. What is the heat absorbed or rejected during a change of state called?
   a) Specific heat
   b) Latent heat
   c) Thermal heat
   d) Lost heat

xiv. Which state of matter has the greatest potential energy and the least kinetic energy?
   a) Solid
   b) Liquid
   c) Gas
   d) None of the above

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xv. Which of the following is an effect of heat?
   a) Change in Temperature
   b) Change is state of the body
   c) Change in size of the body
   d) All of the above

Question – 2 **(5m)**

State whether the underlined part in the following statements makes the statement true or false

(Also Correct and rewrite the false statement, underlined part only)

i. Increasing the magnitude of the applied force will ***decrease*** the turning effect of the force if the distance from the pivot point remains constant.
ii. When heat is ***rejected*** from a body its temperature falls
iii. A body, when placed on a surface, exerts a thrust on the surface equal to its ***own weight***
iv. The energy stored in a trampoline when it is compressed is a form of ***gravitational*** potential energy
v. Absolute zero is the temperature at which molecular motion ***increases.***

Question - 3 **(5m)**

Identify the Energy Conversion

i. When a doorbell ring.
ii. In a solar cell.
iii. During photosynthesis in plants.
iv. A household geyser.
v. In Electric trains.

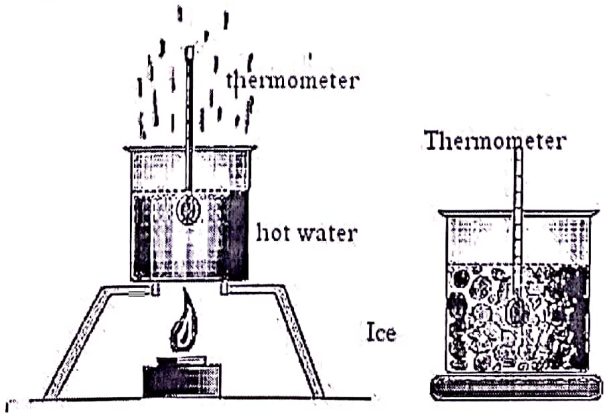
Question - 4

i. Match the following **(5m)**

Column A	Column B
Moment of Force	W
Potential Energy	Pa
Thrust	J
Pressure	N
Power	N m

Question – 5

i. Answer the following questions based on a mercuery thermometer **(3m)**



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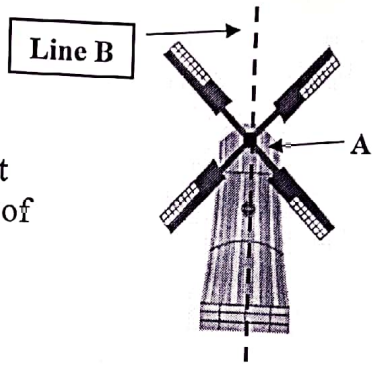
a) why the level of mercury in the capillary tube rises when the thermometer is placed in hot water.
b) What will happen to the mercury in the thermometer when placed in the beaker filled with ice?
c) Based on your answers to parts (a) and (b), state what this phenomenon is called.

ii. A bicycle with a mass of 20,000g is moving at a speed of 4 m/s. Calculate the kinetic energy of the bicycle. **(2m)**

Question – 6

i. In the image provided, a windmill is shown **(3m)**
Identify and describe the following:
a) Point A
b) Line B
c) If the wind speed increases significantly, what effect will it have on the turning effect (torque) of the wind mill.

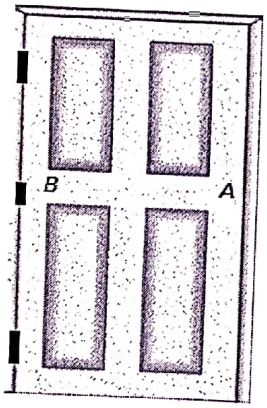


ii. Find the odd one out **(2m)**
[state the reason for your answer]
A stretched bow, a compressed spring, rock on a high hill, Car in motion.

Section B
(Attempt ALL 4 questions from this section)

Question - 7

i. In the image of a door, there are two positions marked as A and B for placing the door handle. Position B is closer to the door hinge (pivot), while Position A is farther from the hinge. **(2m)**
(a) Where should the handle be placed to make it easier to open the door with less force?
(b) State the factor on which the turning effect depends in this case.



ii. Name the factors on which cubical expansion of a solid depend on? **(3m)**

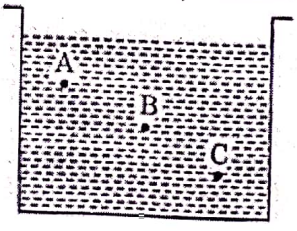
iii. Calculate the potential energy of a 60 kg box that is raised to a vertical height o **(3m)**
400 cm, given that the force of gravity on a 1 kg mass is 10 N.

iv. Define *'Mechanical energy'* and state its types **(2m)**

Question - 8

i. Distinguish between *"Thrust"* and *"Pressure"* by using the following points only **(2m)**
(1) Provide the definition of each term.
(2) Explain whether each depends on area

ii. In the image of a beaker filled with water, answer the following questions **(2m)**



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a) Arrange the points in decreasing order of water pressure (from highest to lowest).
b) Explain the reason for the variation in water pressure at these different heights in the beaker.

iii. Give any ***three*** factors that increase the rate of evaporation. **(3m)**

iv. Calculate the thrust required to exert a pressure of 40,000 Pa on an area of 1 cm^2. **(3m)**

Question - 9

i. Give scientific reason
   a) Why does nose bleed occurs at high altitude? **(2m)**
   b) Why do tall buildings have wide foundations? **(2m)**
   c) Pendulum of a clock is made up of Invar **(2m)**
   d) A glass stopper stuck in the neck of a bottle can be removed by pouring hot water on the neck of the bottle. **(2m)**

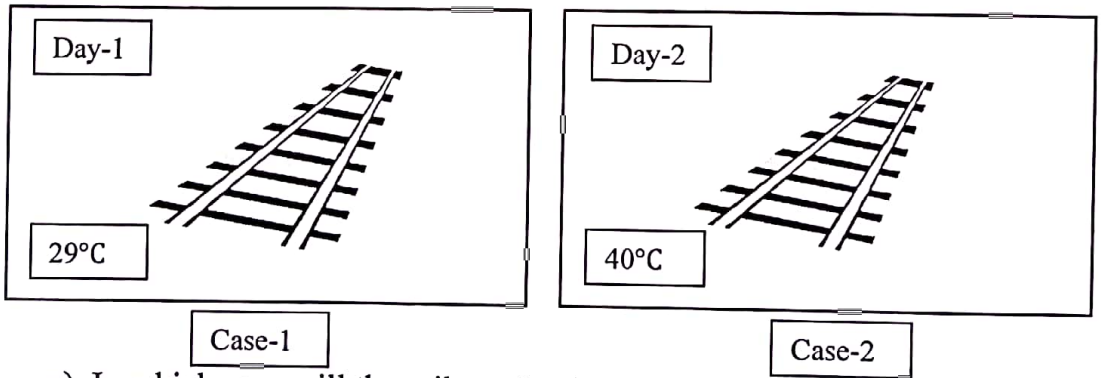
ii. Define ***"Power"*** and explain how the amount of work done affects the power of a source. **(2m)**

Question - 10

i. Identify whether work is done or not in the following cases
   a) When you are pushing a Wall **(1m)**
   b) When you squeeze a rubber ball **(1m)**
   c) You are just holding a Dumbbell **(1m)**
   d) When you are climbing a stair **(1m)**

ii. An electric toaster toasts a piece of bread in 3 minutes. If the toaster uses 900 joules of energy to toast the bread, calculate the power of the toaster. **(3m)**

iii. Given an image of the same metal railway track on two different days, with the first day having a temperature of 29°C and the second day having a temperature of 40°C **(3m)**



a) In which case will the railway track expand more?
b) Explain the relationship between temperature and the length of the metal railway track.
c) What type of thermal expansion is occurring in the railway track due to the change in temperature?

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Best of Luck

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FIRST TERMINAL EXAMINATION

SOLUTION SET

TEACHER: Gerry A.L Fernandes

DATE: 23/09/2024 **STD. VIII** **MARKS: 80**

DAY: Monday **PHYSICS** **TIME: 2 hours**

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Section A

(Attempt all questions from this section)

Question – 1 **(15m)**

Choose the correct answer to the questions from the questions given below.
(Rewrite the options along with the alphabet, viz (a),(b),(c), or (d))

i (c) Pressure increases
ii (b) 50N m
iii (c) Evaporation
iv (b) contracts
v (a) energy
vi (d) 10^5 Pa
vii (a) vapour
viii (a) A bicycle pump
wix (b) changes its shape and size
x (d) All of the above
xi (a) Speed
xii (c) $\beta = 2\alpha, \gamma = 3\alpha$
xiii (b) Latent heat
xvi (a) Solid
xv (d) All of the above

Question – 2 **(5m)**

i. False: Increasing the magnitude of the applied force will ***increase*** the turning effect of the force if the distance from the pivot point remains constant.
ii. True
iii. True
iv. False: The energy stored in a trampoline when it is compressed is a form of ***elastic*** potential energy
v. False: Absolute zero is the temperature at which molecular motion ***ceases/stops.***

Question - 3 **(5m)**

Identify the Energy Conversion

i. When a doorbell ring. – electrical energy to sound energy
ii. In a solar cell. - light energy to electrical energy
iii. During photosynthesis in plants. - light energy to chemical energy
iv. A household geyser. -electrical energy to heat energy
v. In Electric trains. - electrical energy to mechanical energy

Question - 4

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i. Match the following (5m)

Column A	Column B
Moment of Force	N m
Potential Energy	J
Thrust	N
Pressure	Pa
Power	W

Question – 5

i. a) Mercury expands on heating
b) It will contract
c) Thermal Expansion. (3m)

ii. **Solution:** Mass = 20000g = 20kg (1m)
K.E = 1/2mv2
= ½ *20*4*4 (1m)
= 160 J (1m) (2m)

Question – 6

i. a) Pivot
b) axis of rotation
c) the turning effect (torque) on the windmill will also increase. (3m)

ii. *Car in motion*
– as it has K.E while others have P.E (2m)

Section B
(Attempt ALL 4 questions from this section)

Question - 7

i. (a) Point A
(b) Perpendicular distance from the pivot (2m)

ii. 1) Initial volume of the solid
2) The rise in temperature
3) Material of the solid (3m)

iii. **Solution:** 400 cm = 400/100 = 4 m (1m)
Potential Energy = 60kg×10N/kg×4m (1m)
= 2400 Joules
Potential Energy =2400Joules (1m) (3m)
So, the potential energy of the box is 2400 Joules.

iv. The energy possessed by a body due to its state of rest or motion is called mechanical energy (2m)
1) Potential energy
2) Kinetic energy

Question - 8

i.

Thrust	Pressure
it is the force acting normal to a surface	It is the thrust acting per unit area
It does not depend on area	It depends on area

(2m)

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ii. a) C>B>A **(2m)**
b) Pressure increases with depth

iii. 1) Temperature **(3m)**
2) Humidity
3) Area exposed

iv. $1cm^2 = 1 \times 10^{-4} m^2$ (1m) **(3m)**
Thrust= $40{,}000\,Pa \times 1 \times 10 - 4\,m^2$ (1m)
$= 40{,}000 \times 0.0001$
$= 4\,N$ (1m)

Question - 9

i. (a) (1) The atmospheric pressure is low at high altitudes **(2m)**
(2) The pressure inside the body does not change, thus the access pressure inside the body compared to the atmospheric pressure, causes nose bleeding
(b) (1) Invar is an alloy of iron and nickel and it has negligibly small coefficient of linear expansion **(2m)**
(2) This helps the clock neither to lose time in summer due to expansion not to gain time in winter because of contraction
(c) (1) Foundations of building are kept wide so that the weight of the building may act on larger area **(2m)**
(2) As a result, it will exert less pressure on the ground to avoid sinking
(d) (1) The reason is that on warming the neck of the bottle, the neck expands **(2m)**
(2) Hence the glass stopper gets space to expands

ii. *The power of a body is defined as the rate of doing work by the body* **(2m)**
More the work done more is power of the source

Question - 10

i. Identify whether work is done or not in the following cases
a) No work done **(1m)**
b) Work is done **(1m)**
c) No work done **(1m)**
d) Work is done **(1m)**

ii. Solution: **(3m)**

$3minutes = 3 \times 60s\ econds = 180seconds$ (1m)

Power= $900\,Joules/180\,seconds$ (1m)

$= 5\,W$ (1m)

iii. a) Case-2 **(3m)**
b) Higher the temperature more will be the increase in length.
c) Linear expansion.

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Best of Luck

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