THE PRESIDENT'S OFFICE
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT
KILIMANJARO REGIONAL COMMISSIONER'S OFFICE

FORM TWO MOCK EXAMINATION MAY 2024

031   **PHYSICS**

MARKING SCHEME

1. **Multiple choice 10 marks**

i	ii.	iii.	iv.	v.	vi.	vii.	viii.	ix.	x.
A	C	B	B	D	B	C	A	B	C

1mark each

2. Matching items **05 marks**

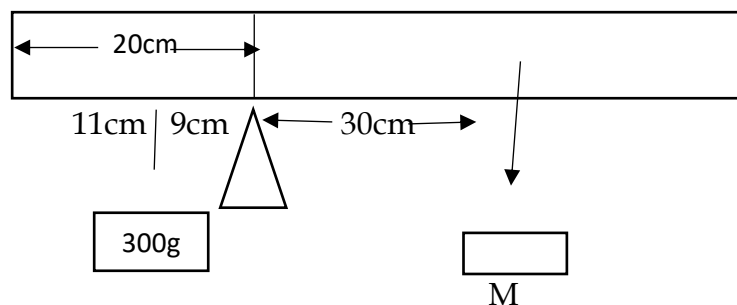| List A	i.	ii.	iii.	iv.	v
List B	G	E	A	B	D

1 mark each

3. a) A bus with seated passengers and loading the lower compartments is more stable because center of gravity is low than the one with standing passengers. (**3 marks**)

b). i)

(4 marks)

ii). Sum of clockwise moment = sum of anticlockwise moment **(01 mark)**

$300g \times 9cm = M \times 30cm$ **(0$\frac{1}{2}$mark)**

$M = \dfrac{300g \times 9cm}{30cm}$

$M = 90g$ **(0$\frac{1}{2}$mark)**

Mass of the meter rule is 90g   **(01 mark)**

4. a). Law of floatation states that "A floating body displaces its own weight of the fluid in which it floats" **(02 marks)**

b). When a ship sails from fresh water into the sea it will rise a little out of it because sea water has higher density than pure water hence it has more upthrust than pure water. **(2 marks)**

c).

Data	Formula	Calculations
$M_0 = 15g$	$\rho = \frac{M1-M0}{V}$ **(01 mark)**	$1.2g/cm^3 =$

$\frac{51g-15g}{V}$**(01mark)**

$M_1 = 51g$

$\rho = 1.2g/cm^3$

$1.2g/cm^3 = \frac{36g}{V}$ **(01mark)**

$1.2g/cm^3\ v\ = 36g$ **(01mark)**

$\frac{1.2}{1.2}g/cm^3\ V\ = \frac{3.6g}{1.2}g/cm^3$

(01mark)

$$V = 30cm^3$$

<u> Volume of the bottle = $30cm^3$ </u> **(01mark)**

5. a). i) Efficiency of a machine is always less than 100% because of friction between its parts where energy is lost in term of heat and sound **(02marks)**

ii) This is due to high moment raised due to perpendicular distance.**(02marks)**

b) Data   Formula

Number of threads   V. R = $\frac{2\pi R}{Pitch}$ **(0.5mark)**

N = 5

Length = 1 cm   Pitch = $\frac{Pitch}{number\ of\ threads}$

(0.5mark)

Load (l) = 20000N

Radius (R) = 40cm   M.A = $\frac{L}{E}$

e = 90%   e = $\frac{M.A}{V.R} \times 100\%$ **(0.5mark)**

V × R =?

M.A =?

Calculations

Pitch = $\frac{1cm}{5}$ = 0.2cm **(0.5mark)**

V. R = $\frac{2\times3.14\times40cm}{0.2cm}$ **(0.5mark)**

<u>V. R = 1256</u>   **(0.5mark)**

$90\% = \frac{M.A}{1256}\times 100\%$ **(01 mark)**

$\frac{90\% \times 1256}{100\%} = M.A$ (**01mark**)

M.A = 110.4

<u>V.R = 1256 and M.A = 1130.4</u>   (**01 mark**)

6. a). i) Because of surface tension (**01 mark**)

   ii) This is because force of gravity on the moon is less than of gravity on the earth. (**02marks**)

   b). i). Data   Formula   Calculations

   Load (l) = 5000N $\frac{F}{A} = \frac{f}{a}$ (**01mark**) $\frac{f}{0.02m^2} = \frac{5000N}{0.1m^2}$ (**01mark**)

   Ld = 0.3 cm   f = $\frac{0.02m^2 \times 5000N}{0.1m^2}$ (**01mark**)

   a = $0.02m^2$

   A = $0.1m^2$

   Effort =?   = 1000N

   <u>Force applied to the smaller piston is 1000N</u>   (**01 mark**)

   ii) f × Ed = F × Ld. (**01mark**)

   $\frac{1000N \times Ed}{1000N} = \frac{5000N \times 0.3M}{1000N}$ (**01mark**)

   Ed = 1.5m

   <u>Smaller piston must be pushed 1.5m down to raise the load</u> (**01mark**)

   Any three of these   (**3marks 1@mark**)

7. a) i). It has law specific heat capacity

   ii). its expansion is uniform

   iii). It is opaque, so it is easily seen,

   iv). It does not wet glass.

   v). High boiling point (360^0C) and low freezing point (-39^0C)

   vi). It is good conductor of heat.

   b).To prevents the mercury thread to flow back into the bulb so as to read accurate temperature. (**2 marks**)

   C) i). This increases the time of impact thus reducing the chance of injuries (**3 marks**)

   ii).This is due to inertia of rest (**2 marks**)

8. a) i) There must be force applied **(1 mark)**

   ii) There must be distance moved in the direction of force **(1 mark)**

   b). Data given

Crane A	Crane B
Mass (M) = 200kg	Mass (M) = 200kg
Height (h) = 12m	Height (h) = 12m
Time (t) = 10s	Time (t) =15s

   i. Crane A: W.d = F x S **(0.5mark)**
   $= 2000N \times 12m$ **(01mark)**
   W.d = 24000J **(01mark)**

   Crane B: W.d = F × S **(0.5mark)**
   $= 2000N \times 12m$ **(01mark)**
   W.d = 24000J **(01mark)**

   ii. Crane A: Power $= \dfrac{W.d}{Time}$ **(0.5 mark)**

   $Power = \dfrac{24000J}{10s}$
   Power = 2400watts **(0.5mark)**

   Crane B: Power $= \dfrac{W.d}{Time}$ **(0.5mark)**

   $Power = \dfrac{24000J}{15s}$
   Power = 1600watts **(0.5 mark)**

   <u>Crane A is more powerful than Crane B because crane A takes less time to lift the same load as crane B</u> **(01 mark)**

9. a) i). Shadow is caused when an opaque object or material is placed in the path of rays of light **(2marks)**

   ii) u = $0m/s$ v = u + at **(0.5mark)**
   $a = 4$ m/s^2 v = 0m/s + 4 m/s^2 × 5s **(0.5mark)**
   v =?   V = 0m/s + 20m/s **(0.5mark)**
   t = 5s   v = 20m/s **(0.5mark)**

   iii)

   (03 marks)
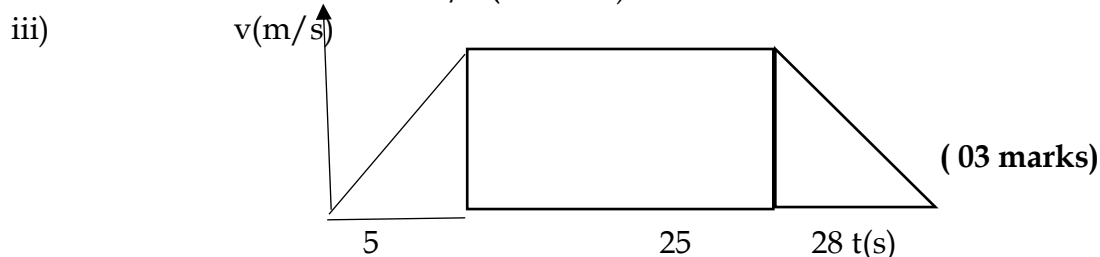
   Total distance = area under the graph, A = $\dfrac{1}{2}$ (a + b) h **(01 mark)**

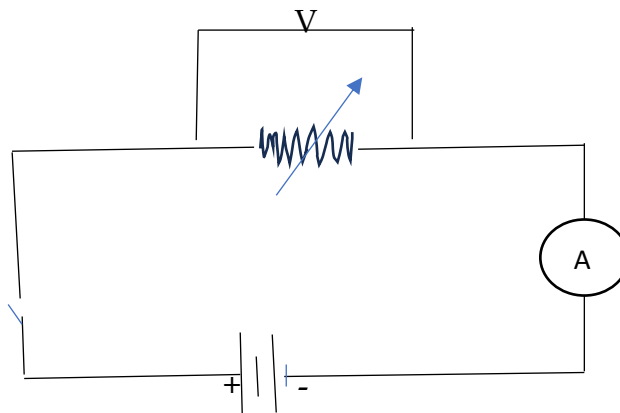 $= \dfrac{1}{2}$ (28s + 20s) × 20m/s **(01 mark)**

   Total distance = 480m **(01 mark)**

10. a) i. **(2.5 marks 0.5@)**
    - Ammeter
    - Voltmeter
    - resistor
    - connecting wires

- source (battery or dry cell
- key (switch)

ii.   **(3.5 marks)**

b). Given

   $I = 2A$

   $R = 5\Omega$

   $V =?$

   $V = IR$

   $V = 2A \times 5\Omega$

   $V = 10v$

Since 10Ω and 5Ω are in the parallel then they share the same voltage.

i)   Data

P.d = $10v$	V= IR **(01 mark)**
R = 10Ω	I = V/R **(01mark)**
I=?	

$I = 10V/10\Omega = 1A$

Current flowing in 10Ω resistor is 1A **(01 mark)**

ii. P.d = ?

R= 10Ω **(01mark)**   V = IR **(01mark)**

$I = I_1 + I_2$ **(01mark)**   V= 3A × 20Ω **(01 mark)**

I = 3A   **(01mark)**   P.d = 60v

Potential difference across 20Ω is 60v   **(01mark)**