MKALAMA DISTRICT COUNCIL
FORM THREE TERMINAL EXAMINATION
MARKING SCHEME MAY 2025
PHYSICS.
Section A (16 marks)

1. Multiple choice**(10MARKS)**

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

2. Matching items **(6MARKS)**

LIST A	i	ii	iii	iv	v	vi
LIST B	F	D	G	B	A	C

Section B (54 marks)

3. a) i)-it aid walking and movement
-it causes lighting in match stick
-it uses to wear unneeded layers of some materials   (Any two **2 marks**)
-it causes nail to stick on the wood
-it causes moving body to stop by applying brakes

ii)-use ball bearing
-use rollers between the rough surface
-use of lubricants e.g., Oil, grease, water
-use of speedy material (Teflon) which have low efficient of friction   (any three =**3 marks**)
-make surface smooth or polishing

b) Data given
speed of the boat, Ub =36m/s
speed of the river, vr=12m/s
velocity of the boat respect to observer, ubr=?

i)   From
Ubr=vb=vr   **(2MARKS)**
Vr=36m/s-12m/s=24m/s
The velocity of the boat result respect to an observer is 24m/s

ii)   By using graphical method
Scale 1cm=6m/s
36m/s=6cm
12m/s=2cm

From the scale
1cm=6m/s
6.4cm=Ubr?
Cross multiplication
Ubr=(6.4cm×6m/s)/1cm
Ubr=38.4m/s
The velocity of the boat with respect to observer is 38.4m/s
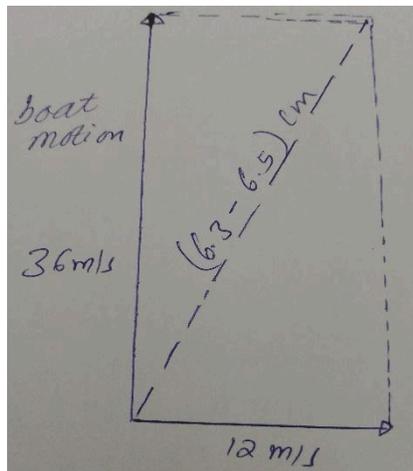
(2marks)

4. a) i) .Both form real, diminished and inverted image
. Both use the convex lens. (2marks)

 ii)**.** Data given
 Wheel radius =45cm=0.45m
 Sprocket radius = 4.5cm=0.045m
 Effort = 160N
 Efficient = 80% = 0.8
 V.R = 10
M.A= VR x Efficiency
M.A = 10 x 0.8= 8
Load = M.A x Effort
Load = 8 x 160= 1280N.
The maximum Load that can be carried by bicycle system is 1280N.
(5marks)

 b) i. Crushed Can Experiment.
   ii. Inverted Glass of water.   **(2marks)**

5. a) i) Centre of the gravity is the point at which the whole weight of the body act while Centre of mass is the point at which the whole mass of the body assumed to be concentrated. **(2marks)**
ii) Principle of moment state that
"When a body is in equilibrium the sum of the clockwise moments is equals to sum anticlockwise about any points of moments**"**   **(2marks)**
b) From the principle of moment
        Clockwise moments=Anticlockwise moment   **(5marks)**
          Consider reaction at P
        P×100cm=30cm × 4N
        P=30cm× $\frac{4N}{100cm} = \frac{120N}{100} = 1.2N$
        The reaction P at the support is 1.2N
        Consider
            Q×100cm=70cm×4N
            Q=70cm× $\frac{4N}{100cm} = \frac{280N}{100}$=2.8N
            The reaction Q at the support is 2.8N

6. (a)(i) Ebonite rod acquires negative charge while the fur becomes positively charged (1.5 marks)
   (ii) The glass acquires positive charge while the silk become negatively charged. (1.5mark)
   (b) i **In series connection** (2 marks)
   Capacitance, $C_1 = 20F$
   Capacitance $C_2 = 25F$
   Effective capacitance $C = C_1C_2/(C_1+C_2)$
   $$C=(20 \times 25)F/(20+25)$$
   Effective capacitance $= 11.11F$
   In parallel connection(2marks)
   $$C = C_1 + C_2$$
   $$= 20F + 25F$$
   Effective capacitance $= 45F$
   ii The propagation of lightning channel follows the path of least air resistance which is not straight but zig zag since moisture in the atmosphere causes the air to ionized in different directions   **2marks**

7. (a) (i) volume of liquid displaced
   ii Density of the liquid.
   Iii volume of immersed object.

   (b) (i)Salt water has high density than fresh water due to presence of dissolved salt in it. Therefore will experience a greater upthrust and displace low volume of salt water than in fresh water. **(2 marks)**
   ii Data given
   mass of object $m = 42g$
   volume of object, $v = 6cm^3$
   Density of water, $D = 1g/cm^3$
   Relative density of object, $RD = $ Density of substance/Density of water
   $RD = 42g/(6Cm^3 \times 1g/cm^3)$
   Relative density of object $= 7$ **(4marks)**

8 (a) (i)
   .store magnets in pairs
   .store magnets away from heat
   .use magnetic keepers   **(Any four =4marks)**
   .store magnets away from mechanical vibrations and hammering
   .store magnets away from strong electric and magnetic fields
   .Avoid random stroking of magnets

   (b) (i) The red tie will appear red while blue spots will appear black. **(2.5marks)**
   (ii) The red tie with blue spots will appear black. **(2.5marks)**

Section c **(30 marks)**
9.(a)i)Apparent weight – is the weight of the body when immersed either partially or totally in   liquid while real weight is the weight of the body in air   **(2marks)**

   ii)Archimedes' principle state that "When a body is partially or totally immersed in liquid it experiences an upthrust which is equal to the weight of the fluid displaced by a body"   **(1mark)**
   The law of floatation state that "A floating body displaces its own weight in air of which it floats"

   (b)(i) Data given
   Weight in air $Wa = 4.6N$

Weight in water Ww=3.1N
Weight in liquid WL=2.7N

i)from
u=Wa-Ww
u=4.6N-3.1N=1.5N
the upthrust exerted on the body by the water is 1.5N **(3marks)**

ii)R.D=upthrust on liquid/upthrust on water
R.D=(Wa-WL)/(WA-Ww)
R.D=(4.6N-2.7N)/(4.6N-3.1N)
R.D=1.9/1.5=1.27
The relative density of the body is 1.27 **(3marks)**

C) Data given
Maximum density Dmax=1.00g/cm^3
Minimum density Dmin=0.80g/cm^3 **(6marks)**
Cross-sectional area of the stem,A=0.5cm^2
Height of the stem ,h=16cm
Volume of hydrometer (bulb), Vb=?
From
Vb=(Ah×Dmin)/(Dmax -Dmin)
Vb=(0.5cm^2 x 0.80g/cm^3)/(1.00g/cm^3-0.80g/cm^3)
Vb=32cm^3

10.(a)i)-it gives wide field of view
-it produces diminished images and erects for all object positions **(2marks)**
ii)-it causes formation of image
-it causes twinkling of stars **(2marks)**

(b) Data given
Height of object, H$_0$=20cm
Object distance , U=40cm
Focal length , f=15cm
Image distance ,V=?
Image height ,Hi=?
From
1/f=1/u+1/v
1/v=1/u-1/f
1/v= 1/15-1/40
1/v=(40-15)/600
1/v=25/600 (reciprocate)
V=600/25
V=24cm.
From
M=v/u=Hi/Ho
24.0cm/40cm=Hi/20cm
Cross multiplication
Hi=(20cmx24.0cm)/40cm
Hi=12cm
The image formed is 24cm from the concave mirror and 12cm high. The image is real, inverted, and diminished **(4marks)**

(c) 1-red

2-orange
3-yellow
4-green
5-blue
 6-**indigo**   (**7marks**)
 7.violet

11. (a) During the hot day the electrical cables appeared loose due to expansion as a result of increase in temperature but during cold day electrical appeared tight due to contraction as the result of decrease in temperature   (**6marks)**

(b)i)its advisable to connect bulbs in parallel during installation so when the bulb blows out or disconnected the other bulbs will keep wincing
ii)it is advisable to connect bulbs in parallel so that all bulbs it provides the same amount of potential difference which gives sufficient light as result of low total resistance   (**6marks**)

(c) When metal is heated its molecules gains kinetic energy and vibrate more vigorously.As the vibration becomes larger due to increased temperature the molecules are pushed further apart and metal slightly expands in all directions. (**3marks)**