PRIME MINISTER'S OFFICE
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT
DAR ES SALAAM AND GEITA REGIONS
FORM FOUR INTERSCHOOL PRE – MOCK EXAMINATION APRIL 2026

031/1 **PHYSICS 1 - MARKING GUIDE**

SECTION A (16 MARKS)

1.

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

@ 1 mark = 10marks

2. ..

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

@ 1 mark = 06marks

SECTION B (54 MARKS)

3. a) i) Always forms diminished image **02marks**

(ii) r – radius of curvature

$f = \frac{r}{2}$ = focal length

$m = \frac{v}{u}$ = linear magnification, M **01 marks**

ii) Substitute into eqn $\frac{1}{f} = \frac{1}{u} = + \frac{1}{v}$

$\frac{1}{\frac{r}{2}} = \frac{1}{u} + \frac{1}{v}$

02 marks

$\frac{2}{r} = \frac{1}{u} + \frac{v}{v}$

Multiply both sides by V

$\frac{2v}{r} = \frac{v}{u} = \frac{v}{v}$

$\frac{2v}{r} = \frac{v}{u} + 1$

Make $\frac{v}{u}$ subject of above eqn. **01 mark**

∴ $\frac{v}{u} = m = \frac{2v}{r} - 1$

$m = \frac{2v}{r} - 1$

b) Data

D=v=25cm

f = 5cm m=?

From magnification $m = \frac{v}{f} + 1$ **02 marks**

$= \frac{25}{5} + 1$

5+1=6 **01 marks**

Hence magnification produced by lens = 6

4. a) i) It is a scalar quantity because has no direction **01 marks**

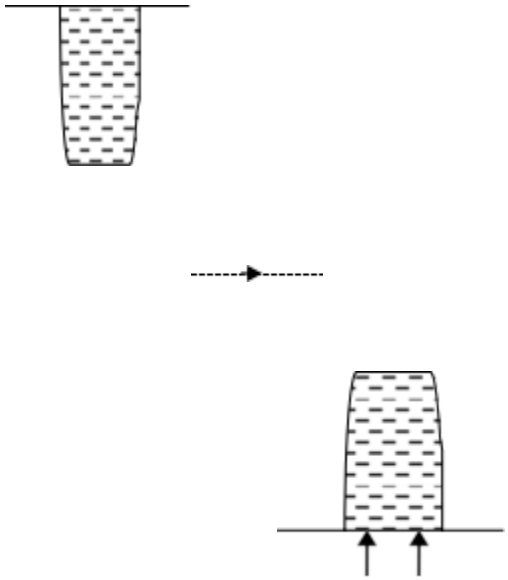
ii) **Apparatus**

- A glass
- Some water
- Card board

Procedures

i. A glass is filled with water and then covered with cardboard.

ii. A card board is held and the glass is inverted **01mark**



Observation:

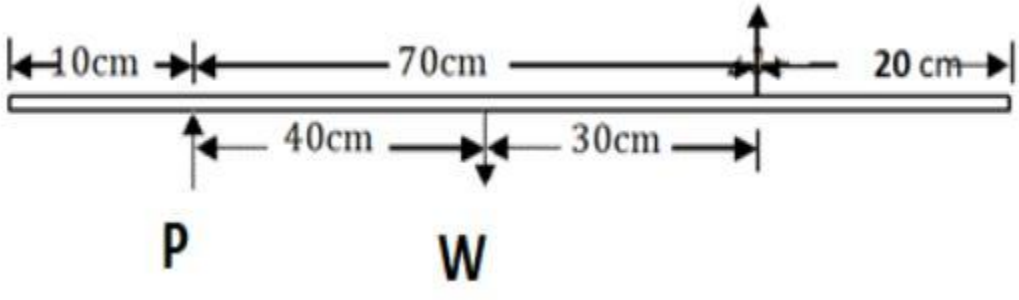
✔ On releasing the cord board, it remains firmly fixed to the glass and water remains in glass.

Conclusion

✔ Atmosphere pressure act on cardboard strongly supporting the weight of water. **01mark**

b) Solution

Since a bar is uniform, its weight acts at midpoint which is 50cm. Let W be weight of bar and P-reaction of peg, take moment about the peg



01mark

From

Sum of clockwise moments = Sum of anticlockwise moments

W x 40cm = 10N x 70cm

$W = \frac{10N \times 70cm}{40cm}$

= 17.5N

02 marks

The weight of the bar is 17.5N

Reaction of the peg

The sum of the upward force = sum of downward force **01mark**

P +10N

P = W – 10N

= 17.5N – 10 N

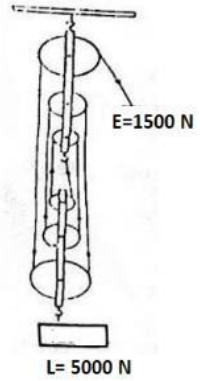
= 7.5N

The reaction of the peg P is 7.5N **01mark**

5. a) i) F = Ma where F – force
M –Mass or inertia of a body **01mark**
a - Acceleration

(ii) Newton's law of motion states that "The rate of change momenturn of a body is directly proportional to the net force applied to it and take place in direction of force" **02 marks**

b)



02marks

Data

VR = 6

MA = $\frac{L}{F} = \frac{5000N}{1500N} = \frac{10}{3}$ **02marks**

e $= \frac{MA}{VR} \times 100\%$

e $= \frac{10}{\frac{3}{6}} = \frac{10}{3} \times \frac{1}{6} \times 100\%$

e = 55.6%

The efficiency of tackle and block pulley system is 55.6% **02marks**

6. a) i)Aluminum – have large linear expansively of 0.0003°C **02marks**
ii) Platinum - Have the same linear expansively of 0.000009°C **02marks**

b) Date

M_1 = 10kg m_2 = 22kg Q_1 =55°C Q_2=?

From :

The substance is heated by the same quantity of heat, Q

$M_1C \quad \Delta Q_1 = M2C \quad \Delta\theta_2$ but c is the same for both equations

$M_1 \Delta Q = M_2 \Delta Q_2$ **02marks**

$10 \times 55 = 22 \Delta Q_2$

$Q2 = \frac{10 \times 55}{22} = 25°C$

The temperature rise of substance is 25°C. **01mark**

7. a) – Polarization

Minimized by :

- Adding depolarizer eg Potassium dichromate which react with hydrogen bubbles to form water **02marks**

- Local action

Minimized by:

- Coating the surface of zinc with mercenary to form zinc amalgam **02marks**

b) Data

let R1 0.5Ω R2 = 3Ω R3 = 6Ω Re =? r = 0.3Ω

Re = R1 = $\frac{R_2 \times 3_3}{R_2 \times R_3} + r$ **01mark**

= 0.5 + $\frac{6 \times 3}{6+3} + 0.3 = 2.8\Omega$ **01mark**

Re = 2.8 Ω

From E=I(R+r) **02marks**

$\frac{E}{R+r} = \frac{6.6v}{2.8\Omega} = 2.36A$

I =

$\frac{6}{9} \times 2.36A$

Read of am ureter A =

= 1.57A **01mark**

8. a) (i) It has not cleared right boarhound round it . i.e fail to dominate its orbital both hence shares with other objects **02mark**

ii) Primary (P) waves.

reasons:

- travel with higher speed about 7 – 14km/s
- Can prepare in solid and liquid hence can pass through crust. Montel and core

02marks

b) Weight in air (W1) = 1000g

Weight in water (w2) =8000g

Weight in liquid(W3) = 900g

Density of body (P)?

Relative density of the liquid (R.d) = ?

- Rd of the body

Rd= $\frac{w_1}{w_1 - w_2} = \frac{1000}{1000-800} = 5$

02marks

∴Rd = 5

FROM

P = PW $\times$ Rd

$\times 5 = 5g/cm^3$

= 1G/CM^3

$= 5g/cm^3$

01mark

- Rd of liquid

Rd= $\frac{W_1-W_3}{w_1-w_2}=\frac{1000-900}{1000-800}$

= $\frac{100}{200}=0.5$

∴ Relative density of liquid = 0.5 **02marks**

SECTION C (30 MARKS)

9. a) (i) Alcohol – To produce alcohol vapor in chamber which saturates air and difference down to be cooled **01mark**

Solid carbon dioxide – To cool the vapor below the condensation temperature in a chamber (act as coolant) **01mark**

The different radiation coves different amount of ionization and distinct shapes

eg.

Thin, fainter and irregular tracks

Beta particle

Alpha particle Broad and straight tracks

01mark

b) Data

Initial counts (No) = 82 – 10 =72

Background counts (BG) = 10

T -= 210 second

Remain counts (N) = 82 – 63

= 19counts/sec – 10counts/sec(BG)

= 19 – 10 = 9counts/sec **01mark**

From

$$\frac{N}{N}=\left(\frac{1}{2}\right)\frac{T}{t}$$

$$\left(\frac{9}{72}\right)=\left(\frac{1}{2}\right)\ \frac{210}{t}$$

02marks

$$\left(\frac{1}{2}\right)=\left(\frac{1}{2}\right)\frac{210}{t}$$

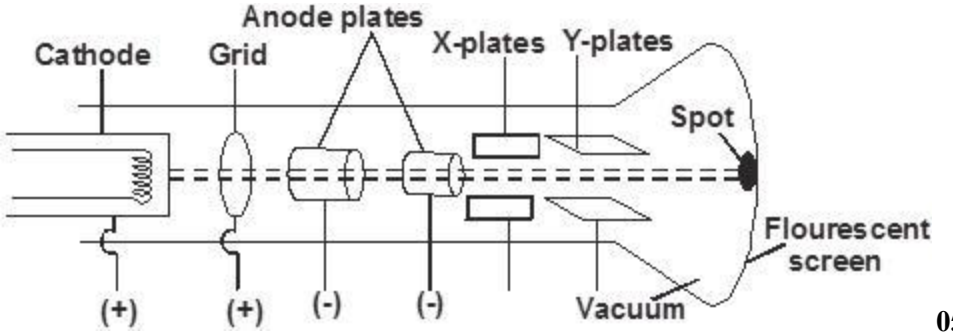
∴ $\frac{210}{t}=3$

$3t_{1/2}210$

$t_{1/2}$ = 70 seconds **02marks**

The half-life of material is 70 seconds

c)



05marks

ELECTRON GUN DEFLECTING SYSTEM DISPLAYING SYSTEM

10. a) Makes heat regulating devices (Thermostats) **01mark**

- As temperature charges the bending and unbending of strip opens and closes on electric circuits that controls the heat regulating devices eg electric irons, ovens, air conditioners and refrigerators hence act as automatic switch, basically act as thermometer attached to switch. **01mark**

- Bimetallic thermometers **01mark**

- The strip is often wound into flat spiral and one end of spiral is fixed while a pointer is attached to the other end
- It records temp of an inaccessible structures eg engines, ship and airplane.
- As temperature increases makes spiral to curl in the clockwise direction forcing pointer to move over calibrated scale.

001/2mark

- Bimetallic valves **01mark**

  Used to open and close temperature sensitive valves, the valves open when temperature falls below a certain point **001/2mark**

  Other uses
  - Automatic flash unit
  - Fire alarm

b) Date

$t_1 = 12_3$ $t_2 = 8_s$ T = 2.1min = 126s

V= 340m/s

Distance (x) = $\frac{V \times t}{2}$ **01mark**

Ship distance at 1st echo

$$x = \frac{v \times t}{2} = \frac{340 \times 12}{2} = 2040m$$

01mark

Ship distance at 2rd echo

$$x = \frac{v \times t}{2} = \frac{340 \times 8}{2} 1360m$$

01mark

Distance between 1st and 2nd echo $d = x_1 - x_2$ =

=2040 – 1360 = 680m **01mark**

Velocity of approach $\frac{distance\ between\ echoes}{time\ intival\ between\ echos} = \frac{d}{T}$

$$V = \frac{d}{T} = \frac{680m}{126s} = 5.4m/s$$

$V = 5.4m/s$

01mark

C). Majority charge carriers are electrons which has better mobility therefore responds quickly to Signals **01mark**

. Cheap and easily to produce from the silicon **01mark**

. Operate well with negative ground system which is standard and more popular **001/2mark**

ii) Data

$I_C = 100mA$ $I_E = 102mA$ $I_B = ?$

From transistor current equation

$I_B = I_C + I_B$ **01mark**

$I_B = I_E - I_C$

$= 102mA - 100mA$ **01mark**

$I_B = 2mA$

The base current is 2mA **001/2mark**

11. a)(i) Lenz s law states that " the direction of induced e m f is always such as to oppose the change Producing it? **02marks**

(ii) Falling magnet creates changing magnetic flux therefore e m f induced, current flows in copper only generating magnetic fields which opposes motion of falling magnet **02mark**s

b) A - Secondary coil **01mark**

B - Primary coil **01mark**

C - Capacitor **01mark**

C – Absorbs electric current due to self – indirection in primary coil (hence prevent sparking across the contact) **02marks**

c) Date

$F_p = 240v$ $E_s = 120v$ $I_s = 12A$ $I_p = ?$ $e = 80\%$

From

e = $\frac{power\ output}{power\ input} \times 100\% = \frac{E_s I_s}{E_{pI_p}} \times 100\%$ **02marks**

$\frac{80}{100} E_pI_p = E_sI_s$

01mark

$\frac{80}{100} \times 240Ip = 120 \times 12$

$192\ Ip = 1440$

01mark

Ip = $\frac{1440}{192} = 75.8A$

- Resistance of copper coils
- Eddy current
- Leakage magnetic field line
- Hysteresis energy loss on soft iron

Any two point @ 1mark