THE PRESIDENT'S OFFICE
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT
KILIMANJARO REGIONAL COMMISSIONER'S OFFICE
FORM THREE JOINT EXAMINATION

PHYSICS 1 MARKING GUIDE

1. 10 marks ,01 @

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

2. 06 marks, 01 @

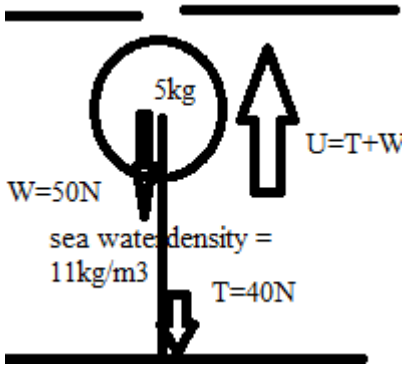
LIST A	i.	ii.	iii.	iv.	v.	vi.
LIST B	I	C	A	B	F	G

3. (a). Some energy wasted in lifting the bottom pulley
Some energy is wasted in overcoming frictional force in the moving parts of a machine
(b). given
Efficiency, e=90% diameter of small piston, d1=d diameter of large piston,d2=8d1=8d
Mechanical advantage, M.A=?
Velocity ratio of hydraulic press, V.R=$\frac{Areaoflargepiston}{Areaofsmallpiston}$ =$(\frac{8d}{d})^2$=64 $05\ marks$

$e = \frac{M.A}{V.R}x100\%90\% = \frac{M.A}{64}x100\%$ Then $M.A = \frac{90\%X64}{100\%}M.A = 15.6$

4. Given
Mass of the sphere, m=5kg g=10N/kg
Tension on the rope, T=40N
Density of sea water,ρ = 1100 kg/m^3 .....$05MARKS$

$$upthrust, U = real weight - apparent weight$$



$$U = W + T$$

$$U = 50N + 40N$$

$$U = 90N$$

$$by Archimedes principle U = Weight of fluid displaced$$

$$90N = Mass of seawater diplaced xg$$

$$90N = Density of seawater x volume of sphere xg$$

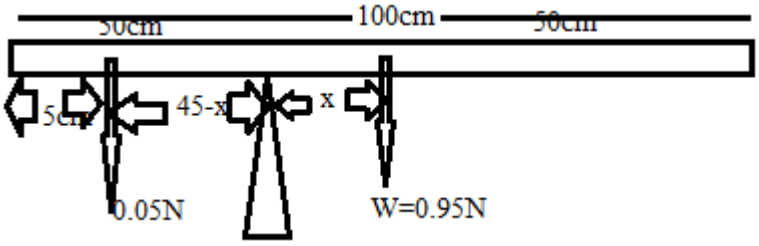
$$v = \frac{90N}{\frac{1100kg}{m3}x10N/kg} volume of the sphere = 0.0082m3$$

(b). so as to lower his/her centre of gravity inorder to maintain his or her stability
04 $marks for a relevant explanation$

5. $(a).$ $Va - Vb = 5m/s$, $Va + Vb = 15m/s$

Using elimination method or substitution method for solving simultaneous equation

$Va = \frac{10m}{s}$.....2.5 $marks and Vb = \frac{5m}{s}$..... 2.5$marks$



6. $02 marks for a neat \& clear force diagram$

$At equilibrium\ ,\ Total clokwise moments = Total anticlokwise moments$

$0.95NxX = 0.05Nx\,(45cm - X)$

$0.95NX = 2.25Ncm - 0.05NXX = 2.25cm$

$therefore the knife edge is\ 2.25cm from the centre of the lath$…….. $03 marks$

(b) $This is due to the refraction of light (bending of light ray) as is passes through media of different densities$

$The direction of light ray changes as it passes from air to water$……$04\ marks$

(b) $Given Real depth R = 0.16m;$ $Apparent depth, A =?;$ $Refactive index of water, \mu = 1.33$

$From the relation,\ \mu = \frac{Real depth}{Apparent depth}\ Apparent depth = \frac{Real depth}{Refractive index}\ Apparent depth = \frac{0.16m}{1.33}$=0.12m

$Therefore the stick will appear to be raised (0.16m - 0.12m)\ 0r\ 0.04m$……$05 marks$

7. $The ship floats in water has large hollow part (large volume),\ making its average density less than a density of water.\ A piece of iron sinkin water because its density is higher than density of water$….. $04 marks$

(b). $Given Density of cork = 0.35 g/cm^3$ $volume of cork = 100 cm^3 Density of water = 1 g/cm^3$

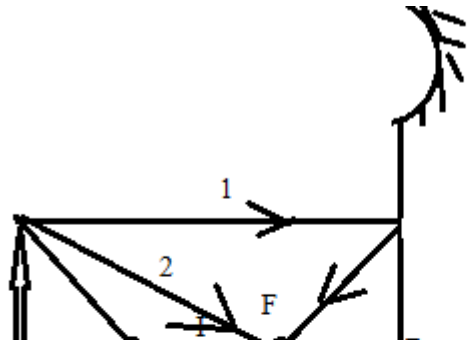
$mass of cork = mass of wated iplaced = Density of cork x volume of cork$…… $LAW OF FLOTATION$

$mass of cork = mass of water diplaced = \frac{0.35g}{cm3} x\ 100cm3 = 35g$

$volume of cork immersed = volume of water displaced = \frac{mass water displaced}{density of water} = \frac{35g}{1g/cm3} = 35cm3$

…… $05\ marks$

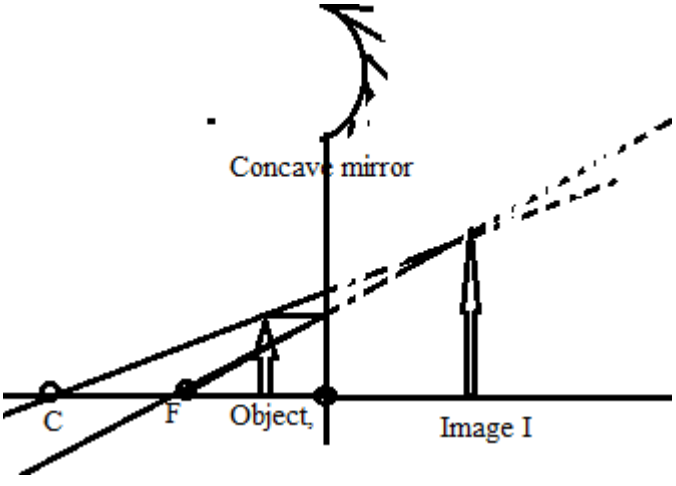
- 8. (a). The ray of light travelling to the mirror parallel to the principal axis is reflected through the principal axis……1
- The ray of light travelling to the mirror through the principal focus is reflected parallel to the principal axis……2
- The ray of light travelling to the mirror through the centre of curvature is reflected along its own path……3 $Any two correct rules = 02 marks\ 01@$



$Any two ray s of light$

$02marks$

(b) A concave mirror form an upright(erect) and enlarged(magnified) image of an object when object is placed the pole P and the principal focus F



$04marks$

9. Given

Length of the iron, lo=600cm

$$Li = \alpha Lo\Delta\theta Li = (0.0000109K - 1x600cmx100K) + 600cm, \quad Li = 600.654cm$$

$$Lcu = \propto Lo\Delta\theta Lcu = 0.0000168K - 1xLox100K, \quad Lcu = 1.00168Lo$$

$$600cm - Lo = Lcu - Li, \qquad 600cm - Lo = 1.00168Lo - 600.654, \; 2.00168Lo = 1200.654, \; ThenLo = 599.$$

(b). Complementary colours are those colours which when mixed in a definite ratio yield white light$04marks$

$Example; magenta + green = whitelight, \; yellow + blue = whitelightorcyan + blue = whitelight$

Colours of light mixed	**Colour formed**
Red+Green+ Blue	$whitelight$
Yellow + Blue	$whitelight$
Yellow + Magenta + Cyan	$whitelight$
$green$+ Magenta	White light
Blue + Green	$cyan.$

$05marks01@$

10. (a)

$Lenghtofaconductor - thelongetheconductorthehighertheresistivity$

$Crosssectionalareaofaconductor - thethickconductorhaslowresistancewhilethinconductorhashighresistance$

$Typeofmaterialmakingtheconductor - someofthematerialhashigherresistancewhiletheothershavelowerresist$

……$06marks02@$

10. (b). $given\frac{R}{L} = 4\frac{\Omega}{mA{=}0.15m2V{=}50VI{=}25mA}$

$$R = \frac{V}{I} = \frac{50V}{25mA} = 2000\Omega L = \frac{R}{4\Omega/m}l = \frac{2000m}{4}L = 500m\ldots\ldots\ldots\ldots(02marks)$$

$\rho = \frac{AR}{L} = \frac{0.15m2x2000\Omega}{500m} = 0.6\Omega m$…… …… $(02marks)$

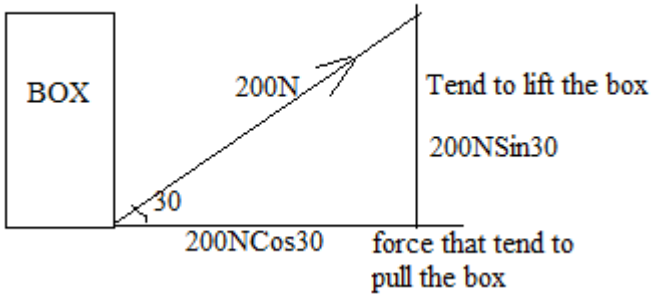
(c) $R = \frac{R1xR2}{R1+R2}$**+R3** $R = \frac{6\Omega x12\Omega\Omega}{6\Omega+12\Omega}$**+8Ω=11Ω**……$(01marks)$

ii) $I = \frac{V}{R} I = \frac{24V}{11\Omega} I = 2.18A$…… $(02marks)$

$V6\Omega = V12\Omega = IR = 2.18Ax3\Omega = 6.54V$…… $(02marks)$

$(iii) I12\Omega = \frac{V12\Omega}{12\Omega} I12\Omega = \frac{6.54V}{12\Omega} I12\Omega = 0.545A$

11. (a) Because rolling friction is less that sliding friction……$03marks$



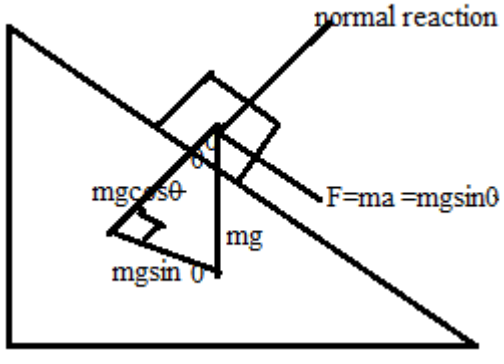
11.

$forcethattendtoliftthebox = 200NxSin\,30 = 200Nx\,0.5 = 100N$……$(03m$

$forcethattendtopulltheboxforward = 200NCos\,30 = 200Nx\,0.866 = 173.2N$…$(03marks)$

11. (b)

$If no friction then Fa = ma = mgSin\theta$



$a = gSin\theta, \quad a = 10\frac{m}{s2} xSin30 = 5\frac{m}{s2}$

$from third equation of motion,\ v2 = u2 - 2aS, \quad V2 = 2x5\frac{m}{s2} x10mV = 10\frac{m}{s}$

$from the first equation of motion,\ v = u + at then t = \frac{v}{a} t = \frac{10m/s}{5m/s2}$

$therefore it will takes\ 2s to move down the inclined plane$…… $(06marks)$