WAKISSHA JOINT MOCK EXAMINATIONS
MARKING GUIDE
Uganda Certificate of Education
PHYSICS 535/2
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Qn.	Scoring point	Notes	Mark
1(a)	Uniform velocity is the constant rate of change of displacement *is when the displacement of a body changes in equal amounts in* **While** *equal time intervals.*	With/without word time you mark	01
	Uniform acceleration is the constant rate of change of velocity		01
b(i)	The motorist initially moves with a constant velocity of 40ms^{-1} for 5s. Then moves with a uniform acceleration to 80ms^{-1} for 10s. Then the motorist maintains a velocity of 80ms^{-1} for 15s. The motorist then decelerates uniformly to rest for 5s	− Identifying u=40m/s ⋆ Velocity, time ⋆type of motions should be catered for.	05
(ii)	Distance = LW + ½h (a+b) + LW + ½bh = 5 X 40 + ½ X 10 (40 + 80) + (15 X 80) + (½ X 5 X 80) = 200 + ¼ X 10 X 1200 + 1200 + 200 ✓ = 2,200m	2200 m² 1200 m ✗ − wrong answer correct units ✗	04
(c)	~~The passenger in the car jerks forward. The passenger in the moving car is in a state of motion.~~ moves When the car stops suddenly, the part of the body in contact with the seat comes to rest but the upper part of his body continues to move with the same velocity due to inertia and hence jerks forward. due to inertia.	− Jerks forward ✓ −due to Inertia ✓ − Related content to inertia ✓	03
(d)	- Rocket engine − Explosion of a bomb - Jet engine − Firing a bullet from a - Fireworks display gun - Lawn sprinkler − Boat rowing 02	any 2 (1st two)	02
2 (a) (i)	Pressure – force acting normally per unit area. - pascals (Pa), Nm^{-2} 02	Reject cross section area/ surface area.	
(ii)	~~Area of contact is small so pressure is greater at narrow section; area of contact is large at wide section so pressure is low hence flow is slower;~~ while for a wider section, there is a decrease in pressure	At the narrow section of the river, the speed of water increase there is a decrease in pressure hence flows highly speed narrow than wider end	
(b)	$h_k \vartheta_k g = h_w \vartheta_w g$ ✓ $w\vartheta_k \times 10 = 8 \times 1000 \times 10$ $\vartheta_k = \dfrac{80000}{100}$ $\vartheta_k = 800$kgm^{-3} ✓ 03	If its g/cc Mark it.	

$V \propto \dfrac{1}{A}$ ✓
$V \propto \dfrac{1}{P}$ ✓

(c)	A floating body displaces its own weight of fluid where it floats.	— Key word is weight.	01
(d)	Mass of wood = mass of water displaced "Archimedes" $v \times d_w = v_w \times d_w$ $0.01 \times d_w = \frac{3}{4} \times 0.01 \times 1000$ $d_{wood} = 0.75 \times 1000$ $= 750 \ kgm^{-3}$ $U = W_L$ $U = \rho V g$ $U = 1000 \times \frac{3}{4} \times 0.01 \times 10$ $U = 75N.$ Law of floatation $U = mg$ $M_s = 7.5 Kg$ $\frac{75}{10} = M_s$ $\rho_s = \frac{m_s}{V_s} = \frac{7.5}{0.01} = 750 kg/m^3$		03
(f)	- Weigh solid in air and records its weight W_1 - Weigh the solid while in water and record of W_2. . Obtain the up thrust in water $W_1 - W_2$ - Obtain the density of solid from $\rho_s = \left(\dfrac{W_1}{W_1-W_2}\right) \times \rho_w$ But $R_D = \dfrac{\rho_s}{\rho_w}$ or where - ρ_w is density of water	- can measure - Mass / weight or	04
3(a)(i)	Power of lens is the reciprocal of the focal length in metres;		01
(ii)	Focal length is the distance between the optical centre and principal focus;	Reject pole for optical centre.	01

(b)(i)	
	
	Image formed - virtual ✓
	         - upright ✓
	         - magnified ✓
		If the diagram is wrong, dont mark the properties	— here should be specified
			⇒ If contradicting properties are given, dont mark any
			e.g virtual ∧
			Real ∧
				03

(ii)	Power of lens $= \dfrac{1}{f} = \dfrac{1}{-0.20} = -5D$		02
(c)	$Sin\ I = n_g\ Sin\ r$ $n_g\ Sin\ C = 1$ $n_g = \dfrac{1}{sin\ 42^\circ} = 1.494$ ∴ $Sin\ i = 1.494\ Sin\ 18^0$ $i = 27.5^0$	$n_g = \dfrac{1}{sin\ C} = \dfrac{1}{Sin\ 42}$ $n_g = 1.494$ using $n_g = \dfrac{sin\ i}{sin\ r}$ $1.494 = \dfrac{sin\ i}{Sin\ 18^\circ}$	$i = Sin^{-1}(1.494\ sin\ 18)$. $i = 27.5^\circ$	05
(d)(i)	Black board is black which absorbs all light white chalk reflects all the light making the writings in white chalk background making it easy to read;		02
(ii)	Concave mirror forms inverted and upright images which are from a small field of view;		02

4(a) (i)	Period is the time taken by a wave to make a complete cycle			01
(ii)	Wave length is the distance between two successive crests or troughs			01
(b) (i)	$V = f\lambda$ $= 800 \times \dfrac{20}{100} \times 2$ $= 2 \times 160 ms^{-1}$ $= 320 ms^{-1}$	$\lambda = 2L$ $\lambda = 2(0.2) = 0.4$ $V = f\lambda$ $= 800 \times 0.4$ $= 320 m/s$	Г	02
(ii)	Temperature of air ⊬ Humidity Density of air ✗ wind	✗First two		02
(c)	- An electric bell is placed in a bell jar connected to a vacuum pump. - When the bell is switched on, a loud sound is heard - When the air gradually removed from the jar loudness of sound reduces gradually until no sound is heard though the hammer is seen hitting the gong. - Sound requires a material medium for propagation	-If only diagram drawn, give (1 mk) correctly leballed		05
(d) (i)	Diffraction is the bending and spreading of waves when they pass through an opening			01
(ii)	Narrow shit 02	— Pattern ① @ —Direction 1 @		02
	Wide shit 02			02
5(a) (i)	Emf is the p.d across a cell in an open circuit - Work done in Joules	-Ratio of power generated to the current it delivers		01
(ii)		-Terminal pd of the cell when it is not supplying any cyrent. Electron @ ½		02
(iii)	- Use of a depolarizer e.g manganese dioxide or potassium dichromate which oxidizes the hydrogen gas to form water and so removes hydrogen bubbles. - By brushing or clearing of the plate surface regulary to remove the Hydrogen bubbles	-Depolarizer OR -using KCl_4		02

(b)(i)	Bulb R ✓			01
(ii)	$A_3 = 1.5 + 2.0 = 3.5A$ ✓ Effective current in a parallel combination is the total of currents in different branches of the circuit	**02**		02
(c)(i)	Resistance $R_{pq} = 2 + 3 = 5\Omega$ Resistance in parallel $= \dfrac{5 \times 5}{5+5} = 2.5\Omega$ **03** Total resistance $12 = 2.5 + 10 = 12.5\Omega$	$R = \left(\dfrac{(2+3)\,7.5}{(2+3)+5}\right) + 10$ $= \dfrac{25}{10} + 10$ $R = 12.5$ ✓	**03**	03
(ii)	Power $P = I^2 R = 3.5^2 \times 12.5 = 153.125W$ **03**		03
(d)	So that the effective resistance is low and a failure of current flow in one branch will not affect the other — Appliances can work independently. **02** branches. — Appliances receive same main P.d's from the supply ✓	**02**

6(a)	**Cathode rays**	**Gamma rays**			
(i)	- Negatively charges - Fast moving electrons - Less penetrative - More ionizing - Massive "Have mass"	- carries no charge - electromagnetic in nature - more penetrative - Less ionizing **02** - Have no mass		Any two	02
(ii)	$^{160}_{170}Co \rightarrow\ ^4_2He + 2\ ^0_{-1}e + ^{156}_{70}Y + \gamma \text{-rays}$ ✓ **02**		$\begin{array}{l} 15k \\ 70 \\ EQ2 \end{array}$ ✓	
b) (i)	 - Cathode is heated using low voltage supply. - Cathode emits electrons by thermionic emission. - Electrons are accelerated towards anode by high voltage. **03** - When cathode rays strike the target, much of K.e is converted into heat and the rest into X-rays		-Well labelled diagram (any 4 lebbeled parts) -working diagram	05
(ii)	**Mechanical use** - Sterilizing medical equipment ✓① - Photography of broken bone ✓① - Detection of T.B. - Treatment of cancer **Industrial Use:** - Defecting hidden flaws ✓① - Crystallography - Detection of forgery in art pieces		Dont mark — Treatment of TB, Xrays detect. detect.	01 01

(c)	Alpha particle is deflected as per Fleming's rule in magnetic field faster than beta particles	- Different ratio - Different mass	01
(d)	- Focuses and accelerates electrons — electron gun - Deflects electrons vertically or horizontally — deflecting system - Forms electrons on screen or bright spot on screen	—mark even when not stated	03
7(a) (i)	Is a region around a magnet where its magnetic is experienced. area ①		01
(ii)	- A thin cardboard is put on a magnet whose magnetic field is required - Iron fillings are then gently sprinkled over the board. - On tapping the board. The fillings arrange themselves along the field lines	04	04
(b) (i)	Current magnetizes the core which induces magnetism in the tape	02	02
(ii)	Iron is a soft magnetic material - easily magnetized/ demagnetized - strongly magnetized can allow iron oxide as a soft magnetic material		02

(c)
(i)
	Output power = 20 x 10 x 200w
	Power input – IpVp = 1 x 240
	         = 240W
	
	Efficiency = $\frac{\text{power output}}{\text{power in put}}$ x 100
	
	    = $\frac{200}{240}$ x 100% = 83.3%
		$\eta = \left(\frac{20 \times 10}{1 \times 240}\right) \times 100\%$ = 83.3%	05

(ii)	Causes of power loses - Hysteresis (magnetic reversals) - Resistance of windings - Eddy currents - Flux leakage		02
8(a) (i)	A notch is a crack or weak point in a material ①		01
(ii)	- Helps in tearing pieces of clothes of clothes, papers - Helps in breaking glass, firewood , Eases contraction & expansions	1st answer .	01
(iii).	- Nature of the material — Length, shape - Thickness of the material size, diameter	- force applied rejected .	02
(b) (i)	Temperature is a number that expresses the degree of hotness or coldness of an object on a chosen scale	key words → hotness/coldness .	01
(ii)	Specific heat capacity is the quantity of heat required to raise the temperature of 1kg mass of a substance by 1 kelvin.		01
(c) (i)	Flask A which is black absorbs more heat than flask B. The length of ether coloumn in flask A lowers	whereas that of flask B rises	01
(ii)	This is because air in flask A expands more than air in B hence the other on the left lowers and that on the right rises		03

(d)(i)	- As temperature reduces, kinetic energy of particles reduce and slowdown - Particles come closer and volume reduces - As temperature reduces further, appoint is reached when the particles have a theoretical zero volume is observed. Hence absolute temperature	03
(ii)	$10 \times (70 - \theta) \times 450 = 20 \times 4200 \times (\theta + 10)$ $45 (70 - \theta) = 840 (\theta - 10)$ $\theta = 13.05^\circ d$	03

END

Fraction $= \dfrac{\text{Volume of solid in liquid}}{\text{Total volume of solid}}$

$= \dfrac{M_s/\rho_L}{M_s/\rho_s}$

$= \dfrac{\rho_s}{\rho_L}$

$\dfrac{3}{4} = \dfrac{\rho_s}{\rho_L}$

$\dfrac{3}{4} = \dfrac{\rho_s}{(1000)}$

$\therefore \rho_s = \dfrac{3}{4} \times 1000 = 750 \, kg/m^3$

*Both are oppositely charged and hence the direction of magnetic force exerted according to flemings left hand rule.