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UGANDA TEACHERS' EXAMINATIONS SCHEME

Uganda Certificate of Education

JOINT MOCK EXAMINATIONS 2024

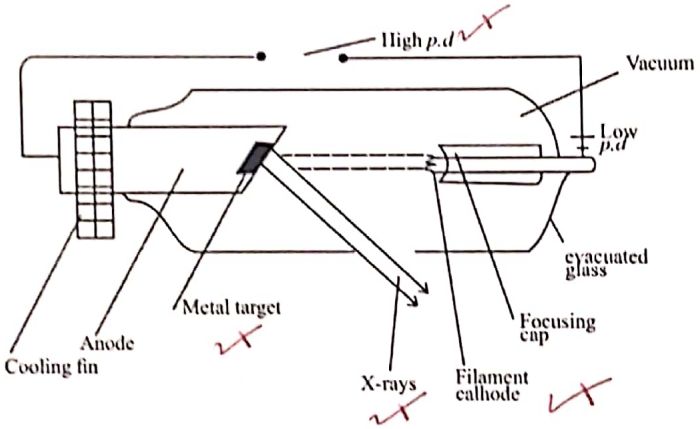
PHYSICS

Paper 1

SCORING GRIDE

ITEM	RESPONSES(S)		SCO
	SECTION A		
ONE	Ultra- sound waves.	R = 01	R_1
(a)	Practical use to man include:-	≥ 3 Any three	03
	- Measuring depth of water bodies .	= 2	02
	- Used to create images of internal	= 1	01
	- Organs and tissues for study.	= 0	00
	- To monitor fetal growth and development.	R = 03	R_3
	- Inspect materials and detect defects or flaws.		
	- Used in purifications of large water bodies.		
	- Detecting shoals of fish		
	- Cleaning delicate equipments		
	- Detecting rocks in water.		
	- Food processing and Inspection		
	- Material characterization e.g thickness and elasticity.		
	- Measure flow rates in industries.		
	- Beauty treatments e.g skin tightening.		

	- Dental cleaning - Research and development e.g Animal behaviour and monitoring current of oceans.		
(b)	- Maintain a safe distance from ultra sound source. - Shielding using high sound absorption / reflection properties. (acoustic foam) - Place a physical barrier (wall) between source and area. - Use sound absorbing materials. - Reduce sound emissions. - Practice frequence selection appropriate. - Use personal protective equipment (PPE) - Practice alternative technologies that avoids such waves.	≥ 3 =02 =01 = 04 Any four	03 02 01 R_4
(c) (i)	Concave mirror since it has ability to magnify images unlike plane or convex mirror.	-Type of mirror. - reason = 04	02 R_1 PP_3
(ii)	Magnification $= \frac{image\ distance}{object\ distance}$ $2 = \frac{60}{u}$ $\therefore u = 30cm$ from metal being cut	- rotation - correct value + unit = 04	02 C_4
			10
ITEM 2. (a)	Scientific roles should support use of x – rays.	≥ 2	02

	- Cancer treatment - Studying the structure of materials (crystals) - Security screening e.g Airports, - Dental imaging - Bone fracture view - Detecting faults in welded joints. - T.B diagnosis - Food preservation	=01 = 0 = 03 R Any three	01 00 R_3
(b)	 Mode of operation: Low p.d heats cathode, elections produced, with help of focusing cap they are directed to anode. High p.d at ~~the~~ across the cathode and the anode accelerates electrons that hit ~~L~~orget. the tungsten target	Any four ports each ½ = 02 D Set up = 04 operation result. PP	02 ½ D02 01 01 03 01

Most of the energy

	Much of ice of electrons is changed to heat, fins absorb it and dissipate to surroundings. Rest of k.e of electrons is converted to x-rays for scientific use.	PPoint	
(c)	Out of bounds signal of side effects due to x-rays like:- - Cause cancer cases - Cause deep burn inside body - Cause genetic mutations. - Destroy body cells. - Lead to loss of eye sights if exposed in excess. - Cause skin loss - Cause hair loss - High radiation level cause bleeding	Any two three response. ≥2 = 1 = 0 = 03 SE ~~SE~~	02 02 01 00 R03 SE03
(d)	Precautions include:- - Lead shielding e.g lead aprons, gloves. - Limit exposure time. - Use right type soft or hard at need. - Wear personal protective equipment (PPE) - Pregnancy precautions (Avoid) - Children safety (apply shields to young) - Follow x-ray safely.	Any ~~two~~ four response ≥ 2 = 01 = 0 = 04 R	02 02 01 00 R04
			16
ITEM 3.	- Eid adhua is celebrated as sighting the moon's cresent. - This occurred on Monday not on Tuesday as it had been ~~cause~~: because	Logical flow	03

	- As the Earth rotates around its axis, the moon also moves around the earth. As result, rays from sun are blocked ~~four~~ by the moon. - Being non-luminous, moon cannot be seen when on earth. - eventually as moon continues to move around earth, a section of moon (cresent) emerges out of earth's shadow, receives rays from sun thus visible.	=05	PP05
10 hrs	- Jupiter is far away from sun. - Jupiter is massive / big/ heavy. - Due to ~~for~~ far distance of Jupiter from sun, locus requires more years to complete its revolution round sun (12 years). - Due to earth's nearness to sun, its locus is small so it requires less time to complete its revolution round sun (1 year). - Jupiters ~~for~~ far distance from sun, ~~sun~~ thus spins at high speed thus short time to move round its axis (10hrs) while earth's near distance to sun, leads to strong attractive force thus spins at low speed thus long time (24 hrs) to move round its axis. - Earth is smaller / light/ less massive thus difference from Jupiter. **On case of shooting star:-** - Small in size and its above the atmosphere. - Cool and break off to enter earth's atmosphere.	=03 =03	PP3 PP2

Jupiter's force

Lunar system (95 known moons)

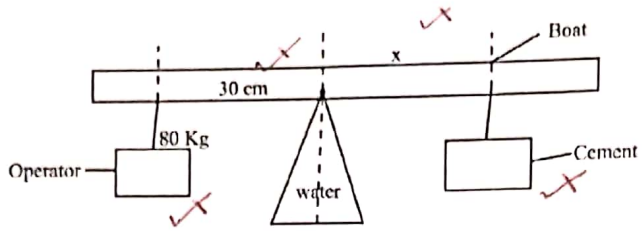
Jupiter has a strong gravitational pull and a massive size allowing to capture and hold onto smaller objects like moons.

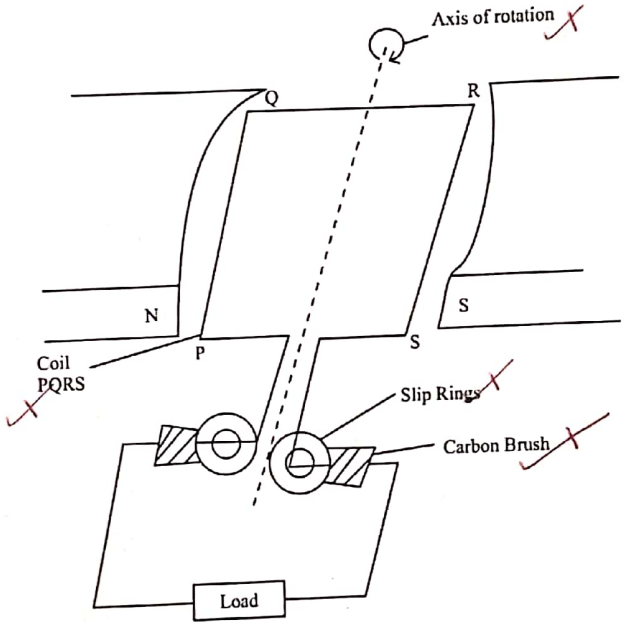
=03 PP03

	• At high speed. - Friction occurs as they fall, generates heat, temperature raises it to ignition point, resulting into a glow. - As it falls from one level to another glow produces a bright light. - It lasts for a few seconds to viewers sight since its falling. - As it falls, it disappears from viewers sight.	= 02	PP02
			~~09~~ 06
ITEM 4(a)	Ways of accelerating process of making tea:- - Nature of inside surface must be smooth/ polished / silvered. - Temperature of heat source be high. - Initial temperature of water be high. - Water quality (impurities) - Altitude be low. - Increase pressure by covering on. - Material of container (conductor) - Uniform stirring - Latent heat of vaporization be low.	Any five ≥ 3 =2 = 1 = 0 = 05	03 02 01 00 R05
(b)	Total quantity of heat = quantity of heat to raise + heat to causing boiling to B.p temp $Q = MC\theta + MLV$	≥ 3 = 2 = 1 = 0	03 02 01 00

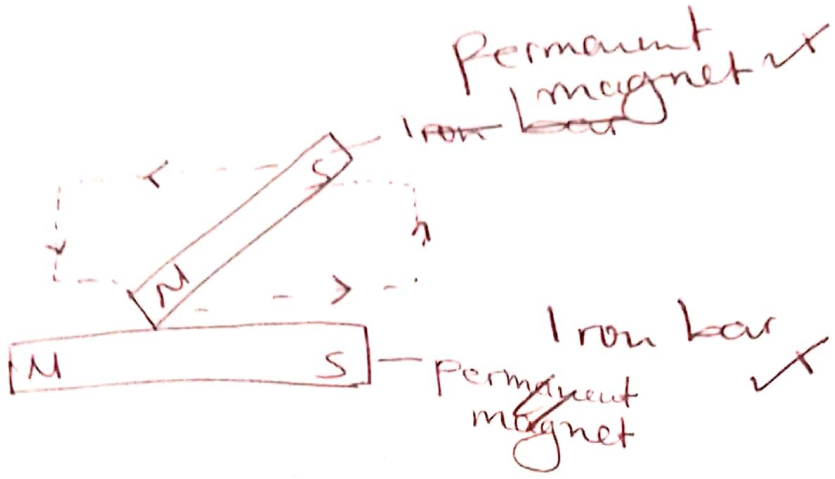
	$Q = \left[\frac{4}{1000000} x\ 1000\ x\ 4200\ x\ (100 - 15\right] + \left[\frac{4}{1000000} x\ 1000\ x\ 2260000\right]$ $= 1,428J + 9040J$ $= 9,041,428J\ (90414.28KJ)$ $= 10468J.$ Conclusion	Formula substitution correct value + unit + conclusion = 04	C_{04}
(c)	Practical role of wooden handle is to help in transferring of metallic container. This because wood is bad poor conductor of heat and this minimizers the burning effect to their user.	≥ 2 = 1 = 0 = 04	02 01 00 PP_{04}
(d)	I recommend clay cup for use because:- - Of traditional beliefs as for centuries have been in use. - Its more comfortable to hold since its poor conductor of heat. - They are flavor preservative since clay is non-reactive. - Clay-cup control temperature as clay is good at retaining heat well, thus tea remain worm for some time.	≥ 2 = 01 = 00 = 03	02 01 00 R_{01} PP_{02}
			~~10~~ 16
ITEM 5 (a)			

(b) Law of floatation / Archimedes principle
Any one law stated & illustrated
=03
R03

	 At equilibrium. Clock wise moments = Ant clockwise moments Mg x h distance = mg x h distance from centre. 100 x 50 x 10 x x = 80 x 10 x 30 $50000x$ = 24000. $X = \frac{24}{50} = 0.48$cm. = (0.0048m)	≥ 3 = 2 =02 = 1 = 0 - Formula - Substitution - Correct value + unit =03	03 02 01 00 R10 C03
(c)	Let h = depth of boat before floating. Using law of floatation:- Weight of fluid displaced = weight of boat displaced. Mg = mg (down word force) V x ϱ x = mass of boat + cement. C.A x depth x density x 9 = [80 + (100 x 50)] 10 200 x h x 1000 x 10 = 50800 2000000h = 50800 h = 0.0254m 2.54cm	≥ 3 = 2 = 1 - Formula - Substitution - Correct + unit + conclusion =05	03 02 01 C05
(d)	The boat is not safe because the departure time is associated with intensive heating from sun, this raises the temperature of water, decreasing the density of water and	≥2 = 1 = 0	02 01 00

	as result the upthrust (supporting) force weakens creating high chances of the boat to sink leading to drowning.	- Option Yes/No - (Reason + effect) =03	PP03 16
ITEM 6 (a)	p.e ⟶ K.e ⟶ electrical energy OR m.e ⟶ electrical energy	= 2 = 1 =03	02 01 R03
(b)		Any four pots each ½ =02 Workable diagram	01 D02
	Mode of production using above method:- - When water drops fall on the water wheel, water wheel is driven.	Effect out put	01

	- Rotation of wheel is transmitted to axis of rotation of generator coil. - Coil in process rotates in space between bar magnets thus crossing filed lines, cause change in magnetic field. - Change in magnetic field produces an induced voltage. - Induced voltage generates an induced current as required.	= 04	01 PP04
(c)	Current required (out put for iron) to operate iron , I, = $\frac{power}{p.d} = \frac{60}{200} = 0.3A$ OR Total power = IV $= 10 \times 120,000$ $= 1,200,000 W$ Current input = 10A Power out put $= I^2R$ $= 10^2 \times 3$ $= 300 W$ Hence current input is greater than current required by iron, thus its on effective method to operate the Iron.	In-put value out-put value conclusion = 04	01 01 01 C04
(d)	Scientific ways include:- - Increase speed of rotation of coil. - Increase on number of turns in coil. - Increase on size of dam water - Increase on size / strength of magnet. - Improve on cooling system of to increase power out put	≥ 2 = 1 = 0 Any three responses 03	01 01 01 R03
			10 16
ITEM 7. (a)			



=01 D01

- Iron bar is made to rest on a hard surface.
- A know pole of bar magnet is used to stroke iron bar from one end.
- At end of each stroke, bar magnet is lifted high above the Iron bar.
- Above steps are repeated several times.
- On test, iron bar is found magnetized.
- Required poles are opposite to that of bar magnet resting above it at end of process.

- Set up 01
- Effect 01
- Wet come 01

=03 PP03

Iron bar magnet	Steel bar magnet
- Easy to magnetize.	- Difficult to demagnetize.
- Easy to demagnetize	- Difficult to demagnetize
- Retains magnetism for short period	- Retain magnetism for long period.
- Used to make temporary magnet.	- Used to make permanent magnet.

Any five
≥ 2
= 1 01
= 0 00

05 P05

Experiment can also be used

	Has varying field - Has constant field		
(c)	- Increase on number of turns in coil - Increase on strength of magnets. - Increase on quantity of electricity used to run motor.	≥ 2 Any three = 1 = 0 03	02 01 00 RB
(d)	1 day = 24hrs 1 tonne = 1000kg of maize But 100kg = 10 KW 1000kg = $\frac{10}{100}$ x 1000 = 100KW needed to mill Hence: Cost = Total x total x unit cost Power time Cost = 100 x 24 x 700/= Cost = 1,680,000/=	= 04 Formula Substitution Correct + unit value + conclusion	04 01 01 01
			10 16

R - Relevance (outline point)
PP - Process production
S & - Side effects

END