SESEMAT MUKONO REGION

UGANDA LOWER SECONDARY CERTIFICATE OF EDUCATION
COMPETENCY BASED CURRICULUM

S.3 PHYSICS END OF YEAR ASSESSMENT - 2023

No	Scoring Points	Notes/Comments	Mark
1	**Over-loading** - This means exceeding the recommended capacity of the bus. A vehicle is overloaded if it exceeds the weight limits displayed on either the manufacturers' or ministry regulations. - Overloading makes the vehicle have a large momentum and difficult to stop when it is moving. The stopping time increases. - It affects the stability of the bus because it raises the centre of gravity making the bus unstable and can easily topple when negotiating bends along the road. - Overloading damages roads in the shortest time due to high pressure exerted on the roads. - Overloading may damage the springs by causing permanent (plastic) deformation. - Overloading may deform some parts of the vehicle to breaking point. - Overloading increases fuel consumption of vehicles.		8 Scores
	Standing of players in the moving bus – Obstructs the driver's view and concentration which may lead to accidents. – Standing also raises the centre of gravity of the bus, making the bus unsatble. – In case the bus suddenly stops, the passengers can jerk forward hence causing body injuries.		3 Scores

Over speeding - Increases momentum of the bus making it difficult to stop and causing collisions with other automobiles or toppling (overturning). - It also makes the bus unstable when negotiating bends along the road. - It increases stopping distance, especially on slippery ground. The bus may not stop in the required distance; it stops at a further point. - Over speeding causes bursting of tyres due to high friction. - High fuel consumption.		5 Scores
Unfastened seat belts – Makes people in the bus to jerk forward hence injuring each other due to inertia when the bus suddenly stops.		2 Scores
Worn out tyres – Minimise friction that is necessary for braking or for moving forward, especially on slippery ground. They may easily burst and cause fatal accidents and loss of lives.		2 Scores
		20 Scores

(a) Slow flow of water is due to decreasing water pressure. This is because there is continuous decrease of depth of water as it flows out of the tank. So as the depth reduces, the pressure reduces too. | | 2 Scores

b (i)

Materials	Reason for their choice		
Steel pipes/ Bars	- Steel is an alloy made from iron and carbon. - Steel is stiff, ductile - Steel is elastic. It can regain former shape and size when deforming force is removed. It is strong in tension and compression - Steel is used to build girders (struts and ties) for the stand. - Struts are strong in compression, while ties are strong under tension. - Steel pipes are hollow to minimise the weight, some of the girders in the stand are struts and the others are ties. - Steel cannot easily be corroded due to rusting - It can be painted to give the stand a better outlook and prevent rusting much more		4 Scores
Bricks	They are strong under compression, especially when they have been first burnt in fire. They are resistant to fire		2 Scores
Mortar	It is a mixture of sand, cement and water. It is adhesive. Used to join bricks together		2 Scores
Concrete	- Concrete is a mixture of cement, sand, gravel and water - It is stiff, brittle and strong and can withstand compressional and tensional forces. - It is dense and this will lower the centre of gravity making the stand more stable - It is fire resistant, weather resistant, durable and cheap in the long run		2 Scores
Wood / timber	It is a poor conductor of heat, easily replaced, strong and can be used to make different shapes/structures		2 Scores

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the materials should be assembled;

The steel pipes/beams are assembled to form some of the girders in the tand (struts and ties)

BJ. 3

- The bricks are well laid/assembled with mortar, to form pillars for the tank stand. — 1
- The stand is made wider at the base to make it more stable. — 1
- The base of the stand is made with concrete since concrete is dense and this will lower the centre of gravity making the stand more stable.
- Concrete is made by mixing sand cement, gravel and water proportionately. — 2
- The wet concrete is poured over stretched steel rods to form reinforced concrete that is stronger under both compression and tension.
- Wood is used to support reinforced concrete as it cures at the base of the tank.
- The height of the tank should be considered during construction as shown below:

  Pressure, $P = hpg$

  Height of the tank, $h = \frac{P}{gp}$

  Height of the tank, $h = \frac{50000}{10 \times 1000} = 5m$ — 2

So, the tank should be constructed with a height of 5m in order to hold water that will produce the required minimum pressure.

6 Scores

20 Scores

3 The device was a magnet. Banging the magnet made it lose its magnetic strength. It got demagnetized. — 1

Explanation:
A magnet is made up of very tiny magnets (called dipoles), with their North poles pointing in the same direction.
In a magnetized state, the dipoles face in the same direction. However, when the magnet is banged several times on a hard surface like a table, its dipoles get disorganized and point in different directions; the north pole of one dipole neutralizes the south pole of the other. Eventually the magnet loses its magnetic force/strength. — 3

4 Scores

The repairer needs to make a magnet for picking the screws which fall on the ground. This is because a magnet attracts screws that are magnetic.

materials

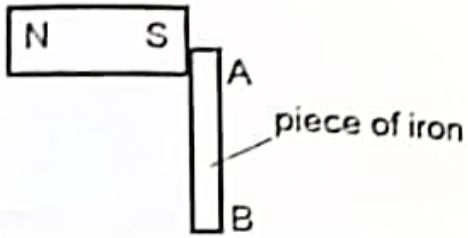
He can make his own magnet by using the induction method, stroking method or electrical method.

4 Scores

Using the induction method

- This can be done by first getting a magnet from a radio loud speaker from the radio he is repairing.

Illustration:



to any method

- A piece of iron is placed in contact with the permanent magnet on the radio speaker.
- This piece of iron acquires temporary magnetism and attracts the screws
- The part of the iron A in contact with the pole of the magnet is has an opposite pole induced on it and the other end gets a similar pole.

4 Scores

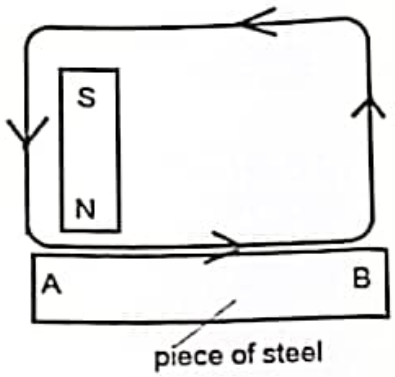
Using the stroking method

- The second magnet can be made by stroking a piece of steel with the first magnet.

A piece of steel is continuously stroked from one end to the other with one pole of a magnet. The piece of steel gets magnetized with the end A where the stroke begins getting a similar pole and the end B where the stroke ends getting an opposite pole to the one used for stroking.

P5.5

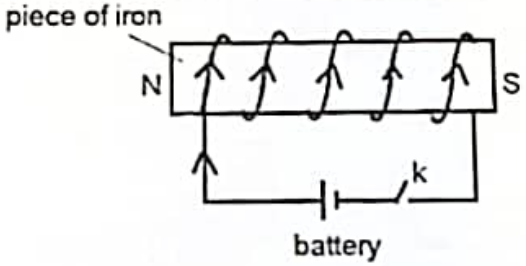
14.1



Using the electrical method

- If there is no permanent magnet available the repairer may magnetize a piece of steel by coiling an insulated wire around the piece of steel and connecting the coil to a battery (d c supply).

4 Scores



When the switch is closed current flows in the coil. The piece of iron gets magnetized. The side of the iron where current is clockwise gets a North pole and the side of the iron where current is anticlockwise gets a South pole.

4 Scores

20 Scores

I . C.

4	**a) Differences in weather and in seasons** The earth is one of the planets. Planets move around the sun in elliptical orbits. This motion causes seasons. Japan is in the northern hemisphere of the earth, where four seasons are experienced, that is to say winter, spring, summer and autumn. Since in japan there was snow may by the season was winter. Uganda is in the equatorial region of the earth where there are two main seasons, that is to say the wet season and the dry season. Since it was raining much it must have been the wet season.		**10 Scores**
	b) Differences in times of the day, existence of day & night time Rotation (spinning) of the earth on its axis causes time of the day, day and night The part of the earth that faces the sun at any time experiences day time and the part that faces away from the sun experiences night time. The earth is an opaque object therefore the side of the earth facing away from the is blocked from the sun light and is in a shadow. This takes place gradually in about 24 hours, through dawn, day, dusk and night. There is a difference in time of the day at different points on the earth depending on their longitude Given that japan is east of Uganda, their time is ahead of the time in Uganda. That is why where as in Uganda it was 2.00pm, which is day time in Japan it was 8.00pm, which is night time.		**10 Scores**
			20 Scores

B.7