**PHYSICS 1 2016 - NECTA FORM FOUR**

Solutions from: Maktaba by TETEA

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1.

| i | ii | iii | iv | v | vi | Vii | viii | ix | X |
|---|---|---|---|---|---|---|---|---|---|
| C | A | D | B | D | E | E | E | D | E |

2.

| i | ii | iii | iv | v | vi | vii | viii | ix | X |
|---|---|---|---|---|---|---|---|---|---|
| C | N | L | D | E | F | A | I | J | K |

3.

i. Transverse waves
ii. Resistance
iii. Third class level
iv. A magnet
v. Neutral
vi. Emf
vii. Momentum
viii. Thermostat
ix. Transformation series
x. Conduction

4. (a) (i)The turning effect of force is the product of force and the perpendicular distance from the line of action of force.SI unit is NM

(ii)The moment of force can be increased by increasing the distance of the force from the pivot.

(b) (i)Factors affecting the stability of the body are;

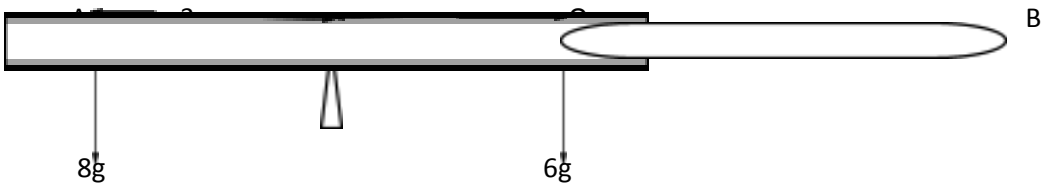
-vertical position of its center of gravity above ground level.

-size of its base relatively to its body.

(ii)The handle of the door is near the outside edge in order to increase the turning effect of the force applied to open or close the door.

(c) (i) A balanced beam is a solid beam supported on a pivot such that there is no resultant force on it or resultant moment about any point.

(ii)




From clockwise moments = anticlockwise moment

6 x  x = 8 x 3

X= 4 cm

AO = x + 3 = 4 + 3 = 7 cm

But AB = 2 x OA = 2 x 7 = 14

The length AB is 14 cm.

5. (a) (i) The law of inertia states that a body will continue to remain on its state of rest or uniform motion unless an external force is applied to it.

(ii)Force is the pull or push of an object.

(b) (i) number of dots = frequency x time

= 25 x 5

= 125 dots.

(ii) the tape represents the linear motion.

(c) (i) From, recoil momentum = muzzle momentum

7000 x recoil velocity = 30 x 600

Recoil velocity is 2.57 m/s

(ii)The answer implies that the heavy mass of the gun ensures that the gun only moves slightly when the shell is emitted.

6. (a) (i)Light spectrum is a band of light waves of different frequency obtained when light is dispersed.

Dispersion of light is the spreading out of the different waves in white light that occurs when light travels from a dense to light medium.

(ii)When light enters an equilateral glass prism light bends towards the normal since the glass prism is denser than air. But different waves that make up white light are bent at different refracted angles with the waves shorter wavelength bent more than those of the longer wavelength. As a result, when the waves emerge from the other side of the prism, they are dispersed in such a manner that light of shorter wavelength violet is closer to the bottom side of the prism.

7. (a) (i) A bimetallic strip is a device consisting of two metal rods of different linear expansivity riveted together and so can bend when heated at different temperatures at different rates.

(ii)Linear expansivity is the fractional increase in length of the material per 1K.

(b) (i)It is because the blade is good conductor of heat than wood hence it conducts heat from the hand whereby leaving the hand cold.

(ii) It is because, due to high heat capacity of water under the same heat condition land becomes hotter than sea. When the land is hot, the air above it becomes hot and light and rise up in the atmosphere and so become replaced by cooler air from sea which due o its lighter density exerts pressure towards the land.

(c) (i)Latent heat of fusion is the amount of heat required to change the solid state of ice to liquid.

(ii) consider heat gained by copper,

Heat gained by copper = MCT

$= 0.68 \times 390 \times (50 - 0) = 13260$ J …….. (i)

Latent heat of fusion of water = mass x L = mass x $3.35 \times 10^5$ ……..(ii)

Equating the two equations, mass = 39.6g

Mass of ice formed is 39.6g

8. (a) (i) Primary cells are cells that produce electricity as a result of irreversible chmical reactions taking place in them. Example Daniel cell.

Secondary cells are the cells that produce electricity as a result of reversible chemical reactions taking place in them. example accumulators.

(ii) Defects of a simple cell

- Formation of hydrogen bubbles on zinc plates due to presence of impurities in zinc.
- Formation of hydrogen bubbles on the copper plate.

(b) (i)Lead acid accumulators are used due to;

-they produce high current

-they are rechargeable

(ii) current = 1/5 = 0.2 A

Emf = 1v + Ir

= 1v + (0.2 x 2)

Emf = 1.4 V

(c) (i) Multimeters and live-mains indicator

(ii)In order to reduce the power loss in form of heat.

9. (a) (i)Zodiacal light is the faint diffuse and roughly triangular white glow visible in the night sky extending from near the sun.

(ii)uses of earth satellite

-the moon leads to ocean tides

-man-made satellites help to reflect radio waves used for communication and so facilitate communication between different parts of the earth.

(b) (i)Jovian planets are the name given to the four biggest planets in the solar system and whose surfaces are not solid but gas. These are Jupiter, Saturn, Uranus and Neptune

Terrestrial planets are planets whose surfaces are solid. Example mercury, Venus, earth

(c)(i) Morning star is the name given to the planet VENUS as it appears in the east before sunrise.

(ii) the 12 months of the year.

10. (a) (i)A radioactive element is an element whose nucleus naturally disintegrates by emitting sub-atomic particles.

(ii)Instruments used to detect radiations are;

- Geiger Muler tube
- Cloud chamber
- Spark counter
- Gold-leaf electroscope

(b) (i) Q is beta particle because as it is deflected towards the positive plate, hence it is negatively charged.

P is gamma radiation as it is undeflected this implies that it is uncharged.

S is alpha as it is positively charged and hence attracted towards negative plates.

(ii)Radioactive source is kept inside a lead box leaving only a small hole in order to protect people from radiations.

(c) (i) Radio-isotopes are isotopes of an element that are radioactive and so emit nuclear radiations.

(ii)Applications of radio-isotopes;

- To detect leakage in fluid systems such as oil networks.
- To study movement of materials in living things.\

11. (a) (i) A dynamo is used to convert mechanical energy to electric energy.

(ii) Can be converted to dc by replacing the slip rings with commutators and pair of brushes

(b) (i)The emf is induced in a coil as it rotates in a uniform magnetic field because the coil cuts through the magnetic flux.

(ii)It is zero when moves along the magnetic flux.

(c) (i) Split-ring commutators ensure that the polarity of each brush does not change, whereby giving a dc voltage.

(ii) Brushes helps to tap emf generated by the coil and link it to the external circuit for use.