PHYSICS FORM FOUR 2018

PHYSICS 1 2008 - NECTA FORM FOUR

Solutions from: Maktaba by TETEA

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1.

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

2.

i	ii	iii	iv	v	vi	vii	viii	ix	x
A	C	H	B	D	R	L	N	Q	T

3.(a)(i) This means that the ratio between the density of brass and water is 8.5

(ii) density = Mass/volume

Mass =density x volume

= 1 x 500

= 500 g.

(b) Mass =density x volume.

= let volume of gold be x, silver be y

then x + y = 60 ---------- (i)

also 19.3x + 10.5y = 1050 ------ (ii)

On solving, x = 48, y = 12

Mass of gold = 48 x 19.3 =926.4 g

4.(a)(i) -forces must be equal

-forces must be opposite.

(ii) example of couple.

-Steering wheel applied by the car driver.

-Opening and closing of a water tap.

-Winding the spring of an alarm clock.

-Unlocking the locker by using a key.

-Opening and closing of a cap of a water bottle, or jug.

-Turning of a screwdriver.

(b)vertical components = Fsin 30° = 60 x sin 30° = 30N

Horizontal components = F cos. 30° = 60 x cos 30° = 51.96N.

5.(a)(i)This observation is usually attributed to metals having higher thermal conductivity than wood. They extract more heat from your hand than wood in a given time. Therefore, you perceive the metal as being colder than the wood.

(ii)Clinical thermometers consist of a glass tube filled with mercury (Hg). ... So, the expanding mercury will exert pressure on the walls of the glass tube, which would result in breaking the glass and damaging the thermometer. Thus, boiling water should not be used to sterilize clinical thermometers.

(b)Let Temperature rise be TPE = mgh

Heat energy = MCT.

Then, mgh = mct

500 x 25 x 10 = 500 x 130 x T

Temperature rise is 1.9°C

6.(a)(i) Lightning conductor is a metal rod that is placed on a building and connected with the ground below to protect the building from being damaged by lightning.

(ii)The point of the point is to increase the electric field near the point. Small radius curves will have a higher local electric field, eventually creating a localize area where the field is greater than the dielectric strength of the air.

(b) (i)Domestic appliances based on the heating effect of electric...

Electric Iron.

Electric heater.

Electric geyser.

Induction Cooker.

Microwave Oven.

(ii) From, resistivity = (AR)÷ L, but area is common and resistivity, then,

R1 = R2/2

4 x 2 = R2

New resistance is 8 ohms

7.(a)(i)Atomic number is the number of protons in the nucleus of an atom, which is characteristic of a chemical element and determines its place in the periodic table.

(ii)the mass number will remain the same but the atomic number reduced by 1 become 14.

(b)A(o) = 512, t(½)= 3, A(t) = 8 t= ?

From, $A(t) = A(o).(½)^{t/t(½)}$

$8 = 512(½)^{t/3}$

On solving, t = 18 minutes

8.(a)(i)solar system is the the collection of eight planets and their moons in orbit round the sun, together with smaller bodies in the form of asteroids, meteoroids, and comets.

(ii)The gravity of the sun and the planets works together with the inertia to create the orbits and keep them consistent. The gravity pulls the sun and the planets together, while keeping them apart.

(b) (i) a star is a celestial object that emits its own light due to a chemical reaction at its core. A planet is a celestial body that orbits around the star in its solar system and gets its glow from the suns light reflecting from the planets face.

(ii)Comet is An object made mostly of ice and dust, often with a gas halo and tail, that sometimes orbits the sun.Meteor is A meteoroid that enters Earth's atmosphere and burns up.

(c)speed = distance ÷ time

$= 150 \times 10^6 \times 366 \times 24$

$= 1.3176 \times 10^{12}$ km/h

9.(a)(i)Work is the ability to supply force and a change in distance to an object. Energy is the ability to supply or create work.

(ii)At this point, the kinetic energy of the bob changes completely into potential energy. The bob does not oscillate forever. It comes to rest because air resistance resists its motion. The pendulum loses its kinetic energy to overcome this friction and stops after some time.

(b)(i)law of conservation of energy states that the amount of energy is neither created nor destroyed. For example, when you roll a toy car down a ramp and it hits a wall, the energy is transferred from kinetic energy to potential energy.

(ii)a = F÷m = 50 ÷ 10 = 5m/s

From $v^2 = u^2 + 2as$

$20^2 = 10^2 + 2\ (5)s.$

On solving displacement= 30 m

(c)From conservation of linear momentum,

20 x 400 = 80 x v

Velocity is 100 m/s

10.(a)(i) Modern vacuum tubes use thermionic emission, in which the cathode is made of a thin wire filament which is heated by a separate electric current passing through it. The increased random heat motion of the filament knocks electrons out of the surface of the filament, into the evacuated space of the tube.

(ii)A magnetic field will cause a force to act on the electrons which is perpendicular to both their direction of travel and the magnetic field.

(iii)Electrons accelerated to high velocities travel in straight lines through an empty cathode ray tube and strike the glass wall of the tube, causing excited atoms to fluoresce or glow.

(b)(i)Cathode rays have electrons, which are charged particles, so they are deflected by magnetic field. X-rays are made up of photons, which travel at the speed of light.

(ii)Cathode ray tubes and x-ray tubes both are vacuum tubes but work totally differently.

(c)(i)The purpose of the lead apron is to reduce exposure of a hospital patient to x-rays to vital organs that are potentially exposed to ionizing radiation.

(ii)cathode-ray tube is a device that uses a beam of electrons in order to produce an image on a screen. Cathode-ray tubes, also known commonly as CRTs, are widely used in a number of electrical devices such as computer screens, television sets, radar screens, and oscilloscopes used for scientific and medical purposes.

11.(a)(i) transistor is a semiconductor device used to amplify or switch electrical signals and power.

(ii)As the electrons have higher or faster mobility than holes, the conductivity also more. For this reason, NPN transistors are more preferable than PNP transistors because the NPN transistor provides more conductivity.

(b)(i), if we have an input signal of 1 volt and an output of 50 volts, then the gain of the amplifier would be “50”. In other words, the input signal has been increased by a factor of 50.

(ii)It may be due to reason that Base -Emitter junction is forward biased and forward biasing the juncton offers less resistance and Base-collector junction is reverse biased and in reverse biasing the junction offers high resistance.

(c)(i)To remove excess signals

(ii)balance the amount of current coming in.