PHYSICS 1 2015 - NECTA FORM FOUR

Solutions from: Maktaba by TETEA

By Yohana Lazaro

1.

I	ii	iii	iv	v	vi	vii	viii	ix	x
C	C	E	B	D	C	D	A	C	C

2.

i	ii	iii	iv	v	vi	vii	Viii	ix	x
A	F	D	N	E	G	H	M	L	B

3.

i. Velocity
ii. Accommodation
iii. Right hand grip rule
iv. A spark
v. Resistance
vi. Moment
vii. Expansion
viii. Overtones/harmonics
ix. Planets
x. Global warming.

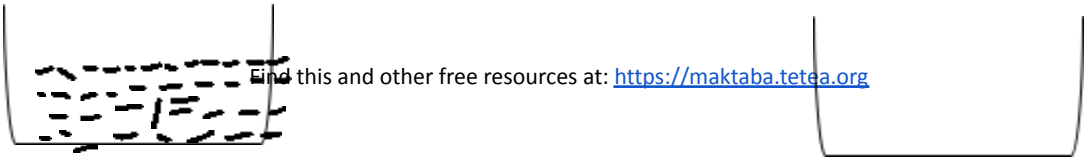
4. (a)Increase in temperature of the liquids make the density to decrease.

(ii)Relative density of spirit = $\frac{apparent\ loss\ in\ weight\ of\ spirit}{apparent\ loss\ in\ weight\ in\ water}$

(b)(i) Archimedes principle states that when the body is partially or totally immersed in fluid will displace its own weight of fluid in which it floats.

(ii) Salty water has higher density than fresh water because of dissolved salt in it. Hence ship will sink deeper in fresh water as has low density than in salty water.

(c)consider figures below



17.7cm^3 18.5 cm^3

(i)since the wood floats,

Mass of wood = mass of displaced water

= density x volume displaced

= 1 x (18.5 – 17.7) = 0.8 g

(ii)volume of wood = mass/density

= 0.8/0.6

= 1.33 cm^3

5. (a)(i) Coefficient of superficial expansion is the fractional increase in area of the material per 1K.

(ii) Anomalous expansion of water is the abnormal behavior of water to expand instead of contracting when its temperature is lowered from 4^{0}C to 0^{0}C.

(b)(i) Latent heat of fusion = mass x spec. latent heat of fusion

= 340 x 336

=114240 J/g

(ii)Latent heat of fusion is the amount of heat required to melt the ice.

(c)from $\alpha = \frac{l - l_0}{L - \Delta T}$

$1.24 \times 10^{-5} = (8.92 - 8.95)/ (8.95\ \Delta T)$

$\Delta T = -270$ K

Then, T = -270 + 20 should be cooled to -250^{0}C

6. (a)(i)

Plane mirror image	Pin hole camera mirror
It is behind the mirror	Formed on screen
Same size as object	It is diminished
It is virtual	It is real
It is upright	It is inverted

(ii)From the magnification formula, moving the pin hole camera closer to the object will increase the height of the image formed.

(b) Rules for locating images formed by curved mirrors

i. A ray passing parallel to the principal axis is reflected through the principal focus.
ii. A light ray passing through the principal focus is reflect parallel to the principal axis
iii. A ray of light through the pole is reflected through the same pole.

7.(a)(i) Internal resistance of a cell is the resistance that a cell and its components poses to the flow of electricity through it.

(ii)A cell is an electrochemical unit that produces electricity due to a chemical change taking place in it.

(b)Disadvantages of Leclanche' cell lead-acid accumulators

i. They cannot produce electricity for long periods
ii. They can produce only small amount of current
iii. They are not rechargeable.

(c) case 1,

$E = I (R + r)$

$E = 3(5 + r)$ …….. (i)

Case 2,

$E = I (R + r)$

E = 0.25(4 + r) …… (ii)

On solving, E = 3V, r = 51 Ω

8. (a) (i)Nuclear fission is the process whereby an unstable nucleus disintegrates to form two or more lighter nuclei.

(ii)two products of nucleus fission are

i. Two light nuclei
ii. Energy in form of heat and gamma radiation.

(b)A = gamma radiation

B = Beta radiation

C = alpha radiation

(c) $^{266}_{88}R \rightarrow {}^{4}_{2}\alpha + {}^{222}_{86}R$ Alpha decay

$^{222}_{86}R \rightarrow 2\ {}^{}_{-1}e + {}^{222}_{88}$ beta decay

9. (i)Asteroids are astronomical bodies smaller than planets that orbit the sun.

(ii)Astronomy is the study of the origin, composition and motion of bodies in the outer space.

(b) (i)Constellation is a small group of stars that form a pattern which is viewed from the earth WHILE galaxy is a giant collection of billions of stars and bodies revolving around them.

(ii)A meteor is an asteroid which enters the earth's atmosphere and burns completely before reaching the ground **WHILE** Meteorites are asteroids that enter the earth's atmosphere and reach the ground before they are completely burnt.

10. (b)(i) It is in order to generate sounds of different notes since the timbre generated by a string depends on the thickness of the string.

(ii)The violinist changes the note emitted by particular string by stopping a string at different positions using a figure.

(c) from, fundamental note, $\lambda/4 = 22$ …… (i)

Second harmonic, $3\lambda/4 = l_2 + C = 47$ …… (ii)

Solving the two equations, $\lambda = 50$ m

Also, $v = \lambda f$

$340 = 50f$

Frequency = 68Hz

11. (i)Hair springs have a function of controlling the movement of the coil so that the position of the pointer is proportional to the magnitude of the current.

(ii)Moving coil galvanometer is unstable for measuring A.C because the changing polarity of an alternating current will result to changing of the polarity of magnetic induced in the galvanometer and so result to oscillation of the pointer which if the frequency of AC is high will lead to effectively no deflection.

(b) (ii)When an AC is used instead of DC the pattern will be the same but the direction of the magnetic lines will be changing with changing direction of the current.

(c) (i) To increase the speed of rotation of a DC motor we should increase the voltage or current applied to it.

(ii)From, V = IR

240 = 10 x R

R = 24Ω