WAEC PHYSICS
2017 QUESTIONS

Compiled by

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QUESTION 1

A particle is dropped from a vertical height h and falls freely for a time t. With the aid of a sketch, explain how h varies with t_2

QUESTION 2

A particle projected horizontally at $15\,ms^{-1}$ from a height of 20 m. calculate the horizontal distance covered by the particle just before hitting the ground.

QUESTION 3

List three phenomena which can be explained by the molecular theory of matter.

QUESTION 4

A spiral spring has a length of 14 cm when a force of 4 N is hung on it. A force of 6 N extends the spring by 4 cm. Calculate the unstretched length of the spring.

QUESTION 5

a. State two factors on which surface tension depends

b. How can mosquito larvae be made to sink in stagnant water?

QUESTION 6

List three advantages of fluorescent tubes over filament bulbs.

QUESTION 7

List three advantages of p-n junction diode over diode valve

QUESTION 8

a. State two deductions that can be made from a displacement-time graph

b. If the distance between two equal masses is doubled and their individual masses are also doubled, what would happen to the force between them? Support your answer quantitatively

c. State two factors that affect the maximum height attained by a bullet fired from a gun.

d. State two practical examples of mechanical resonance.

e. A body is released from rest at the top of a plane inclined at 30^o to the horizontal and 4.0 m high. If the coefficient of friction between the body and the plane is 0.3, calculate the time the body takes to reach the bottom of the plane.

QUESTION 9

a. Define stable equilibrium as applied to a rigid body

b. Sketch a block and tackle system of pulleys with a velocity ratio of 3

c. At the beginning of a race, a tyre of volume $8.0\times 10^{-4}m^3$ a$t 20^oC$ has a gas pressure of $4.5\times 10^5 Pa$. Calculate the temperature of the gas in the tyre at the end of the race if the pressure has risen to $4.6\times 10^5 Pa$.

d.

i.

	Ice Point 273K	Steam Point 373K
Resistance/Ω	5.67	7.75

Pressure/Pa	7.13 x 104	9.74 x 104

The table above shows readings of the resistance and pressure of a platinum resistance thermometer and a constant volume gas thermometer respectively when immersed in the same liquid bath. Use these data to determine the temperature of the bath on the
(α) resistance thermometer;
(β) gas thermometer;
When the resistance and pressure are 7.43 Ω and $9.33 \times 10^4 Pa$ respectively.

ii. By what percentage is the temperature measured on the platinum resistance thermometer in error?

QUESTION 10

a. What is a wave front?

b.

i. State two practical uses of glass prism

ii. List two factors that determine the deviation of a ray of light travelling from air into a triangular prism.

iii. Sketch a graph to illustrate the variation of the angle of deviation, d, with that of incidence, i, for a ray of light travelling from air into a triangular glass prism. Indicate on the graph the point at which the angle of incidence i is equal to the angle of emergence e.

c.

i. Draw and label a diagram of an astronomical telescope in normal adjustment.

ii. The angular magnification of an astronomical telescope in normal adjustment is 5. If the focal length of the objective is 100 cm, calculate the
(α) focal length of the eyepiece;
(β) length of the telescope.

QUESTION 11

a.

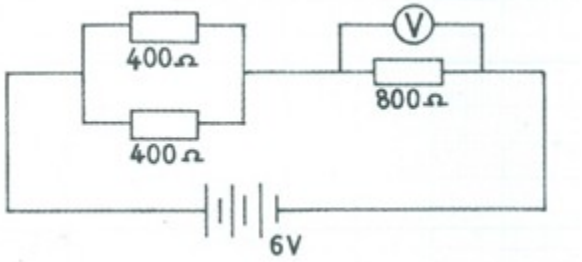
i. What is dielectric?

ii. A parallel plate capacitor consists of two plates each of area $9.6 \times 10^{-3} m^2$, separated by dielectric of thickness $2.25 \times 10^{-4} m$ and dielectric constant 900. Calculate the capacitance of the capacitor. [εo = permittivity of free space ¿$8.85 \times 10^{-12} F m^{-1}$].

b.

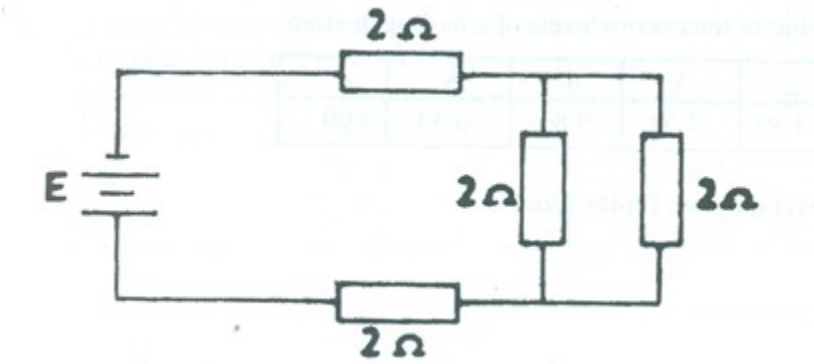
i. Which of the following devices has a higher resistance: an ammeter or a voltmeter? Give a reason for your answer.

ii.



The resistance of the voltmeter in the circuit diagram illustrated above is 800 Ω. Calculate the voltmeter reading.

c.



A battery of negligible internal resistance is connected to a set of resistors as illustrated in the circuit diagram above, Determine the equivalent resistance of the circuit.

QUESTION 12

(a) (i) What is nuclear fission?

(ii) State the function of **each** of the following materials in a nuclear fission reactor:

(α) graphite;

(β) boron rod;

(γ) liquid sodium

(b) The table below gives some of the energy levels of a hydrogen atom.

N	1	2	3	4	5	∞
E_n/Ev	-13.60	-3.39	-1.51	-0.85	-0.54	0.00

(i) Draw the energy level diagram for the atom.

(ii) Determine the wavelength of the photon emitted when the atom goes from the energy state n = 3 to the ground state.
[h = 6.6 x 10^{-34} Js, c = 3.0 x 10^{8} ms^{-1}, e = 1.6 x 10^{-19}C]

(c) A piece of ancient bone from an excavation site showed $^{14}_{6}C$ activity of 9.5 disintegrations per minute per 1.0 x 10^{-3} kg. if a bone specimen from a living creature shows $^{14}_{6}C$ activity of 12.0 disintegrations per minute per 1.0 x 10^{-3} kg, determine the age of the ancient bone. [Half-life of $^{14}_{6}C$ = 5572 years]