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Mock assessment 2020

Multiple choice question book

Physics AS

Paper 1

Section 1

Instructions

- Answer all questions in the question and response book.
- This book will not be marked.

QUESTION 1

When measured in °C, what temperature is 296 K?

(A) –23 °C

(B) 23 °C

(C) 25 °C

(D) 569 °C

QUESTION 2

Heat transfer by radiation is described as heat transfer

(A) by electromagnetic waves.

(B) by moving subatomic particles.

(C) directly through a solid material.

(D) through a fluid influenced by gravity.

QUESTION 3

In the equation $E_{\mathrm{k}} = hf - W$, the physical quantity represented by W is the

(A) maximum kinetic energy of an ejected photoelectron.

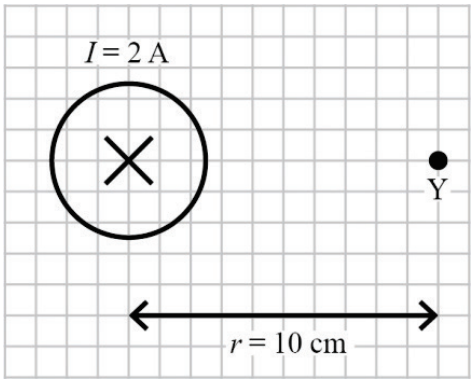
(B) wavelength of a photon required to eject a photoelectron.

(C) minimum energy required to remove an electron from a solid.

(D) minimum energy required to ionise an electron from a single atom.

QUESTION 4

The diagram below shows an electric current-carrying wire.



Calculate the magnitude of the magnetic field at point Y.

(A) 4×10^{-8} T

(B) 4×10^{-6} T

(C) 4 T

(D) 40 T

QUESTION 5

A 100 g metal object was heated from 40 °C to 90 °C using 1000 J of heat.

Calculate the specific heat capacity of the metal.

(A) 0.2 J kg^{-1} K^{-1}

(B) 200 J kg^{-1} K^{-1}

(C) 500 J kg^{-1} K^{-1}

(D) 5000 J kg^{-1} K^{-1}

QUESTION 6

The correct definition of *period* is

(A) the amount of time one cycle or one event takes to occur.

(B) the amount of time half of one cycle or event takes to occur.

(C) the distance travelled by an object in uniform circular motion.

(D) the distance travelled by a wave when one whole wavelength passes a given point.

QUESTION 7

A mechanical system has an input of 200 kW of power. Which of the following options is a realistic scenario for its output?

(A)

Efficiency	Power associated with work	Power associated with energy lost
70%	140 kW	60 kW

(B)

Efficiency	Power associated with work	Power associated with energy lost
80%	40 kW	160 kW

(C)

Efficiency	Power associated with work	Power associated with energy lost
90%	180 kW	–20 kW

(D)

Efficiency	Power associated with work	Power associated with energy lost
100%	200 kW	0 kW

QUESTION 8

The definition of *interference* is a phenomenon in which waves

(A) overlap in space.

(B) change direction and speed.

(C) return into the same medium.

(D) superimpose to form a resultant wave.

QUESTION 9

Select an example of a longitudinal wave from the list below.

(A) Light

(B) Sound

(C) Microwave

(D) Vibrating guitar string

QUESTION 10

The quantity defined as *the rate at which work is done or the rate at which energy is transferred or transformed* is

(A) power.

(B) current.

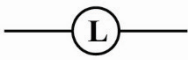
(C) resistance.

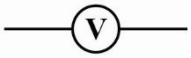
(D) potential difference.

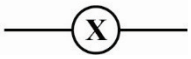
QUESTION 11

Select the circuit diagram symbol for a light bulb.

(A) 

(B) 

(C) 

(D) 

QUESTION 12

The ratio of the voltage applied to the electric current that flows through it is the definition of

(A) power.

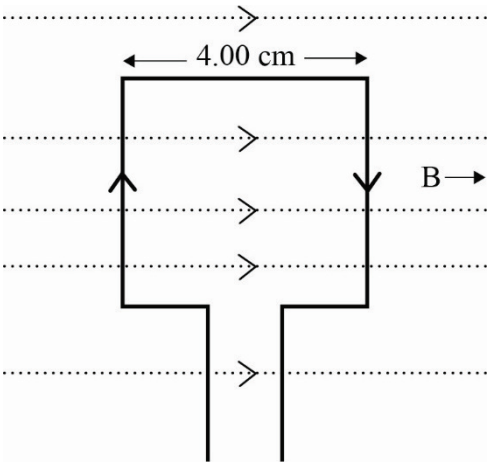
(B) charge.

(C) resistance.

(D) potential difference.

QUESTION 13

The diagram shows a conducting loop placed in a magnetic field, B, that can rotate about the axis. The magnitude of the magnetic field is 0.28 T. The length of each side of the square loop is 4.00 cm.



The maximum magnetic flux generated by the loop is

(A) 4.48×10^{0} Wb

(B) 4.48×10^{-4} Wb

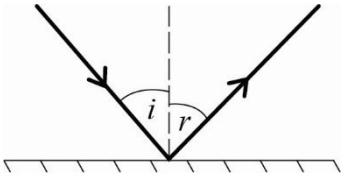
(C) 1.12×10^{-2} Wb

(D) -4.48×10^{-4} Wb

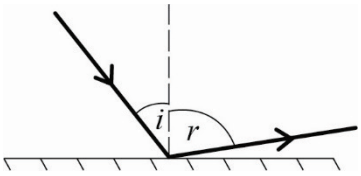
QUESTION 14

Select the ray diagram that represents the reflection of light as it travels through air to a mirror.

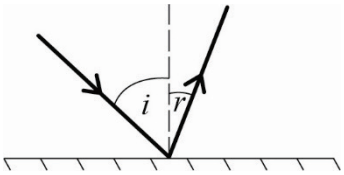
(A)



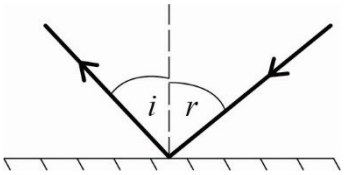
(B)



(C)

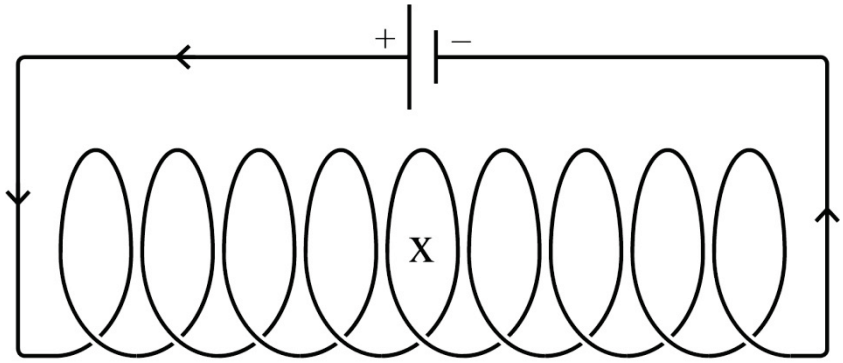


(D)



QUESTION 15

The diagram below shows a solenoid.



Determine the direction of the magnetic field inside the solenoid at point X.

(A) into the page

(B) out of the page

(C) right to left of the page

(D) left to right of the page

QUESTION 16

Select the correct definition of *electromagnetic radiation*.

(A) Emissions of energy as electromagnetic waves or moving subatomic particles, especially high-energy particles, that cause ionisation

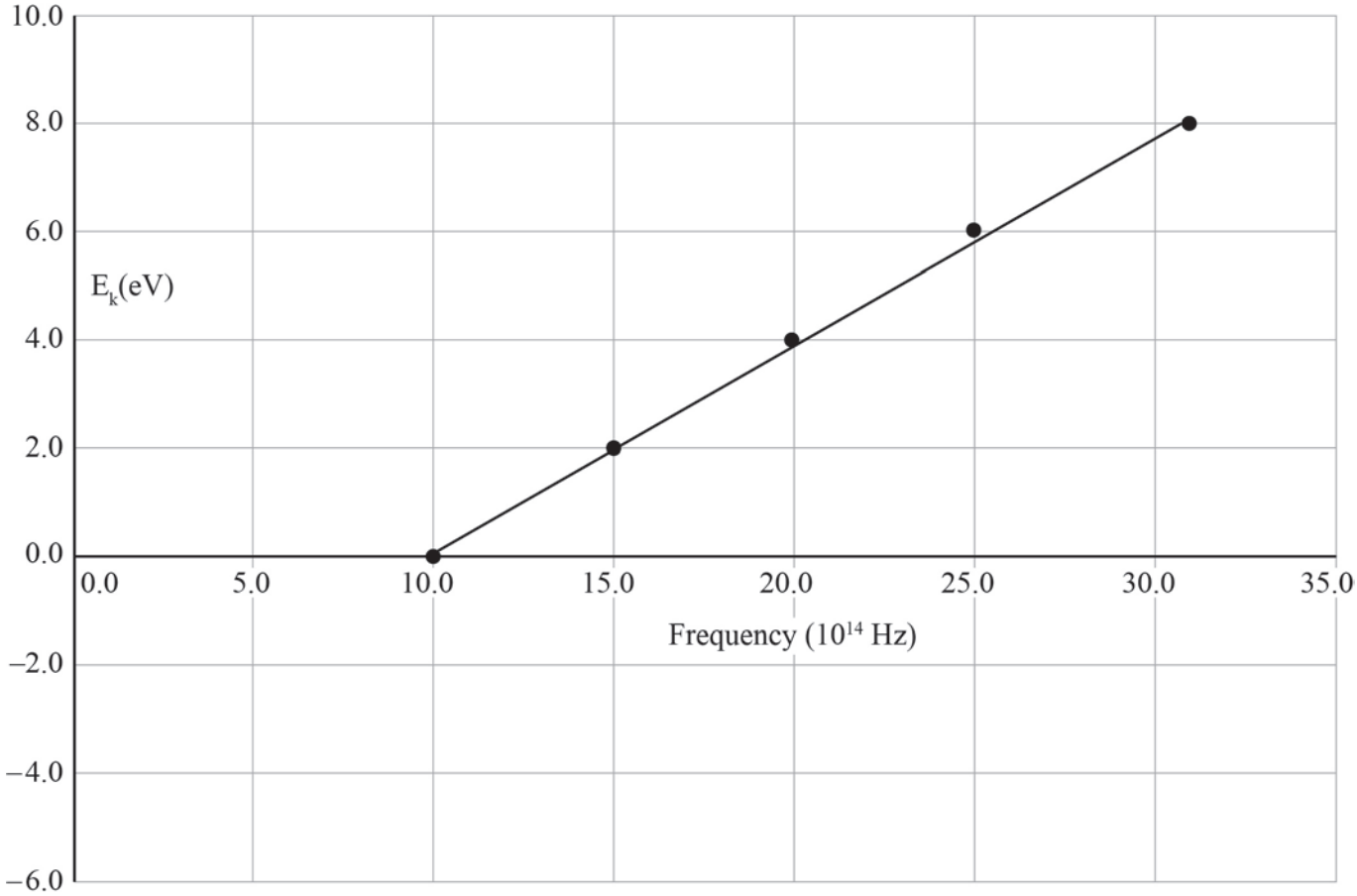
(B) The production of an electromotive force or voltage across an electrical conductor due to its dynamic interaction with a magnetic field

(C) Radiant energy consisting of synchronised oscillations of electric and magnetic fields, or electromagnetic waves, propagated at the speed of light in a vacuum

(D) The process by which heat or electricity is directly transferred or transmitted through the material of a substance when there is a difference of temperature or of electrical potential between adjoining regions, without movement of the material

QUESTION 17

A photoelectric effect experiment was conducted. The graph shows the kinetic energy of photoelectrons with respect to the frequency of light incident on a metal plate.



Calculate the threshold frequency for this metal plate.

(A) 0 Hz

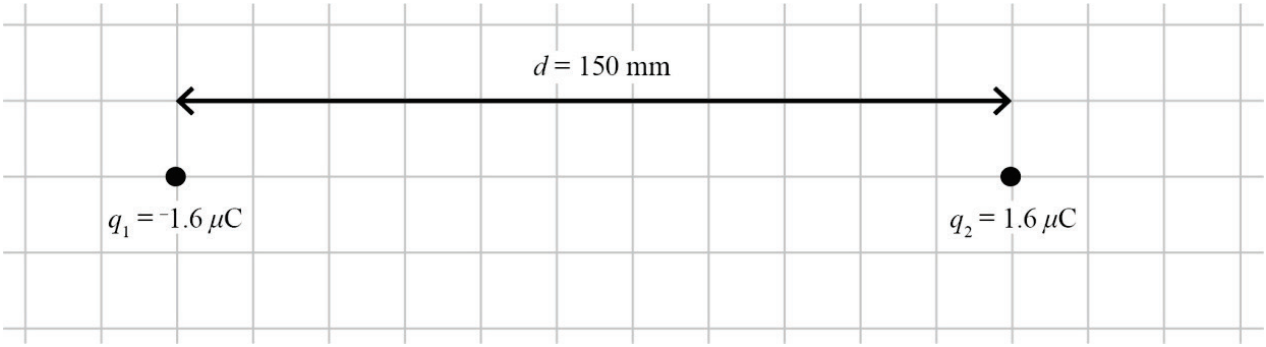
(B) 9.7×10^{14} Hz

(C) 2.1×10^{14} Hz

(D) 3.1×10^{14} Hz

QUESTION 18

The diagram below shows two charges (q_1 and q_2), separated by a distance (d).



Calculate the magnitude of the force (F) acting between the two charges.

(A) 1.0 N

(B) 1.0×10^{6} N

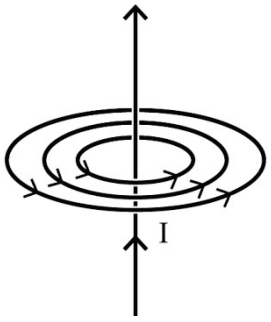
(C) 1.0×10^{-6} N

(D) 1.5×10^{-4} N

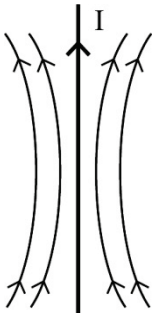
QUESTION 19

Which of the diagrams below is the correct representation of the magnetic field around an electric current-carrying wire?

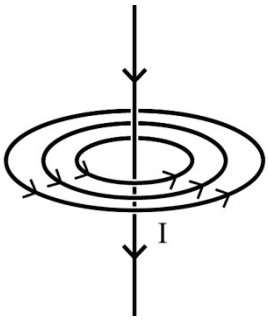
(A)



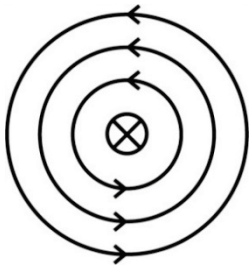
(B)



(C)

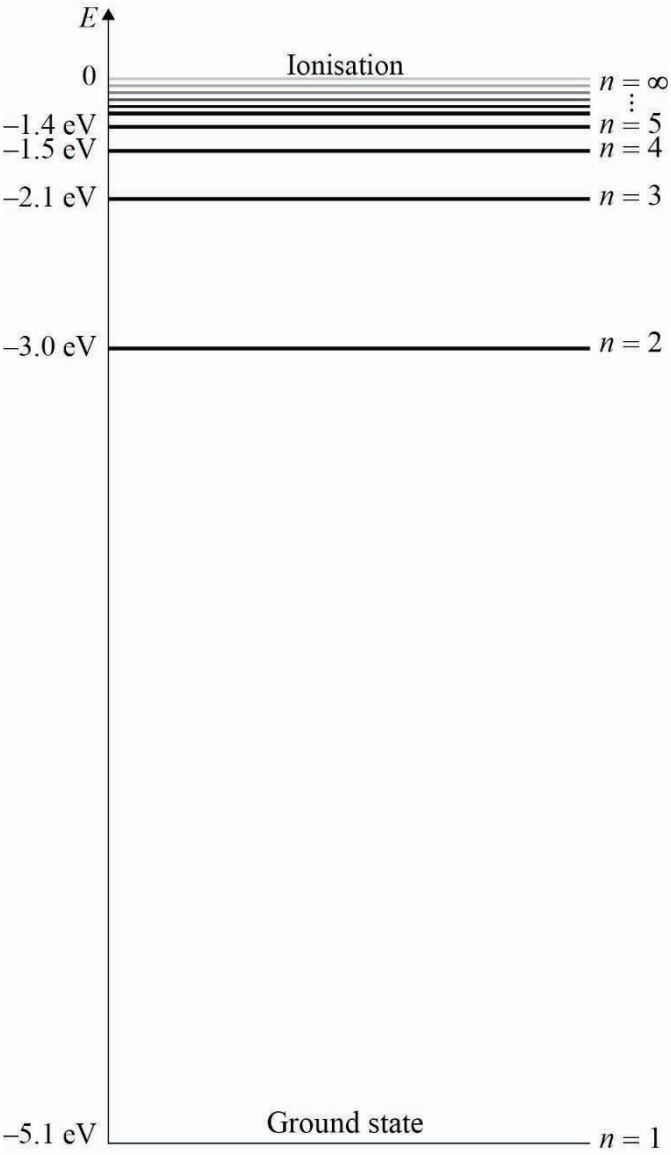


(D)



QUESTION 20

The diagram is an energy level diagram for the sodium atom.



Determine the wavelength of light that would be produced by an electron transitioning from the energy level $n = 3$ to $n = 1$.

(A) 13.5 nm

(B) 171.6 nm

(C) 411.4 nm

(D) 591.6 nm

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