PHS 102

Name:..... Time Allowed: 25 minutes

Department:..... Matric No.....

Use the following constants where applicable.

$\frac{1}{4\pi\varepsilon_0} = 9.0\times10^9 \frac{m^2}{C^2}$, $G = 6.67\times10^{-11}\,\frac{m^3}{kgs^2}$, $e = 1.602\times10^{-19}C$, Coulomic mass unit = $1.661\times10^{-27}kg$, $R = 3.07\times10^{7}$

$c = 2.998\frac{x10^8 m}{s^2}$, $h = 6.626\times10^{-34}Js$,

1. An α particle is the nucleus of a helium atom. It has mass $m = 6.64\times10^{-27}kg$ and charge $q = 2e = 6.4\times10^{-19}$ C. Find the ratio of the electric repulsion between two α particles with the force of gravitational attraction between them
(a) 1.25×10^{38} (b) 1.25×10^{-38} (c) 1.25×10^{36} (d) 1.25×10^{-36} (e) 1.25×10^{37}

2. Two point charges, $q_1 = 425nC$ and $q_2 = -75nC$, are separated by a distance of 6.0 cm. Find the magnitude of the force that q_1 exerts on q_2
(a) $4.69\times10^{-3}N$ (b) $0.469\times10^{-3}N$ (c) $0.0469\times10^{-3}N$ (d) $4.69\times10^{-1}N$ (e) $4.69\times10^{-2}N$

3. Two point charges are located on the positive x–axis of a coordinate system. Charge $q_1 = 1.0nC$ is 4.0cm from the origin, and charge $q_2 = -3.0nC$ is 8.0 cm from the origin. What is the total force exerted by these two charges on a charge $q_3 = 5.0nC$ located at the origin? Gravitational forces are negligible.
(a) $-70\mu N$ (b) $+70\mu N$ (c) $-7\mu N$ (d) $-7nN$ (e) $+7nN$

4. What is the magnitude of the electric field at a field point 4.0m from a point charge $q = 16.0nC$?
(a) $10.0N/C$ (b) $1.8N/C$ (c) $1.1N/C$ (d) $9.0N/C$ (e) $18.0N/C$

5. Which of the following net charges could be found on an object?
(1) $+4.80\times10^{-19}$ C
(2) $+3.60\times10^{-19}$ C
(3) -0.50×10^{-19} C
(a) (1) only (b) (2) only (c) (1) and (2) only (d) (2) and (3) only (e) none of the above

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6. The vessel containing electrolytes along with electrodes is called
(a) Electrolysis (b) Electrochemical cell (c) Electrolyte (d) Electromotive force (e) Electrolytic cell

7. The device used to convert chemical energy into electrical energy is called an
(a) Electrolytic cell (b) Electrochemical cell (c) Electromotive force (d) Electrolysis (e) Electrolyte

8. In the following nuclear equation

$$^{14}_{7}N + {}^{4}_{2}He \rightarrow {}^{17}_{8}O + X$$
$$^{9}_{4}Be + {}^{4}_{2}He \rightarrow {}^{12}_{6}C + Y$$

The values of X and Y are
(a) ${}^{1}_{0}H$; ${}^{1}_{0}n$ (b) ${}^{1}_{1}H$; ${}^{1}_{0}n$ (c) ${}^{0}_{-1}e$; ${}^{0}_{1}n$ (d) ${}^{0}_{-1}e$; ${}^{1}_{1}H$ (e) ${}^{1}_{0}H$; ${}^{4}_{2}He$

9. What is the threshold frequency for a metal that has a work function of 5.10 eV
(a) 7.7×10^{33}Hz (b) 1.23×10^{15}Hz (c) 3.3×10^{33}Hz (d) 1.48×10^{33}Hz (e) 2.05×10^{33}Hz

10. Green light of wavelength 540nm is diffracted by a grating ruled with 2000 lines per cm. find the angular deviation of third-order image?
(a) 20.30^0 (b) 16.9^0 (c) 18.9^0 (d) 22.4^0 (e) 25.9^0

11. A photon of radiation has energy of 0.512 eV. What is the wavelength of this photon?
(a) 6563 nm (b) 91.22 nm (c) 2.59 nm (d) 1.24×10^5m (e) 2422nm

12. The intensity of the transmitted beam passing through an analyzer when its transmission axis is set at an angle of that of polarizer is reduced by
(a) half (b) quarter (c) two-fold (d) twice the initial value (e) one

13. The minimum frequency of light that will liberate electrons from a particular metal is known as
(a) resonant frequency (b) harmonic frequency (c) threshold frequency (d) quantum frequency (e) photon frequency

14. A laser beam (λ=632.8nm) is incident on two slits 0.2mm apart. How far apart are the bright interference fringes on a screen 4 m away from the double slit?
(a) 1.68cm (b) 1.58cm (c) 1.27cm (d) 2.80cm (e) 1.42cm

15. A transparent surface with fine parallel lines etched on it causes light to be dispersed when it passes through it. Such a device is called
(a) Radiometer (b) Carnot Cycle (c) Prism (d) Grating (e) Sunometer

s/n	a	b	c	d	e
1					
2					
3					
4					

s/n	a	b	c	d	e
9					
10					

UNIVERSITY OF AGRICULTURE
COLLEGE OF NATURAL SCIENCES
2002/2003 SECOND SEMESTER EXAMINATION
PHS102-General Physics II

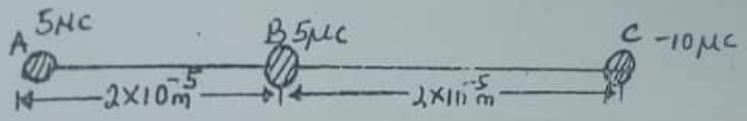
Instruction: Answer ALL questions by SHADING the correct option in the answer sheet attached

Date: 7th April, 2004

Time: 1Hr. 15 Minutes

List of Constants

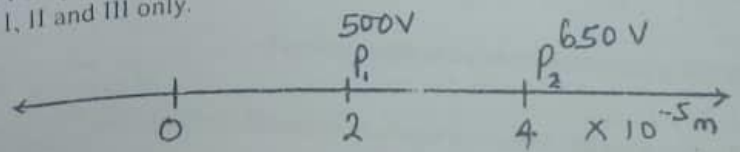
Mass of an electron	$= 9 \times 10^{-31}$ Kg
Mass of a proton	$= 2 \times ^{-27}$ Kg
ε_0, permittivity of free space	$= 8.854 \times ^{-12}$ Fm^{-1}
μ_0, permeability of the vacuum	$= 4\pi \times 10^{-7}$ H/m



1. Find the force acting on charge at A due to charges B and C.
   A. $0.03125/4\pi\varepsilon_0$ N repulsive B. $0.03125/4\pi\varepsilon_0$ N attractive
   C. $0.0625/4\pi\varepsilon_0$ N attractive D. 0 E. None of the above
2. What is the potential at point P distance 3 x 10-5 from A, 4 x 10-5 from B and 7 x 10-5 from C? ($K = 1/\pi\varepsilon_0$)
   A. 1/12 K B. 2/12 K C. 2.5/12 K. D. 7/12 K E. 3/7 K.

I. There is no electric field within a charged conductor.
II. The direction of a line of force is always at right angles to an equipotential surface.
III. $E = -dV/dx$.

3. Which of the above statement is/are correct?
   A. I only. B. II only. C. III only. D. I and II only.
   E. I, II and III only.



4. What is the electric field intensity E due to the above arrangement?
   A. 7×10^6 V/m. B. 0.7×10^6 V/m C. 7.5×10^6 V/m
   D. 1.05×10^6 V/m E. 1.3×10^6 V/m5.
5. A circular disk of diameter 4mm has a charge of 8μc. What is the charge density of the disk?
   A. $2/\pi$ C/m^2. B. 2π C/m^2. C. $\pi/2$ C/m^2 D. 3π C/m^2.
   E. None of the above.

30. The high tension of an X-ray generator is 50KV. Therefore the minimum or cut-off wavelength of the X-ray generator (in $10^{-10}m$) is:
(a) 2.48 (b) 24.8 (c) 0.248 (d) 0.025 (e) 0.0025

In the following radioactive process P refers to the parent nuclide, D to the daughter nuclide and ϵ the radioactive emission.

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(i) ${}^{A}_{Z}P \rightarrow {}^{A-4}_{Z-2}D + \epsilon$

(ii) ${}^{A}_{Z}P \rightarrow {}^{A}_{Z+1}D + \epsilon$

(iii) ${}^{A}_{Z}P \rightarrow {}^{A}_{Z-1}D + \epsilon$

(iv) ${}^{A}_{Z}P \rightarrow {}^{A}_{Z}D + \epsilon$

Use the above information to answer the next two questions.

31. Which of the processes (i) to (iv) represents alpha decay?
(a) (i) (b) (ii) (c) (iii) (d) (iv) (e) none

32. Which of the processes (i) to (iv) represents positron (β^+) decay?

33. Which of the following is/are FALSE?
(i) The neutrino (ν) accompanies electron (or β^-) decay
(ii) The antineutrino (ν) accompanies positron (or β^+) decay
(iii) Either the neutrino or antineutrino has zero rest mass
(iv) The neutrino and antineutrino serve to ensure conservation of energy
(a) (i) and (ii) only (b) (iii) and (iv) only (c) (i) and (iv) only (d) (i), (ii) and (iii) only (e) (i), (ii), (iii) and (iv).

34. Gamma rays can accompany either alpha or beta decay because
(i) the rays are not particles.
(ii) they are mere manifestations of transition to lower energy states of an initially excited nucleus
(iii) assist in ensuring that the radioisotope quickly stabilizes
which of the above are true?
(a) (i) only (b) (ii) only (c) (iii) only (d) (ii) and (iii) only (e) (i), (ii) and (iii).

35. Which of the following statements is not correct:
(a) The Electric potential is the property of a point in space
(b) The Electric potential is the property of a charged particle
(c) The Electric potential at any point is directly proportional to the distance from the source
(d) The Electric potential at any point is inversely proportional to the distance from the source
(e) All of the above.

36. A positive point charge $12\mu C$, is placed in a fixed paition. The potential difference between two points $6cm$ and $10cm$ from the fixed charge is:
(a) $7.2 \times 10^5 V$ (b) $27 \times 10^5 V$ (c) $18 \times 10^5 V$ (d) $10.8 \times 10^5 V$ (e) $14.4 \times 10^5 V$

37. A positive point charge $8\mu C$, is moved from a position $10cm$ from a fixed $12\mu C$ positive point charge to a point $6cm$ from it. What is the work done?
(a) 14.4 J (b) 21.6 J (c) 5.76 J (d) 8.64 J (e) 11.52 J

38. Which of the following statements is correct.
(a) The electric field between two oppositely charged parallel plates is uniform
(b) The electric field between two oppositely charged parallel plates is stronger nearer the positive plate
(c) The electric field between two oppositely charged parallel plates is stronger nearer the negative plate

2005/2006 SECOND SEMESTER EXAMINATION

SUBJECT: PHS102: General Physics II

INSTRUCTIONS: Answer all questions in section A, one question from section B and one question from section C

Where necessary use $e = 1.6 \times 10^{-19}C$, $\frac{1}{4\pi\varepsilon_0} = 9 \times 10^9 Nm^2C^{-2}$, $m_e = 9.1 \times 10^{-31}kg$, $c = 3 \times 10^8 ms^{-1}$

Time allowed: $1\frac{1}{2}$ hrs

Section A:

1. In a graph of current I through an ohmic conductor as ordinate versus the p.d. V across the conductor as the abscissa the gradient is (A) resistance B. conductance C. resistivity D. conductivity (E) $\frac{1}{\text{resistivity}}$

2. Four equal charges of magnitude q each are located on the vertices of a square of side l. The magnitude of the force on each charge (where $\frac{1}{4\pi\varepsilon_0} = K$) is A. $\frac{\sqrt{2}Kq^2}{l^2}$ (B) $\frac{1+2\sqrt{2}}{2}\frac{Kq^2}{l^2}$ (C) $\frac{1+2\sqrt{2}}{2}\frac{Kq^2}{l^2}$ D. $\frac{Kq^2}{\sqrt{2}l^2}$ E. 0

3. A straight horizontal rod X, of mass $50g$ and length $0.5m$, is placed in a uniform horizontal magnetic field of $0.2T$ perpendicular to X. Calculate the current in X if the force acting on it just balances its weight ($g = 10ms^{-2}$) A. 9A B. 6A C. 7A D. 8A (E) 5A

4. The conductivity of a wire of length $2.0m$ and radius $3.5mm$, which allows a current of $2.0A$ when a p.d. of $10V$ is applied between its ends is A. $20.25 \times 10^{-3}\Omega^{-1}m^{-1}$ (B) $10.39 \times 10^{-3}\Omega^{-1}m^{-1}$ C. $30.35 \times 10^{-3}\Omega^{-1}m^{-1}$ D. $45.36 \times 10^{-3}\Omega^{-1}m^{-1}$ E. $51.52 \times 10^{-3}\Omega^{-1}m^{-1}$

For Q.5 & Q.6: The driver cell of a potentiometer has an e.m.f. of $2.0V$ and negligible internal resistance. The potentiometer wire has a resistance of 3.0Ω.

5. Calculate the resistance needed in series with the wire if a p.d. of $5.0mV$ is required across the whole wire. A. 1719Ω B. 1179Ω (C) 1197Ω D. 1917Ω E. 1597Ω

6. If the wire is $100cm$ long and a balance length of $60cm$ is obtained for a thermocouple of e.m.f. E. What is the value of E? A. $1mV$ B. $2mV$ C. $4mV$ D. $3mV$ E. $5mV$

7. The galvanometer depends on which effect of the electric current?
A. mechanical B. chemical C. heating (D) magnetic E. electrical

For Q8 & Q9: A battery of e.m.f. $24V$ and internal resistance r is connected to a circuit having two parallel resistors of 3Ω and 6Ω in series with an 8Ω resistor. The current flowing in the 3Ω resistor is then $0.8A$.

8. Calculate r (A) 2Ω B. 4Ω C. 6Ω D. 8Ω E. 10Ω

9. Calculate the terminal p.d. of the battery. A. $4V$ B. $8V$ (C) $16V$ D. $20V$ E. $30V$

Department:..... Matric. No.....

Use the following constants where applicable.

$$\frac{1}{4\pi\varepsilon_0} = 9.0 \times 10^9 N.\frac{m^2}{C^2}, \quad G = 6.67 \times 10^{-11} N.\frac{m^2}{kg^2}$$

1. An α particle is the nucleus of a helium atom. It has mass $m = 6.64 \times 10^{-27} kg$ and charge $q = 2e = 3.2 \times 10^{-19} C$. Compare the force of the electric repulsion between two α particles with the force of gravitational attraction between them.
   (a) 3.9×10^{-40} (b) 3.6×10^{-40} (c) 3.6×10^{-35} (d) 3.2×10^{-35} (e) 3.2×10^{-50}
2. Two point charges, $q_1 = +25nC$ and $q_2 = -75nC$, are separated by a distance of 3.0 cm. Find the magnitude of the electric force that q_1 exerts on q_2.
   (a) $0.019N$ (b) $0.049N$ (c) $0.009N$ (d) $0.039N$ (e) $0.0019N$
3. Two point charges are located on the positive x-axis of a coordinate system. Charge $q_1 = 1.0nC$ is 2.0cm from the origin, and charge $q_2 = -3.0nC$ is 4.0 cm from the origin. What is the total force exerted by these two charges on a charge $q_3 = 5.0nC$ located at the origin? Gravitational forces are negligible.
   (a) $-30\mu N$ (b) $+30\mu N$ (c) $-28\mu N$ (d) $-28mN$ (e) $-32mN$
4. What is the magnitude of the electric field at a field point 2.0m from a point charge $q = 4.0nC$?
   (a) $10.0N/C$ (b) $8.0N/C$ (c) $11.0N/C$ (d) $9.0N/C$ (e) $7.0N/C$
5. Which of the following net charges could be found on an object?
   (1) $+4.80 \times 10^{-19}$ C
   (2) $+3.60 \times 10^{-19}$ C
   (3) -0.50×10^{-19} C
   (a) (1) only (b) (2) only (c) (1) and (2) only (d) (2) and (3) only (e) none of the above

6. The vessel containing electrolytes along with electrodes is called
   (a) Electrolysis (b) Electrochemical cell (c) Electrolyte (d) Electromotive force (e) Electrolytic cell
7. The device used to convert chemical energy into electrical energy is called an
   (a) Electrolytic cell (b) Electrochemical cell (c) Electromotive force (d) Electrolysis (e) Electrolyte
8. A sound source sends waves of 400 Hz. It produces waves of wavelength 2.5 m. The velocity of sound waves is
   (a) 100m/s (b) 1000m/s (c) 10000m/s (d) 3000km/s (e) 2000km/h
9. Which of the following quantities is transferred during wave propagation?
   (a) Speed (b) Mass (c) Matter (d) Energy (e) Velocity
10. SI Unit of time period is _____.
    (a) second (b) hour (c) minute (d) nanosecond (e) millisecond
11. An α-particle incident on a nuclide X produces a nuclide Y and two β – par represented by $^{88}_{37}X + {}^{4}_{2}He \rightarrow {}^{x}_{y}Y + 2\beta$.
    Which of the following is correct?
    (a) $x = 90, y = 37$ (b) $x = 92, y = 35$ (c) $x = 90, y = 38$ (d) $x =$

2010/2011 Continuous Assessment Test (C.A.T.)

PHS 102 (General Physics II)

Thirty Five minutes. π=3.142 $\varepsilon_0 = 8.85 \times 10^{-12} C^2 N^{-1} m^{-2}$, $\mu_0 = 4\pi \times 10^{-7}$ Wb $A^{-1} m^{-1}$, c = 3.0 X 10^8 ms^{-1}, K =

e=1.6 X 10^{-19}C; $\frac{1}{4\pi\varepsilon_0} = 9X10^9 Nm^2C^{-2}$

technician uses a small mirror that gives a magnification of 4 when it is held 6mm from a tooth. Find the radius of f the mirror

2.1cm ; c.4.8cm; d. -1.6cm ; e. -4.0cm.

active index of wave passing from medium X to medium Y is 2/3. If the speed in medium X is 3450m/s, determine its nedium Y.

10^{-1}m/s; b. 5.15 X 10^3m/s, c.2.31 X 10^3m/s, d. 3.0 X 10^8m/s, e.0.67m/s.

ate the total energy density (J/m^3) of a plane electromagnetic wave with maximum electric field strength of 220 Vm^{-1}.

X 10^{-9}, b. 2.25 X 10^{-9}, c.3.19 X 10^{-6}, d. 2.14 X 10^{-7}, e. 4.67 X 10^{-7}

and Q5: A radio station transmits 7.5MW signal at a frequency of 4.0 KHz. Assuming that it radiates as a point source, e of 0.25 Km from the antennae, find:

mplitudes of electric and magnetic field strength respectively

10^3, 2.4X10^{-5}; b. 2.40X10^{-5}, 8.0X10^{-12}; c. 2.40X10^{-6}, 4.88X10^{-5}; d. 7.20X10^{-3}, 1.46X10^{-4}; e. 0.115 X 10^{-6}, 1.46X10^{-1}

energy (in J) incident on on a square surface of dimension 2.0cm by 2.0cm in 3 minutes

2 X 10^{-7}; b. 2.67 X 10^{-4}, c.3.19 X 10^{-6}, d. 2.74 X 10^{-6}, e. 6.97 X 10^{-1}

ht of frequency 6.0 X 10^{14}Hz traveling in air is transmitted through glass of refractive index 1.5. Calculate the frequency n glass.

4.0 X 10^{14}, b. 9.00 X 10^{14}, c.6.0 X 10^{14}, d. 3.0 X 10^{14}, e. 9.0 X 10^{14}

hich of the following is/are NOT correct about electromagnetic waves? i. they can travel through vacuum; ii. they are nples of longitudinal waves; iii. the ratio of electric field and magnetic field gives the speed of the wave; iv. the y the law of superposition of waves. a. I only, b. II only, c. II and III , d. III and IV, e. I, III and IV.

hich of the following is/are examples of electrostatic field? i. distribution of charges at rest; ii. the magnetic field of a st e current in a conductor; iii. the fields manifested in the induced e.m.f's in inductances; iv. the fields manifested e induced e.m.f's in transformers. a. I only, b. II only, c. II and II , d. III and IV, e. I, II and IV.

Which of the following part of electromagnetic spectrum can induce cancer in man if it is produced in excess? i. Infra Red diation; ii. Microwaves; iii. x-rays; iv. Ultraviolet. a. I only, b. II only, c. II and III , d. III and IV, e. IV only.

Which of the following is/are correct about interference of light waves? i. if the path difference is zero or a whole number o wavelengths, a bright band is obtained; ii. if the path difference is zero or a whole number of wavelengths, a dark band is ob iii. if the path difference is an odd multiple of wavelengths, a dark band is obtained; iv. if the path difference is an odd multi wavelengths, a bright band is obtained. a. I only, b. II only, c. I and II , d. I and III, e. IV only.

Which of the following is correct about Freshnel diffraction? i. the screen should be very close to the slit; ii. the slit sh be sufficiently wide; iii. the slit should be sufficiently far from the screen; iv. the slit should be sufficiently narrow.

INSTRUCTIONS: Answer all Questions, WRITE YOUR MATRIC NO. & DEPT ON PAGE 6

Assume the followings:

Speed of light in vacuum,	$c = 2.998\times10^{8} m/s^2$
Planck's constsant,	$h = 6.626\times10^{-34}$ J s
Electronic charge,	$e = 1.602\times10^{-19}$ C
Boltzmann constant,	$k = 1.381\times10^{-23} J K^{-1}$
1 atomic mass unit,	$u = 1.664\times10^{-27}$ kg
Mass of a proton,	$M_p = 1.673\times10^{-27}$ kg
Mass of a neutron,	$M_n = 1.675\times10^{-27}$ kg
Mass of the electron,	$M_e = 9.110\times10^{-5}$ kg
Rydberg constant,	$R_\infty = 1.097\times10^{7} m^{-1}$
Ground state of hydrogen atom,	$E_1 = -2.180\times10^{-18}$ J.
	$\frac{1}{4\pi\epsilon_o} = 9\times10^{9}$

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1. The energy of the photons in a beam of wavelength 326nm is:
(a) 1.6×10^{-17} J (b) 3.4×10^{-17} J (c) 6.1×10^{-17} J (d) 12.4 J (e) 1.6×10^{-18} J

2. The energy of the photons in a beam of wavelength 326nm in eV is:
(a) 2.0 eV (b) 1.2 eV (c) 3.8 eV (d) 23.0eV (e) 54.2 eV

3. The value of the Rydberg constant R (for hydrogen) is about $1.087\times10^{7} m^{-1}$, the wavelength of the Balmer series would be:
(a) 255.5 m (b) 662.3nm (c) 1004 nm (d) 1048 nm (e) 2048 nm

4. Given that the ionization energy for a hydrogen atom is 13.6eV, the wavelength of the level with quantum number n=3 , is:
(a) -0.51 eV (b) -2.51 eV (c) -1.51 eV (d) -3.51 eV (e) -7.51eV

5. An electron revolves in a circle around a nucleus with positive charge Ze. Assume $K = \frac{1}{4\pi\epsilon_o}$. The relationship between the electron velocity, V , and the orbit is given by V =:
(a) $4Ze^2/r$ (b) kZe^2/r (c) KZ/mr (d) $\sqrt{\frac{Ze^2}{mr}}$ (e) $\sqrt{\frac{kZe^2}{mr}}$

6. The wavelength of the third electron beam of the hydrogen atom is:
(a) 0.019 nm (b) 0.478 nm (c) 0.778 nm (d) 0.656 nm (e) 1.345 nm

7. For two equal charges of 2C each separated by a force of 21C, the force of attraction between them is:
(a) 1 KN (b) 3 KN (c) 9 KN (d) 18 KN (e) 27 KN

8. A point charge of -50 μC is placed at the origin of the coordinate system. The magnitude of the electric field at the point x = 7.5 m on the x- axis is:
(a) 8 KN/C (b) 16 KN /C (c) 80 KN/C (d) 800 KN/C (e) 1620 KN/C. For the next two questions. Given a photon (q = +e, m = 1.67×10^{-27} Kg) in an electric field of intensity 300 N/C,

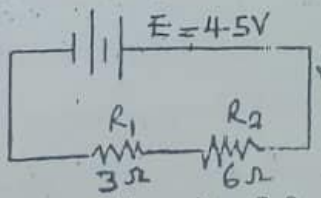
Find the force in the test charge and its direction.
A. 43.2N away from Q_1. B. 28.8N owards Q_1. C. 14.4N away from Q_1.
D. 28 8N away from Q_1 E. 43.2N towards Q_1.

18. An oil drop carries six electronic charges, has a mass of 1.6×10^{-12}g, and falls with a terminal velocity in air. What magnitude of vertical electric field is required to make the drop move upward with the same speed as it was formerly moving downward?
A. 16.35KN/C. B. 32.7 KN/C. C. 1.635 KN/C. D. 3.27 KN/C.
E. 0.1635 KN/C.

19. What is the magnetic field at a point 50mm from a wire carrying a current of 3A?
A. 1.2×10^{-5}T. B. 2.4×10^{-5}T. C. 12.0×10^{-5}T.
D. 24.0×10^{-5}T. E. 3.6×10^{-5}T.

20. Calculate the capacity of pair of parallel plate of area $25cm^2$ if they are separated by a piece of Perspex 0.1mm thick. Take the relative permittivity of Perspex to be 3.50.
A. 0.74nF. B. 7.4nF. C. 74nF. D. 0.37nF. E. 3.7nF.

21. A flat circular coil having 40 loops of wire on it has a diameter of 329mm. What current must flow in its wire to produce a flux density of $300\mu Wb/m^2$ at its center?
A. 2.0A. B. 1.9A. C. 2.1A. D. 2.2A. E. 21.0A.29.



22. What is the power dissipated in resistor R_1?
A. 0.75W. B. 2.25W. C. 7.5W. D. 10.5W. E. 22.5W.

23. A potential difference of 150V is applied to two parallel metal plates. If an electric field of 5000V/m is produced between the plates, how far apart are the plates?
A. 0.3m. B. 3.0m. C. 0.03m. D. 30.0m. E. 33.33m.

24. Which of the following wave equations is correct for two displacement waves having same phase, equal and opposite directions.
A. $Y_1 = 2aCos2\pi ftSin2\pi ft$ B. $Y = 2aSin2\pi ftCos2\pi x/v$
C. $P_1 = 2pCos2\pi ftCos2\pi x/v$ D. $P_1 = 2pSin2\pi ftSin2\pi ft$
E. None of the above.

6. Calculate the workdone in charging a sphere of radius 3cm to a potential of 1000V.
A. 0.74 nF. B. 7.4 nF. C. 0.7 nF. D. 0.6 nF.
E. 0.5 nF.

7. Calculate the capacitance of a pair of parallel plates of area $25cm^2$, if they are separated by a piece of Perspex 0.2mm thick. Take the relative permitivity of Perspex to be 3.5.
A. 3.4 nF. B. 4.38 nF. C. 3.87 nF. D. 0.5 nF.
E. None of the above.

8. How much electricity passes along the filament of an electric lamp, which uses 0.4A for 6Ω?
A. 86400C. B. 864C. C. 432C. D. 4320C. E. 8640C.

9. If the resistivity of copper is $1.7 \times 10^{-8}\Omega m$, calculate the resistance of $2cm^3$ of copper when in the form of a wire of 0.02cm.
A. $1.7 \times 10^{-10}\Omega$. B. $0.17 \times 10^{-10}\Omega$. C. $3.4 \times 10^{-10}\Omega$.
D. $8.5 \times 10^{-10}\Omega$. E. $0.34 \times 10^{-10}\Omega$

10. If the resistance of a copper wire is 5Ω at 25°C, calculate its resistance at 60°C (α for copper $= 43 \times 10^{-4}K^{-1}$)
A. 5.1Ω. B. 4.5Ω. C. 5.4Ω. D. 6.3Ω.
E. 7.1Ω

11. Three resistances 10,12 and 15Ω are connected in parallel. What resistance must be connected in series with the combination to give a total of 20Ω?
A. 8Ω. B. 10Ω. C. 12Ω. D. 14Ω.
E. 16Ω

12. Calculate the magnetic flux density at the center of a solenoid of 3000 turns 70cm long and carrying a current of 1.2A.
A. $2.5\pi \times 10^{-4}T$. B. $2.057\pi \times 10^{-3}T$. C. $0.257 \times 10^{-3}T$. D. $2.0507 \times 10^{-3}T$. E. None of the above.

13. The coil in a certain galvanometer is rectangular, with sides of 4cm and 3cm and with 200 turns. Calculate the initial deflecting couple due to a current of 5mA in the coil, if the magnetic field has a flux density of 0.05T.
A. $2 \times 10^{-5}N$. B. $3.5 \times 10^{-5}N$ C. $2.5 \times 10^{-5}N$. D. $3 \times 10^{-5}N$ E. $2.7 \times 10^{-5}N$

14. At the equator, the earth's magnetic field is nearly horizontal, directed from the southern to northern hemisphere. Its magnitude is about 2×10^{-4} Tesla. Find the force on a 20m wire carrying a current of 40A parallel to the earth from north to south.
A. 0 N B. 0.016N C. 1.6N D. 16N E. 18N

15. What is the resistance of the filament of a lamp rated 240V, 40W?
A. 2400Ω B. 1440Ω. C. 240Ω. D. 1060Ω. E. 1600Ω.

16. For how long should an electric iron of 600W be used to consume 18KV of electricity, if electricity costs 6K a kilowatt hour?
A. 2hrs. B. 3hrs. C. 4hrs. D. 5hrs. E. 6hrs.

17. A test charge Q 12μc is placed half way between a charge $Q_1 = +6\mu c$ and $Q_2 = +4\mu c$, which are 10cm apart.

celeration of the proton in the given field is.
$.98\ m/s^2$ (b) $2.87 \times 10^{10} m/s^2$ (c) $9.11 \times 10^{12} m/s^2$ (d) $2.87 \times 10^{10} m/s$ (e) $9.11 \times 10^{12} m/s$

e ratio a/g for the proton in the above case is
a) 0.45 (b) 12×10^8 (c) 2.78×10^8 (d) 2.93×10^8 (e) 14.305

Two positive charges a distance b apart have sum Q. What are the values of the charges for which the Coulomb force is a maximum.
(a) $q_1 = q_2/2$ (b) $q_1 = q_2 = Q/2$ (c) $q_1 - q_2 = Q$ (d) $q_1/q_2 = 0.5$ (e) $q_1 + q_2 = Q/2$.

12. Three point charges are placed on the following points along the x- axis: + 2 μC at x=0, -3 μC at x = 40 cm and -5 μC at x = 120cm. The force on the -3 μC charge is:
(a) 0.45N to the right (b) 0.45N to the left (c) 0.55N to the right (d) 0.55n to the left (e) None of the above.

13. An equipotential surface is one:
(a) One on the same surface. (b) With a static magnetic field. (c) consisting of a continous distribution of points at the same electric potential. (d) that does not exist. (e) None of the above.

14. Which of the following devices is the principle of electrostatics not applied.
(a) Van de Graaf generator (b) Electrostatic precipitator. (c) Xerography (d) Cordless Kettle (e) Field-Ion microscope.

15. The radius of a carbon nucleus is about $3 \times 10^{-15} m$ and its mass is 12μ. The density of nuclear material is:
(a) $2.0 \times 10^{12} kg/m^3$ (b) $2.8 \times 10^{12} kg/m^3$ (c) $1.8 \times 10^{12} kg/m^3$ (d) $8.1 \times 10^{12} kg/m^3$ (e) $1.8 \times 10^{11} kg/m^3$

16. In a particular fission reaction, a $^{235}_{92}U$ nucleus captures a slow neutron; the fission products are three neutrons, a $^{143}_{57}La$ nucleus and a fission product $_{Z}X$. Determine Z.
(a) 35 (b) 34 (c) 53 (d) 43 (e) none of the above.

17. The wavenumber of a line arising from an electron transition from the L- to the K-shell of the hydrogen atom is:
(a) $8.23 \times 10^6 m^{-m}$ (b) $1.22 \times 10^7 m^{-1}$ (c) $1.1 \times 10^7 m^{-1}$ (d) $8.23 m^{-1}$ (e) $8.23 \times 10^7 m^{-1}$

18. In photoelectricity, the maximum kinetic energy of the emmitted electrons:
(a) increase with the intensity of the illuminating radiation.
(b) increases with the magnitude of the voltage between the anode and cathode.
(c) increases with the frequency of radiation.
(d) depends on the degree of roughness of the surface of the metal only.
(e) is obtained after a long time of exposure of the metal to radiation.

19. A copper plate is irradiated with light of frequency $1.2 \times 10^{15} Hz$. If the work function of copper is $7.2 \times 10^{-19} J$, calculate the stopping potential for copper at the operating frequency.
(a) 7.2V (b) 7.95V (c) 4.50V (d) 12.5V (e) 3.45V

20. The work function of a certain metal is $2eV$. Therefore the maximum kinetic energy of photoelectrons when the metal surface is illuminated with radiation of frequency $6.7 \times 10^{14} Hz$ is :
(a) $1.2 \times 10^{-19} J$ (b) $1.2 \times 10^{-18} J$ (c) $1.2J$ (d) $1.2eV$ (e) $3.2 \times 10^{-19} J$

The atomic number of two metals M_1, M_2 are Z_o, $1.5Z_o$, respectively. The metals are used as anodes (i.e. targets) in an x-ray tube operated under identical conditions.
Use this information to answer the next two questions.

21. The ratio of the intensity of continous spectrum X-rays of M_1 to that of M_2 is:
(a) 1 (b) 0.67 (c) 0.44 (d) 2.25 (e) 1.5

22. Th minimum wavelength of the X-ray spectrum is:
(a) the same for M_1 and M_2
(b) in the ratio of 1 to 1.5 for M_1 relative to M_2

32. An electric current is passed through a circuit containing two wires of the same material, connected in parallel. If the lengths and radii of the wires are in the ratio of 4/3 and 2/3, then the ratio of the currents passing through the wires will be a. 3; b.1/3; c. 8/9; d. 2; e. 9/8

33. If an ammeter reads up to 1 ampere and has internal resistance 0.81 ohm. To increase the range to 10 ampere, the value of the required shunt is a. 0.09 Ω b. 0.03 Ω; c. 0.3 Ω; d. 0.9 Ω; e. 0.07 Ω

34. A potentiometer is employed to compare the e.m.f. of a standard cell is 2.4 volt to the e.m.f. of another battery whose internal resistance is 0.5 Ω. If the balance point for the standard cell is obtained at l = 75 cm from zero and that of the other battery is obtained at l = 30 cm from zero, the e.m.f. of the battery is

a. 60.00 V; b. 0.36 V; c. 0.45 V; d. 0.96 V; e. 0.69 V

35. If Rp is equivalent to parallel connection of two resistors R_1 and R_2, and Rs is equivalent to the series connection of the two resistors, which of the following relation is correct?

a. $\frac{R_1}{R_2} = R_p R_s$; b. $R_1 R_2 = R_p R_s$; c. $R_1 R_p = R_2 R_s$; d. $R_1 = \frac{R_2}{R_s + R_p}$; e. $R_2 = \frac{R_1}{R_p + R_s}$

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...ARTMENT OF PHYSICS

2008/2009 SESSION, Second Semester Examination

PHS 102 (General Physics II)

Time allowed: One Hour Thirty minutes

OPTION A

$\varepsilon_0 = 8.85 \times 10^{-12} C^2 N^{-1} m^{-2}$, $\mu_0 = 4\pi \times 10^{-7}$ Wb $A^{-1} m^{-1}$, $c = 3.0 \times 10^8$ ms^{-1}, $k = 9.0 \times 10^9$ Nm^{2}C^{-2}, $e = 1.6 \times 10^{-19}$C,

$\frac{1}{4\pi\varepsilon_0} = 9X10^9 Nm^2C^{-2}$

For Q1 and Q2: An electromagnetic wave of frequency 20.5 KHz travels in the positive x-direction. At some instance and so... point the electric field has a maximum value of 800 NC and its along y-axis:

1. Compute the wavelength (in m) and period (in s) of the wave

a. 1.46X10^4, 4.88X10^{-5}; b. 1.46X10^{-4}, 4.88X10^{-3}; c. 2.80 X 10^3, 4.88X10^{-5}; d. 4.88X10^{-5}, 1.46X10^{-1}; e. 0.115 X 10^{-5}, 1.46X10^4

2. Compute the magnitude and the direction of the maximum magnetic field strength.

a. 2.67 X 10^{-6}jT, b. 2.67 X 10^{-6}iT, c. 2.67 X 10^{-6}kT, d. 2.67 X 10^{-6}iT, e.800kT

3. Compute the total energy density (J/m^3) of a plane electromagnetic wave with maximum electric field strength of 120 Vm^{-1}.

a. 12.74 X 10^{-6}, b. 2.67 X 10^{-4}, c.3.19 X 10^{-6}, d. 4.67 X 10^{-6}, e. 6.37 X 10^{-8}

4. Two slits spaced at 0.2mm apart and a screen distance 1m, the fifth bright fringe is found to be displaced 7.5mm from the ... fringe. Compute the wavelength (in m) of the light used. a. 5.0 X 10^{-6}, b. 7.5 X 10^{-6}, c.5.0 X 10^{-7}, d. 3.0 X 10^{-7}, e. 4.52 X 10^{-8}

5. The separation between the 2nd and 5th bright fringe is 3.25 cm when a light of wavelength 5.25X10^{-9} cm was used. The distance between the slits and the screen is 750mm. Compute the separation between the slits (in m).

a. 0.46 X 10^{-5}, b. 2.15 X 10^{-5}, c.1.19 X 10^{-5}, d. 2.35 X 10^{-7}, e. 1.21 X 10^{-5}

6. Light of frequency 6.0 X 10^{14}Hz traveling in air is transmitted through glass of refractive index 1.5. Calculate the frequency ... light in glass. a. 4.0 X 10^{14}, b. 8.15 X 10^{14}, c.6.0 X 10^{14}, d. 7.5 X 10^{14}, e. 9.0 X 10^{14}

For Q7 and Q8: An air wedge film is formed by placing aluminum foil between two glass slides at a distance of 75m... from the line of contacts of the slides. When the air wedge is illuminated normally by light of wavelength 560nm, interference fringes are produced parallel to the line of contact which has a separation of 1.20mm. Calculate the following:

7. The angle of the wedge (in rad)

a. 1.15 X 10^{-6}, b. 2.30 X 10^{-4}, c.2.30 X 10^{-7}, d. 2.30 X 10^{-5}, e. 0.57 X 10^{-4}

8. The thickness of the foil (in m)

a. 6.8 X 10^{-5}, b. 3.24 X 10^{-5}, c.1.7 X 10^{-5}, d. 2.3 X 10^{-7}, e. 6.37 X 10^{-8}

9 Which of the following is correct about Fraunhoofer diffraction? I. the screen should be very close to the slit; ii. the slit size should be sufficiently wide; iii. the slit should be sufficiently far from the screen; iv. the slit should be sufficiently nar...

a. I only, b. ii only, c. ii and iii, d. iii and iv, e. I, ii, iii and iv.

10. Compute the angular breadth of the 3rd order spectrum of red light of wavelength 700nm. Assume that the plane grating th... produces the light has 55 lines per mm.

22. If electricity costs 50 kobo per kilowatt-hour, how much would it cost to run a 1000 Watt heater for 10 hours? a. N5000.00; b. N500.00; c. N50.00; d. N5.00; e. 50 kobo

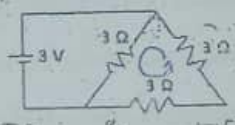
23. Which of the following is the correct meaning of Electromotive Force (emf)? a. Electric force exerted on an electron; b. Potential difference between the terminals of a cell at open circuit; c. Potential difference between the terminals of a cell at closed circuit; d. Work done to move an electron from the negative terminal to positive terminal of a cell; e. Work done to move a positive charge from positive terminal to negative terminal of a cell

24. What is the resistance of the shunt required if the galvanometer is to be used as an ammeter of 1.0 A maximum capacity? a. 0.3 Ω; b. 3.3 Ω; c. 33.3 Ω; d. 333.3 Ω; e. 3333.3 Ω

25. What size of external resistance is required if the galvanometer is to be used as a voltmeter of 250 V maximum capacity? a. 1.1 KΩ; b. 1.0 KΩ; c. 0.9 KΩ; d. 0.8 KΩ; e. 0.7 KΩ.

26. Which of these actions will induce current in a solenoid?
a. A bar of magnet is placed close to a stationary solenoid; b. Both bar of magnet and solenoid are moved at the same velocity; c. Solenoid is moved away from a stationary bar of magnet; d. All A, B, and C;
e. Only B and C

27. A 3 volt battery with negligible internal resistance is connected in a circuit as shown in the figure. The current I in circuit will be
a. 1 / 3 A; b. 1 A; c. 1.5 A; d. 2 A; e. 2.5 A



28. If a wire of resistance R is melted and recasted to half of its length keeping its cross-sectional area constant, then the new resistance of the wire will be
a. R / 4; b. R / 2; c. R; d. 2 R; e. 4 R

29. A constant voltage is applied between the two ends of a uniform metallic wire. Some heat is developed in it. The heat developed is doubled if
a. both the length and the radius of the wire are halved; b. both the length and the radius of the wire are doubled; c. the radius of the wire is doubled; d. the length of the wire is doubled; e. the radius is doubled and the length is halved

30. A house is served by a 220 V supply line. In a circuit protected by a fuse marked 9 A, the maximum number of 60 W lamps in parallel that can be turned on is a. 44; b. 22; c. 55; d. 33; e. 11

31. Two thin, long, parallel wires, separated by a distance 'd' carry a current 'i' A in the same direction. Which of the following is most correct? a. both wires have magnetic field around them; b. the wires repel each other; c. the wires attract each other; d. A and B; e. A and C

PHS 102 Fantastic

OKUNZ

UNIVERSITY OF AGRICULTURE, ABEOKUTA, NIGERIA
DEPARTMENT OF PHYSICS
2008/2009 SESSION, Continuous Assessment Test (C.A.T)
PHS 02 (General Physics II)

Time allowed: 40 minutes

$\varepsilon_0 = 8.85 \times 10^{-12} C^2N^{-1}.m^{-2}$, $\mu_0 = 4\pi \times 10^{-7}$ Wb.A^{-1}.m^{-1}, c = 3.0 X 10^8 ms^{-1}, k = 9.0 X 10^9 Nm^2/c^2.

For Q1 & Q2: A radio station transmits 5 MW signal at a frequency of 2.0 KHz. Assuming that it radiates as a point source distance of 0.5 Km from the antennae, find;

1. The amplitudes of electric and magnetic field respectively a. 1.2 X 10^{3}V/m, 0.115 X 10^{-6}T; b. 0.346 X 10^{2}V/m, 0.116 X 10 0.854 X 10^{2}V/m, 0.115 X 10^{-5}T ; d. 0.62 X 10^{2}V/m, 1.2 X 10^{-1}T ; e. 0.115 X 10^{-6}T, 0.346 X 10^{2}V/m.
2. The energy (in J) incident on a circular plate of radius 5.0mm in 2.5 minutes
a. 7.5 X 10^{-2}, b. 30.0 X 10^{-2}, c. 0.597 X 10^{-2}, d. 1.875 X 10^{-2}, e. 0.986 10^{-4}

For Q3 and Q4: An electromagnetic wave of frequency 20.5 KHz travels in the positive x-direction. At some instance and point the electric field has a maximum value of 800 N/C and its along y-axis;

3. Compute the wavelength (in m) and period (in s) of the wave
a. 1.46X10^4, 4.88X10^{-5}; b. 1.46X10^{-4}, 4.88X10^{-3} ; c. 3.30 X 10^2, 4.88X10^{-5}; d. 4.86X10^{-5}, 1.46X10^{-4} ; e. 0.115 X 10^{-5}, 1.46X
4. Compute the magnitude and the direction of the maximum magnetic field strength.
a. 2.67 X 10^{-6}jT, b. 2.67 X 10^{-6}iT, c.2.67 X 10^{-6}kT, d. 2.67 X 10^{-6}iT, e.800kT
5. Which of the following is/are the condition(s) for obtaining interference effect from monochromatic source of light: (i) tw sources must be produced; (ii) the coherent sources must be significantly separated from each other; (iii) the coherent so must be very close to each other. a.i only, b. ii only, c.i, ii and iii d.i and ii, e.i and iii
6. Compute the total energy density (J/m^3) of a plane electromagnetic wave with maximum electric field strength of 120 V
a. 12.74 X 10^{-8}, b. 2.67 X 10^{-4}, c.3.19 X 10^{-6}, d. 4.67 X 10^{-6}, e. 6.37 X 10^{-8}
7. At what distance (in m) from a point charge of 10μC is the electromagnetic potential equal 10kV. a. 0.7, b. 0.9, c.1.2, None
8. Electric field and potential field are related by: a. E=V=X, b. EDX=-dV, c.dV.dX = -E, d. dE = -XdV, e. None
9. A wire has a resistance of 1.32 ohms, a length of 110cm and an area of cross-section of 0.0014cm^2. Compute the res the material in ohms meter. a. 1.98, b. 2.98, c.3.98, d. 4.98, e. 4.38
10. What length of a resistance wire of diameter 0.6mm and resistivity 1.1 X 10^{-6} Ωm will you cut from a reel in order to 44Ω resistor (in m) a. 8.30, b. 9.30, c.10.38, d. 11.30, e. 12.38
11. A glass prism of angle 72^0 and index of refraction 1.66 is immersed in a liquid of refractive index 1.33. What is the a minimum deviation for parallel beam passing through the prism? a. 72^0, b. 94.36^0, c. 22.36^0, d. 47.18^0, e. 49.64^0
12. For which of the following pairs is the critical angle smallest?
a. Water to air; b. Glass to water, c. Glass to air, d. Glass to glass; e. Water to water
13. Two slits spaced at 0.2mm apart and a screen distance 1m, the fifth bright fringe is found to be displaced 7.5mm fr central fringe. Compute the wavelength (in m) of the light used. a. 5.0 X 10^{-6}, b. 7.5 X 10^{-5}, c.5.0 X 10^{-7}, d. 3.0 X 10^{-7}, e
14. The separation between the 2nd and 5th bright fringe is 3.25 cm when a light of wavelength 5.25X10^{-9} cm was used. The distance between the slits and the screen is 750mm. Compute the separation between the slits (in m).
a. 0.46 X 10^{-5}, b. 2.15 X 10^{-5}, c.1.19 X 10^{-5}, d. 2.35 X 10^{-7}, e. 1.21 X 10^{-5}
15. Compute the amplitude of the resultant wave (in m) if two waves each of amplitude 9.8mm and the phase differenc the two waves is 100^0 a. 0.00, b. 0.013, c. 0.019, d. 0.0098, e. 0.023
16. Light of frequency 6.0 X 10^{14}Hz traveling in air is transmitted through glass of refractive index 1.5. Calculate the fr light in glass a. 4.0 X 10^{14}, b. 8.15 X 10^{14}, c.6.0 X 10^{14}, d. 7.5 X 10^{14}, e. 9.0 X 10^{14}

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S/N	A	B	C	D	E	S/N	A	B	C	D	E	S/N	A	B	C
1						6						11			
2						7						12			

10

4. R/2; c. R; d. 2 R; e. 4 R

house is served by a 220 V supply line. In a circuit protected by a fuse marked 9 A,

maximum number of 60 W lamps in parallel that can be turned on is a. 44; b. 22; c. 55; d. 33; e. 11

For Q10 and Q11: An electromagnetic wave of frequency 10.5 MHz travels in the positive x-direction. At some instance and some

and the electric field has a maximum value of 900 N/C and its along y-axis:

10. Compute the wavelength (in m) and period (in s) of the wave

a. 1.46X10⁴, 4.86X10⁻⁵; b. 1.46X10⁻⁴, 4.86X10⁻³; c. 0.29 X 10², 9 ;2X10⁻⁵; d. 0.29X10², 1.46X10⁻⁴; e. 0.115 X 10⁻⁶, 1.46X10⁶

11. Compute the magnitude and the direction of the maximum magnetic field strength.

a. 2.67 X 10⁻⁶]T, b. 2.67 X 10⁻⁸]T, c.2.67 X 10⁻⁶;T, d. 2.67 X 10⁻⁶T, e.800KT

12. Compute the total energy density (J/m³) of a plane electromagnetic wave with maximum electric field strength of 240 V/m

a. 12.74 X 10⁻⁹, b. 2.25 X 10⁻⁴, c.3.19 X 10⁻⁸, d. 2.55 X 10⁻⁷, e. 5.10 X 10⁻⁷

For Q13 and Q14: A radio station transmits 7.5MW signal at a frequency of 4.0 KHz. Assuming that it radiates as a point source. At

a distance of 0.25 Km from the antennae, find:

13. the amplitudes of electric and magnetic field strength respectively

a. 7.2X10³, 2.4X10⁻⁵; b. 2.40X10⁻⁵, 4.88X10⁻³; c. 3.80 X 10², 4.68X10⁻⁵; d. 7.20X10⁻³, 1.46X10⁻⁴; e. 0.115 X 10⁻⁶, 1.46X10⁴

14. The energy (in J) incident on a rectangular on a rectangular surface of dimension 2.0cm by 3.0cm in 4 minutes

a. 12.74 X 10⁻⁴, b. 2.67 X 10⁻⁴, c.3.19 X 10⁻⁶, d. 2.74 X 10⁻⁶, e. 1.37 X 10⁰

15. Light of frequency 6.0 X 10¹⁴Hz traveling in air is transmitted through glass of refractive index 1.5. Calculate the frequency of the light in glass a. 4.0 X 10¹⁴, b. 9.00 X 10¹⁴, c. 6.0 X 10¹⁴ d. 3.0 X 10¹⁴, e. 9.0 X 10¹⁴

16. Which of the following is/are correct about electromagnetic waves? i. they can travel through vacuum; ii. they are examples of longitudinal waves; iii. they ratio of electric field and magnetic field gives the speed of the wave.; iv. they obey the law of superposition of waves.

a. I only, b. II only, c. II and III , d. III and iv, e. I, III and IV.

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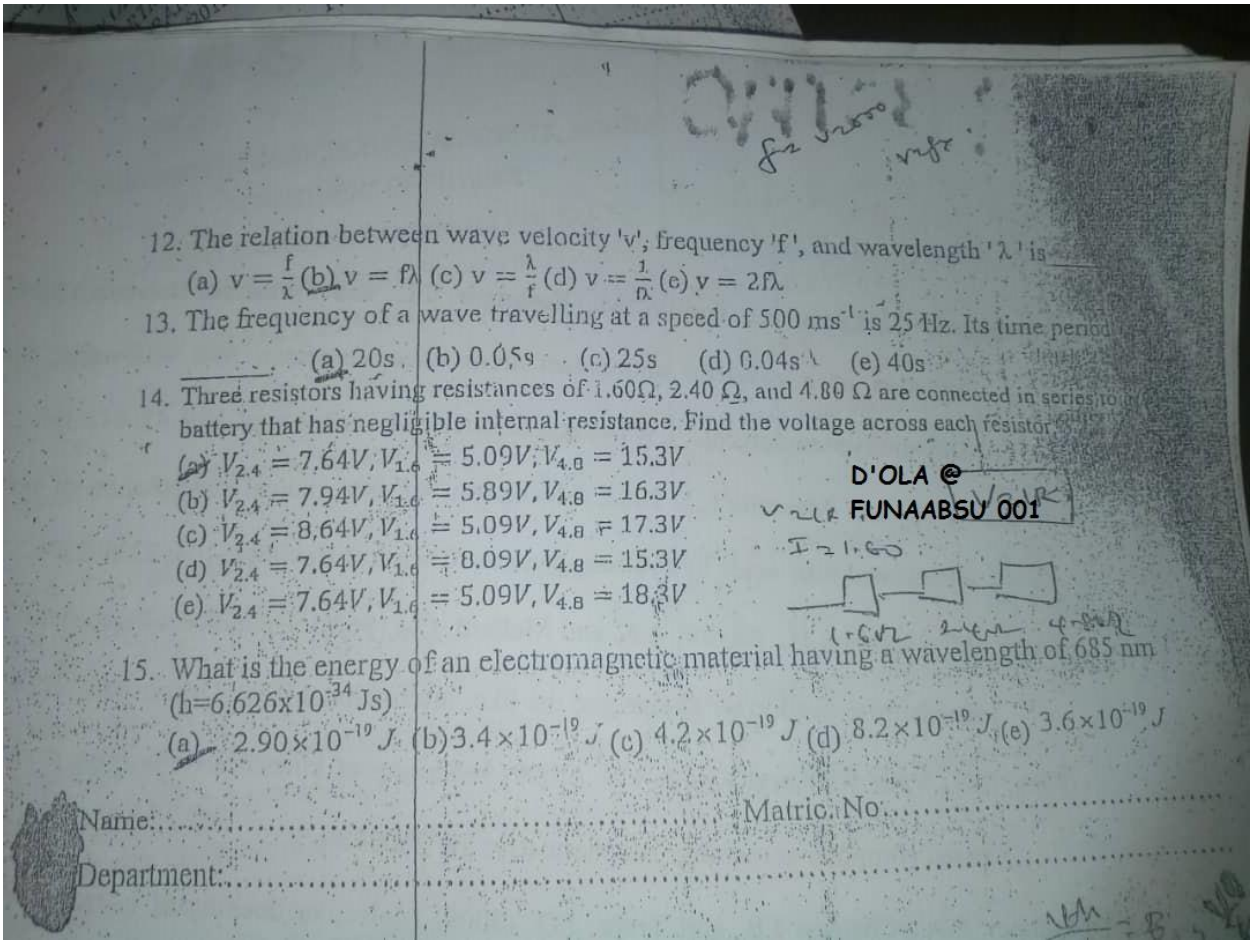
Name: Matric no: Dept/College

S/N	A	B	C	D	E
11					



12. The relation between wave velocity 'v', frequency 'f', and wavelength 'λ' is
(a) $v = \frac{f}{\lambda}$ (b) $v = f\lambda$ (c) $v = \frac{\lambda}{f}$ (d) $v = \frac{1}{f\lambda}$ (e) $v = 2f\lambda$

13. The frequency of a wave travelling at a speed of 500 ms^{-1} is 25 Hz. Its time period _____.
(a) 20s (b) 0.05s (c) 25s (d) 0.04s (e) 40s

14. Three resistors having resistances of 1.60Ω, 2.40 Ω, and 4.80 Ω are connected in series to a battery that has negligible internal resistance. Find the voltage across each resistor
(a) $V_{2.4} = 7.64V, V_{1.6} = 5.09V, V_{4.8} = 15.3V$
(b) $V_{2.4} = 7.94V, V_{1.6} = 5.89V, V_{4.8} = 16.3V$
(c) $V_{2.4} = 8.64V, V_{1.6} = 5.09V, V_{4.8} = 17.3V$
(d) $V_{2.4} = 7.64V, V_{1.6} = 8.09V, V_{4.8} = 15.3V$
(e) $V_{2.4} = 7.64V, V_{1.6} = 5.09V, V_{4.8} = 18.3V$

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15. What is the energy of an electromagnetic material having a wavelength of 685 nm ($h=6.626\times10^{-34}$ Js)
(a) 2.90×10^{-19} J (b) 3.4×10^{-19} J (c) 4.2×10^{-19} J (d) 8.2×10^{-19} J (e) 3.6×10^{-19} J

Name:..... Matric No:.....
Department:.....

THE WILL TO END A JOURNEY SUCCESSFULLY IS GREATER THAN THE WILL THAT STARTED IT.

I BELIEVE IN YOU.

YOU CAN AND YOU WILL…… IMPOSSIBILITY IS NOTHING

STAY STRONG STAY DETERMINED

STAY INSPIRED STAY POSITIVE

THINK D'OLA THINK FUNAABSU 001

LET'S MAKE A NOBLE HISTORY TOGETHER