

Physics Paper One Set A.

1. The following are the fundamental quantities of measurement except.

- A. Distance, Speed and Time
- B. Length, Time and Speed
- C. Distance, Time and Mass
- D. Mass, Volume and Density

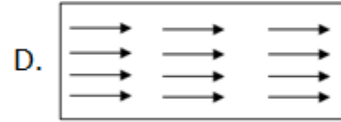
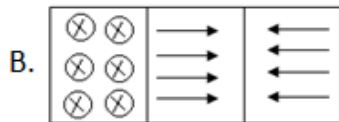
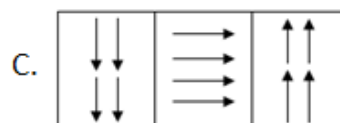
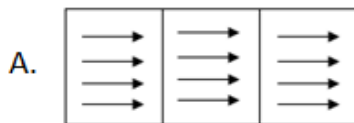
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2. When the nucleus of a radioactive atom gains a beta particle, the atomic number of the atom

- A. increases by one
- B. decreases by one
- C. remains the same
- D. doubles

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3. Which of the following diagrams shows a correct arrangement of the magnetic domain of saturated magnet?


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4. Two capacitors of capacitance $2\mu\text{F}$ are arranged across the terminals of a cell of potential difference 3V , as shown in figure 1 below.

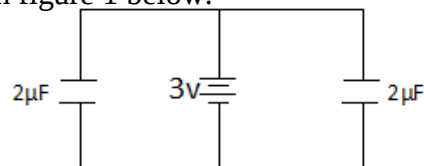


Fig. 1

Determine the charge stored in the circuit

- A. $12 \times 10^{-6}\text{C}$
- B. $12 \times 10^{-5}\text{C}$
- C. $6 \times 10^{-5}\text{C}$
- D. $10 \times 10^{-6}\text{C}$

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5. The particles of the medium through which longitudinal waves travels

- A. move in the opposite direction.
- B. vibrate parallel to the direction of the propagation of the wave.
- C. vibrate perpendicular to the direction of the propagation of the wave.
- D. move along the wave

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6. An object is placed between the focal point and the pole of a concave mirror. The nature of the image formed is

- A. virtual, erect and magnified
- B. real, erect and magnified
- C. real, inverted and diminish
- D. virtual, inverted and diminish

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7. The amount of heat required to raise the temperature of 20g of copper from 25°C to 50°C is

A. $\frac{20 \times 25}{400 \times 1000}$

B. $\frac{20 \times 400}{1000 \times 25}$

C. $\frac{20 \times 400 \times 25}{1000}$

D. $\frac{400 \times 25}{20 \times 1000}$

☐

8. When solid substance is heated,

- (i). the kinetic energy of atoms in solid increases
- (ii). intermolecular force of attraction between its atom increases
- (iii). the atom vibrate vigorously

- A. (i) only is correct
- B. (i) and (ii) are correct
- C. (i), (ii) and (iii) are correct
- D. (ii) and (iii) are correct

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9. Figure 2 below shows the magnetic flux lines of an isolated bar magnet. Identify the poles X and Y of the magnet.

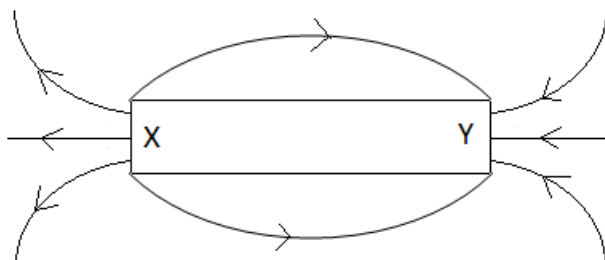


Fig. 2

- A. X is South and Y is North
- B. X is North and Y South
- C. X is South and Y is South
- D. X is North and Y is North

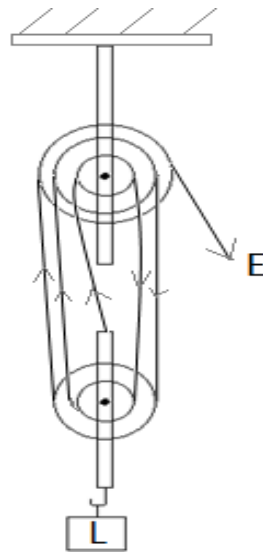


10. Determine the acceleration of an electron moving in an electric field of force $2.0 \times 10^{-30} \text{N}$.

- A. 2.0ms^{-2}
- B. 0.5ms^{-2}
- C. 20ms^{-2}
- D. 5ms^{-2}



11. What is the velocity ratio of the block and tackle system shown in figure 3 below?



- A. 2
- B. 3
- C. 5
- D. 6

Fig. 3



12. In a pin hole camera, blurred and very bright image is formed on the screen when

- A. the object is moved closer to the pin hole
- B. the distance between the pin hole and the screen is increased beyond average value.
- C. the pin hole is enlarged
- D. the size of the object is increased



13. Figure 4 below shows a uniform meter rule that is balanced by a force of 20N. Determine the mass of the meter rule

- A. 5kg
- B. 10kg
- C. 20kg
- D. 30kg

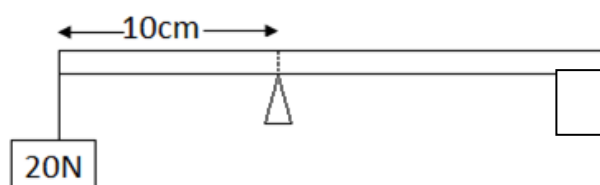


Fig. 4

14. Which of the following changes occur when a ripple from a region of deep water reaches a region of shallow water?

(i). Wave length decreases.

(ii). Velocity increases.

(iii). Frequency remains constant

A.(i) and (ii) are correct

B (ii) and (iii) are correct

C (i), (ii) and (iii) are correct

D.(i) and (iii) are correct

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15. The volume of a fixed mass of a gas is 50cm^3 at 76cmHg . Calculate the volume of the gas when pressure doubles.

A. 50cm^3

B. 76cm^3

C. 100cm^3

D. 25cm^3

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16 .Calculate the maximum wave length of light required to cause photoelectric emission in a metal of work function $3.2 \times 10^{-19}\text{J}$.

A. $\frac{6.63 \times 3}{3.2 \times 10^7}$

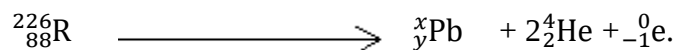
B. $\frac{6.63 \times 3.2}{3 \times 10^7}$

C. $\frac{3 \times 3.2}{6.63 \times 10^7}$

D. $\frac{3.2 \times 10^7}{6.63 \times 3}$

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17 .Radium ${}^{226}_{88}\text{R}$ decays by emitting two alpha particles and one beta particles to produce isotope of lead according to the equation



Determine the value of x and y.

A. X -228, y -83

B. X – 218, y – 84

C. X – 226, y – 85

D. X – 218, y – 85

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18. An alternating potential difference of 240v is connected to a transformer of 50 turns in the primary coil and 30 turns in the secondary coil. If transformer is 100% efficient, calculate the output voltage of the transformer.

A. $\frac{50 \times 30}{240}$

B. $\frac{240 \times 30}{50}$

C. $\frac{240 \times 50}{30}$

D. $\frac{240 \times 30}{260}$

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19. A block and tackle system of velocity ratio 2 and efficiency 90% is used in lifting a load of 90kg.

Determine the effort applied.

A .500N

B . 200N

C. 900N

D. 180N

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20. During the eclipse of the sun, both light and heat are cut off from reaching the earth because

A. both light and heat energy are electromagnetic waves and are therefore absorbed by the moon.

B. the shadow of the moon falls on the earth.

C. the sun, the earth and the moon are in straight line .

D. the moon pass between the sun and the earth .

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21 Total internal reflection occurs when

(i).angle of incidence is greater than critical angle.

(ii).ray of light passes from a dense medium to a less dense medium.

(iii). When speed of light in two media are the same.

A.(i) and (ii) are correct.

B. (ii) and (iii) are correct

C. (i) ,(ii) and (iii) are correct

D. (iii) only is correct

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22. The change of state of matter from solid directly to gas is referred to as

- A. freezing.
- B. melting.
- C. evaporation.
- D. deposition.

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23. Pressure in liquid depends on

- A. density.
- B. height.
- C. Area.
- D. Gravity.

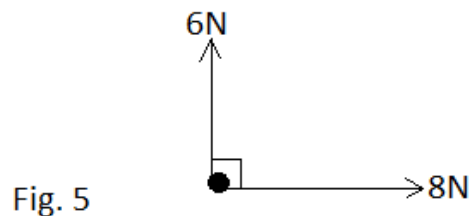
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24. Which of the following statements is correct about resistors arranged in parallel?

- A. Potential difference across them is different.
- B. The current through them is the same.
- C. The effective resistance is smaller than the smallest resistor.
- D. The effective resistance is equal to the sum of the individual resistors.

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25. The diagram below shows two perpendicular forces of 8N and 6N acting on a body of mass 100kg as shown in figure 5 .



Find the resultant force acting on the body.

- A. 2N
- B. 6N
- C. 8N
- D. 10N

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26. Which of the following is not a property of cathode rays?

- A. Darken photographic plate
- B. Carry a charge of negative one.
- C. Cathode ray ionizes metals
- D. They are negatively charged.

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27. A car is accelerated from rest at a rate of 5ms^{-2} for half a minute Calculate how far the car moved at the end of the acceleration.

- A. 2250m
- B. 750m
- C. 1000m
- D. 500m

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28. Which of the following statements is not correct about the force of gravity?

- A. It decreases as the height above sea level increases.
- B. It is responsible in holding the moon in its orbit about the earth.
- C. All free falling bodies have the same acceleration due to gravity.
- D. The pull force of gravity is larger at the equator than at the pole of the earth.

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29. Figure 6 below shows water flowing into a tube of cross –sectional area 60cm^2 at a speed of 50ms^{-1} .

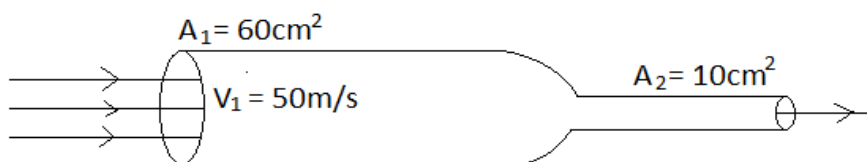


Fig. 6

Determine the speed at which the water flows out of the narrow end of area 10cm^2 .

- A. $\frac{60 \times 50}{10}$
- B. $\frac{60 \times 10}{50}$
- C. $\frac{50 \times 10}{60}$
- D. $\frac{10 \times 60}{50 \times 10}$

☐

30. Which of the following statements is correct?

- A. Primary cell produces current by a reversible change.
- B. Lead peroxide acts as a positive terminal in lead acid accumulator.
- C. When two identical cells are arranged in parallel, the electromotive force of the battery is the sum of their electromotive force.
- D. Copper electrode is the cathode of a simple cell.

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31. A vibrating tuning fork produces a sound wave of frequency 10Hz and travelling at 100m per second. Find the wave length of the wave produced by the fork.

- A. 10m
- B. 1000m
- C. 60m
- D. 20m.

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32 .Rectification of an alternating current means

- A. stepping up of the alternating current.
- B. changing direct current to alternating current.
- C. converting alternating current to direct currents.
- D. rectifying the alternating current.

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33. A pressure cooker cooks food faster than an ordinary pot because

- A. it loses no heat to the surrounding.
- B. it regulates temperature using a safety knob.
- C. it retains heat energy using a heavy cover.
- D. it boils food at a higher temperature due to its higher pressure.

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34. Which of the following statements is correct about doping a pure semi-conductor?

- A. Doping increases electrical conductivity of semi-conductors.
- B. Doping reduces electrical conductivity of semi-conductors.
- C. Doping is used in changing extrinsic semi-conductors to intrinsic semi-conductors.
- D. n-type semi-conductors are produced by doping pure semi-conductors with trivalent atoms.

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35. A stone of mass 1kg weighs 8N in water.

Determine the upthrust of water.

- A. 2N
- B. 4N
- C. 8N
- D. 10N

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36. A bullet of mass 20g is released from a gun of mass 1kg with a muzzle velocity of 900ms^{-1} .

Determine the recoil velocity of the gun.

A. $\frac{20 \times 900}{1000}$

B. $\frac{900 \times 1000}{20}$

C. $\frac{1000 \times 20}{900}$

D. $\frac{0.02 \times 900}{1000}$

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37. Electrically, energy is transmitted over long distance at

A. high voltage and low current.

B. low voltage and low current.

C. high voltage and high current.

D. low voltage and high current.

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38. A man standing near the foot of a cliff hears the echo of his clap after 9 seconds.

How far is the man from the cliff?

A. $\frac{340 \times 2}{9}\text{m}$

B. $\frac{340 \times 9}{2}\text{m}$

C. $\frac{9 \times 2}{340}\text{m}$

D. $\frac{9 \times 30}{340}$

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39. The magnitude of force on a coil of a direct current motor depends on

(i) strength of magnetic field.

(ii) the shape of magnet.

(iii) the size of the coil.

(iv) the number of turns of the coil.

- A. (i) and (ii) are correct.
- B. (i) and (iv) are correct.
- C. (i), (ii) and (iii) are correct.
- D. (iv) only is correct.

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40 .A man standing 3m away from a plane mirror moved 2m further away from the mirror.

Determine the distance between the man and his image.

- A. 5m
- B. 3m
- C. 2m
- D. 10m

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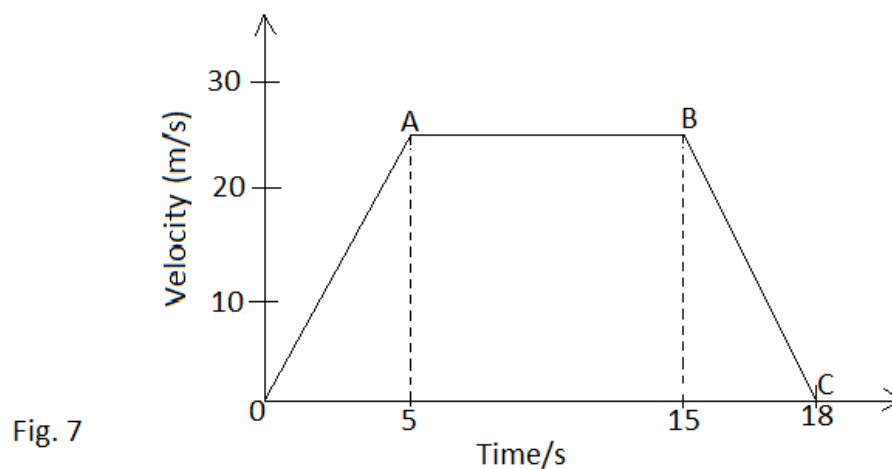
SECTION B (60 MARKS)

41. (a). Define the term acceleration.

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(1mark)

(b). Figure 7 below shows a velocity –time graph for a motorist.



(i) .Describe the motion of the motorist.

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(3marks)

(ii) . Calculate the distance travelled by the motorist.

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(2marks)

42. (a) .Explain the term principal focus as applied to lenses.

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(1mark)

(b) . In an experiment to determine the focal length of a lens, the following results were obtained by a student for the object and the image respectively.

Object distance ,u.	Image distance ,v.
20	25
100	∞

(i). Determine the focal length of the lens.

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(1mark)

(ii) .Find the magnification of the lens

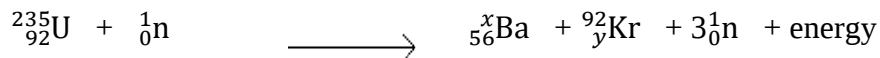
(c). Using a ray diagram show how a converging lens can be used as a magnifying glass.

43. (a). Explain the following terms as applied to nuclear physics.

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.....(1mark)

(b). An atom of uranium235 is bombarded with a neutron as shown in the nuclear equation below.



Find the value of x and y.

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.....(2marks)

(c)Outline two places where nuclear fission takes place.

(i).....(1mark)

(ii).....(1mark)

44. (a) .Define the term power as applied to electrical energy.

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.....(1mark)

(b). Name two electrical appliances that convert electrical energy to heat energy.

(i).....(1mark)

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(ii).....
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.....(1mark)

(c). An electrical appliance is rated 250v.

(i)Determine the electrical energy consumed by the appliance in one minute.

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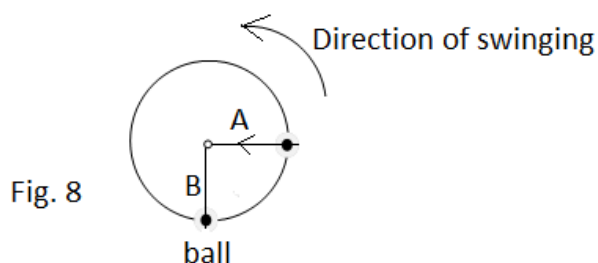
(ii). Explain what will happen to the appliance when it's connected to a main supply through a fuse of 10A.

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.....(1mark)

45. (a). Explain the term centripetal force.

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.....(1mark)

(b). Figure 8 below shows a ball of mass 2kg swinging with a uniform speed of 10ms^{-1} in a circular path of radius 50cm



. (i). Indicate the forces acting on the ball at point

A.....
.....(1marks)

B.....
.....(1marks)

(ii). Calculate the centripetal force of the ball.

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.....(2marks)

(c). Explain why the road is banked in a bend.

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.....(1mark)

46. (a).Explain the following terms as applied to waves.

(i). stationary wave.

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.....(1mark)

(ii). Progressive wave.

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.(1mark)

(1mark)

(3marks)

(1 mark)

(2marks)

(c). In a cathode ray oscilloscope, an electron is accelerated by a potential difference of 200v.
Find the speed of the electron.

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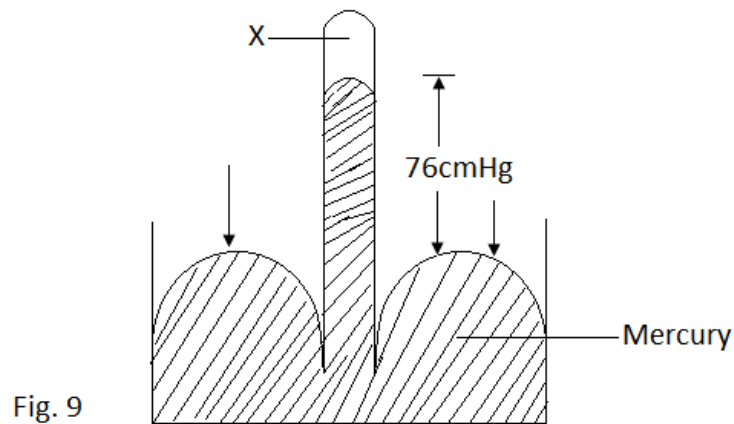
(3marks)

48.(a) .Define pressure and state its S.I unit.

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(2marks)

(b).Figure 9 below shows an instrument that is used in measuring the atmospheric pressure of Juba City.



(i) .Name part labeled x.

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(1mark)

(ii). Explain the term atmospheric pressure.

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.....(1mark)

(iii). Calculate the atmospheric pressure of Juba City in Nm^{-2} .

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49.(a).Distinguish between the lower fixed point and the upper fixed point as applied to mercury in a glass thermometer.

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.....(2marks)

(b).The lower and the upper fixed point of an ordinary thermometer is 0° and 100°C respectively.

Find the temperature reading if the liquid is 2cm above the lower fixed point and the fundamental interval is 10cm.....

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.....(2marks)

(c). Outline two properties of mercury that makes it a good thermometric liquid.

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.....(2marks)

50.(a).Explain why a pen rubbed on the hair attracts small pieces of paper.

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.....(2marks)

(b).(i) State the coulomb's laws of electrostatic.

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.....(1mark)

(ii).Two point charges A and B are placed 2cm apart. Determine the repulsive force between A and B if they are both equal to $2.0 \times 10^{-6} \text{C}$ and opposite in sign.

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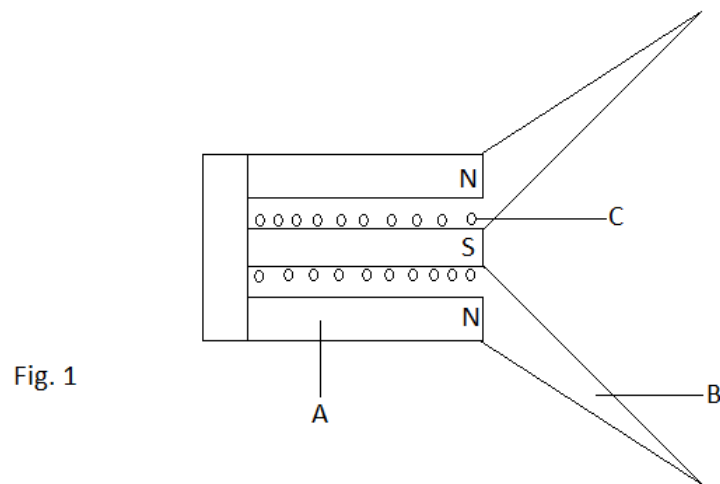
The End.

Physics Paper Two B

Q1. (a). Briefly explain what is meant by mutual induction.

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.....(1mark)

(b). Fig. 1 below shows the structure of a moving coil loud speaker



(i). Name parts labeled

A(1mark)

B(1mark)

C (1mark)

(ii). Outline three modifications you can make in the loud speaker to increase the pitch and loudness of sound produced by the loud speaker.

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.....(3marks)

(iii). Describe the mode of operation of the loud speaker

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(c). (i). State the domain theory of a magnet.

(ii). Explain magnetic saturation with reference to the domain theory of magnet.

(d). (i). Distinguish between ferromagnetic and paramagnetic materials.

(ii). Describe briefly how a steel bar can be magnetized by single touch method.

.....(4marks).

..... (2marks)

.....(1mark)

.....(2marks)

.....(5marks)

.....(5marks)

.....(3marks)

.....(2marks)

.....(1mark)

.....(2marks)

.....(2marks)

.....(2marks)

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.....(6marks)

(d). The diagram in figure 2 below shows a ray of light incident at an angle of 40° on one side of an equilateral triangular glass prism of refractive index 1.5

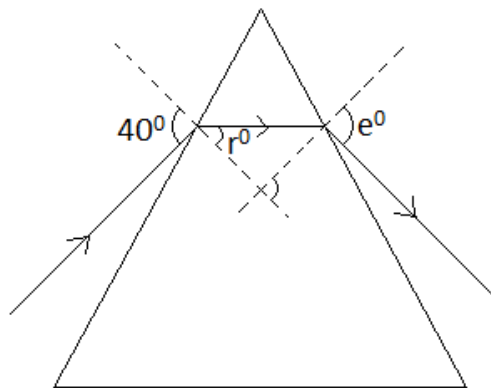


Fig. 2

Find the values of r^0 and e^0 .

.....(5marks)

(e). Mention two properties of image formed in a plane mirror.

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.....(2marks)

4. (a) (i). What is a conductor?

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.....(1mark)

(ii). Give two examples of conductors.

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.....(2marks)

(iii). Sketch the electric field lines between two opposite charges of equal magnitude placed close to each other.

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.....(1mark)

(iv). When two charges are brought together they exert a force on each other. State one factor that determine the size of the force.

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.....(1mark)

(b). Describe an experiment to verify Ohm's law.

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(c). (i). Define the term capacitance and state its unit.

(ii). Give one use of capacitors

(d). Figure 3 below shows a system of a capacitor.

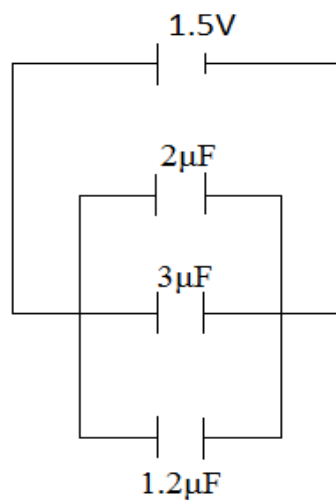


Fig. 3

(i). Effective capacitance.

.....(3marks)

(ii). Charge stored

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.....(2marks)

5. (a). Define

(i). Scalar quantity

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.....(1mark)

(ii). Vector quantity

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.....(1mark)

(b). (i). Give two reasons why weight of a body varies from place to place on the earth's surface.

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.....(2marks)

(ii). A body of mass 50kg on planet P where acceleration due to gravity is 10m/s^2 has a weight of 500N. Find its weight on planet Q whose acceleration due to gravity is $\frac{2^{th}}{5}$ of that on planet P.

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.....(3marks)

(c). (i). Differentiate between mechanical advantage and efficiency as applied to machines.

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.....(2marks)

(ii). Give two reasons why the efficiency of a machine is always less than 100%.

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.....(2marks)

(d). Figure 4 below shows a pulley system.

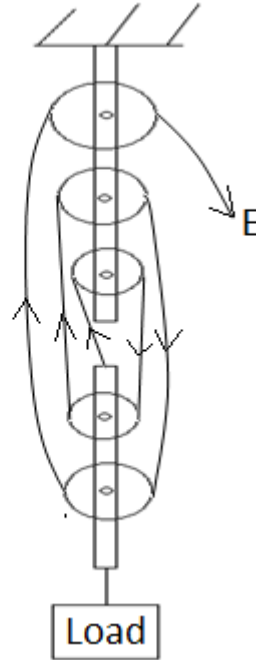


Fig. 4

(i). what is the velocity ratio?

.....(1mark)

(ii). Find how far the load is raised if the effort moved down by 2m.

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(3marks)

(iii). Calculate the effort required to raise the load of 1600N, if mechanical advantage is 4

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(3marks)

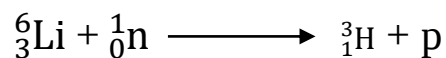
(e). Give two practical applications where pulley systems are used

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.....(2marks)

6. (a). Define radioactivity.

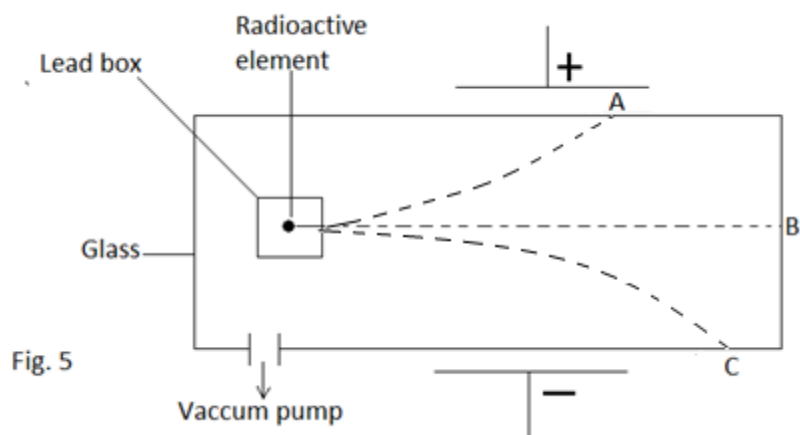
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(b). When lithium is bombarded by neutrons, a nuclear reaction occurs which is represented by the equation below. Complete the equation and name P



.....(2marks)

(c). Figure 5 below shows the deflection of radiation from a radioactive element by an electric field



(i). Why is the radioactive source kept inside a lead box with only a small hole?

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.....(2marks)

(ii). Identify the radiations

A.....(1mark)

B.....(1mark)

C.....(1mark)

(iii). Give reasons for your answers in (c) (ii) above.

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.....(3marks)

(d). (i). Define half life.

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.....(1mark)

(ii). The half life of uranium is 24 days. Calculate the mass of uranium which remains after 120 days if the initial mass is 64g

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.....(4marks)

(e). (i). Apart from penetrating power, state three differences between soft and hard X-rays.

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.....(3marks)

(ii). Mention one use of X-rays in hospital

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.....(1 mark)

(i). Oscillation of a simple pendulum bob that swings close to the ground.

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.....(2marks)

[illegible]

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.....(6marks)

(d). A car travelling with a velocity of 10m/s accelerates uniformly to 50m/s for 20s and maintained this speed for 15s and is uniformly brought to rest in 5s.

(i). Draw a velocity – time graph for this journey

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.....(2marks)

(ii). Calculate the total distance covered by the car.

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.....(4marks)

(e). (i). Define diffusion.

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.....(1mark)

(ii). State two factors which determine the rate of diffusion.

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.....(2marks)

8. (a). What is an echo?

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.....(1mark)

(b). Describe an experiment to show that sound can not travel in a vacuum (diagram not required).

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(c). (i). With the aid of a sketch diagram, explain the effect of size of a gap on a diffraction of waves.

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.....(4marks)

(ii). Explain why sound is louder at night than during the day.

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(d). (i). Distinguish between transverse and longitudinal waves.

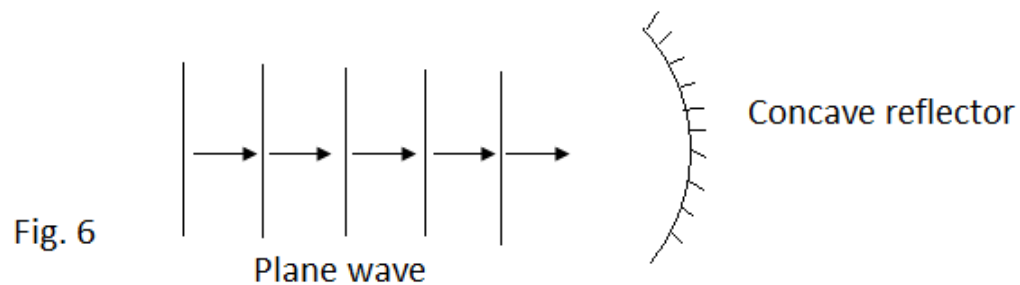
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(ii). List two differences between sound waves and radio waves.

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(e). Figure 6 below shows waves propagating towards a concave reflector.

(i). Complete the diagram to show how the waves will be reflected . (2marks).



(ii). If the velocity of the waves is 320m/s and the distance between two successive crests is 10cm, find the period of the wave.

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The End.