Name ……………………………………………………………Centre No……

Sign …………………………

535/1
Physics
Paper 1
2 ¼ hours

ACEITEKA JOINT MOCK EXAMINATIONS 2023

UGANDA CERTIFICATE OF EDUCATION

PHYSICS

PAPER 1

TIME: 2 ¼ HOURS

Instructions to candidates :

Answer all questions in Section A and Section B.

*Fill answers for Section B in the spaces provided on the question paper.*

Where applicable use:

Acceleration due to gravity	g	=	$10 ms^{-2}$.
Density of water		=	$1000 kgm^{-3}$.
Speed of light in vacuum	c	=	$3 \times 10^{8} ms^{-1}$.
Speed of sound in air	v	=	$320 ms^{-1}$.
Specific heat capacity of water		=	$4,200 Jkg^{-1}{}^{o}C^{-1}$.
Specific latent heat of ice		=	$336,000 Jkg^{-1}$.
Specific latent heat of steam		=	$2,260,000 Jkg^{-1}$.

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Section A

1. When a primary cell stops giving current after a long time of use due to:

   (i) Polarization   (ii) depletion of zinc   (iii) local action

   A. (i) (ii)   (iii)   B. (i)   C. (ii) (iii)   D. (iii)

2. When a conductor is being charged positively by induction.

   A. Electrons move from the conductor to the earth.

   B. Electrons move from the earth to the conductor.

   C. Positive charges move from the conductor to the earth..

   D. Positive charges move from the earth to the conductor.

3. In which ways does heat move through air?

   (i) Conduction   (ii) Convection   (iii) Radiation

   A. (i), (ii) and (iii).   B. (ii) and (iii)   C. (ii) only   D. (iii) only

4. Which of the following will make a thermometer more sensitive?

   (i) Thick capillary tube   (ii) Thin capillary tube   (iii) Big bulb (iv) Small bulb

   A. (i) and (iii).   B. (ii) and (iii)   C. (i) only   D. (ii) only

5. Brownian motion shows that:

   A. matter is made of particles

   B. particles in matter are constantly moving

   C. smoke particles are faster than air particles

   D. air particles are faster than smoke particles

6. A person of mass 50 kg is travelling downwards in a lift which accelerates at 8ms^{-2}. Force exerted by the person on the floor of the lift is:

   A. 0N   B. 400N   C. 500N   D. 100N

7. Which of the following is used to change electrical energy to kinetic energy?

   A. Electric motor.   B. Transformer.   C. Dynamo   D. Thermo-couple.

8. Which of the following statements are correct?

   (i) Crystals of the same substance have the same size

   (ii) Crystals of the same substance have the same shape

   (iii) Crystals demonstrate that matter is made of particles

   A. (i), (ii), (iii)   B. (ii), (iii)   C. (i), (iii)   D. (i), (ii)

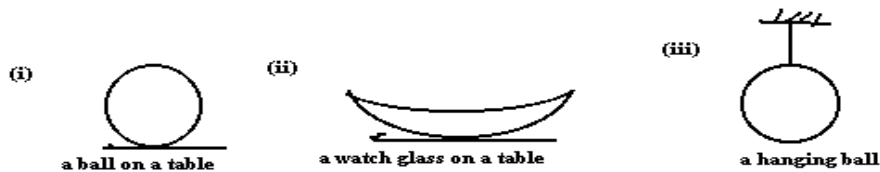9. The diagram shows how the displacement of a vibration varies with time.
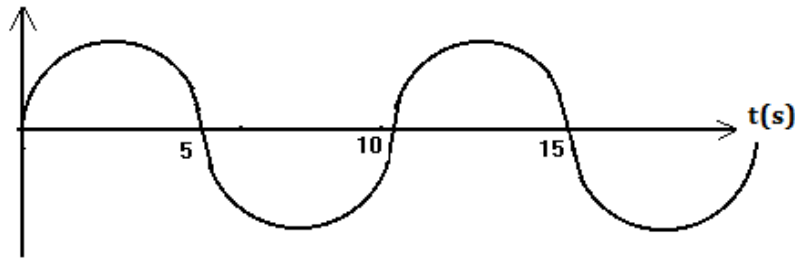
The frequency of the vibrator is.

A. 5HZ   B.10HZ   C. 0.1HZ   D. 25HZ

10. Which of the following is in stable equilibrium?

(i) a ball on a table   (ii) a watch glass on a table   (iii) a hanging ball

A. (i) and (ii)   B. (ii) and (iii)   C. (i) and (iii)   D. (i), (ii) and (iii)
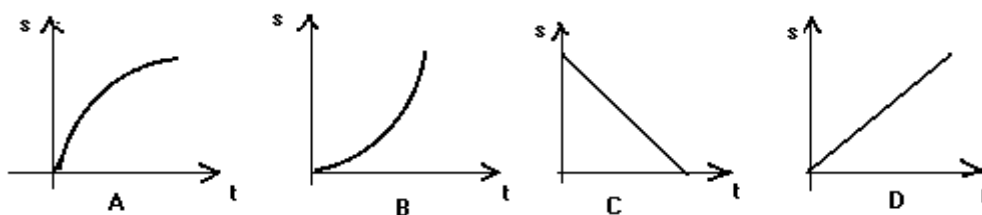
11. An object is placed 20 cm from a concave mirror of focal length 15cm. The image formed is

(i) real   (ii) diminished   (iii) magnified   (iv) virtual

A. (i) (ii)   B. (ii) (iv).   C. (i) (iii).   D. (iii)

12. A car accelerates at a constant rate during a period starting from t = 0. Which of the following is the correct displacement-time graph?
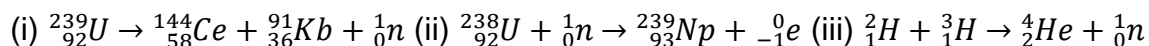

13. Air is blown above the paper as shown below. Which of the following explains what is observed?

A. The paper moves up because pressure below the paper is lower.
B. The paper moves up because pressure above the paper is lowered.
C. The paper moves down because pressure below the paper is lowered.
D The paper moves down because pressure above the paper is lowered.

3

14. Which of the following reactions show(s) the process of fission?

(i) $^{239}_{92}U \rightarrow {}^{144}_{58}Ce + {}^{91}_{36}Kb + {}^{1}_{0}n$ (ii) $^{238}_{92}U + {}^{1}_{0}n \rightarrow {}^{239}_{93}Np + {}^{0}_{-1}e$ (iii) $^{2}_{1}H + {}^{3}_{1}H \rightarrow {}^{4}_{2}He + {}^{1}_{0}n$

A. (i), (ii) and (iii)   B. (ii) and (iii) only   C. (iii) only   D. (i) only

15. The diagram below shows a bar magnet and an iron nail. The plotting compasses P and R are placed as shown. Which direction will R point?
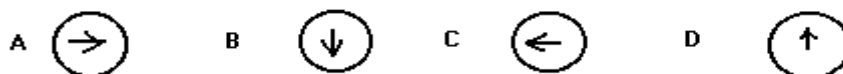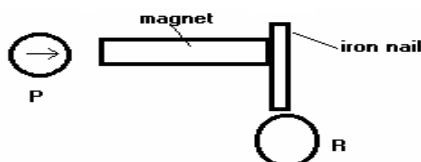
16. Sound waves are carried from a point x to a point y in air by:
A. molecules at x moving to y
B. molecules between x and y vibrating in the direction x-y
C. molecules between x and y vibrating in a direction perpendicular to x-y.
D. random movement of the air molecules.

17. Which of the following sets includes only scalar quantities?
A. weight, acceleration, momentum.   B. energy, potential, momentum.
C. mass, velocity, force.   D. heat capacity, power, time.

18. The acceleration due to gravity on the moon is one sixth that on the earth. The normal reaction to an object of mass **3kg** resting on the surface of the moon is.
A. 50N   B. 5000N   C. 500N   D. 5.0N

19. Water waves of frequency f and wave length λ move from deep lake towards the shallow beach. How will the frequency and wave length of the waves change?

|	f.	λ
A	Increase	Constant
B	Constant	Decrease
C	Increase	Increase
D	Constant	Constant

20. When a stone falls from a height on to the ground, it has,

(i) zero potential energy when it is moving

(ii) zero potential energy when it is on the ground position

(iii) maximum potential energy when it is at rest on the ground.

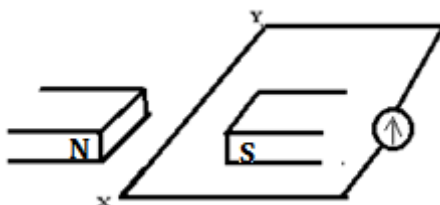(iv) maximum kinetic energy when about to hit the ground.

A. (i), (ii) and (iv)   B. (i) and (iv)   C. (i) and (iii)   D. (ii) and (iv)

4

21. Which of the following diagrams shows correctly the passage of plane waves through a narrow slit in the direction indicated by arrows?
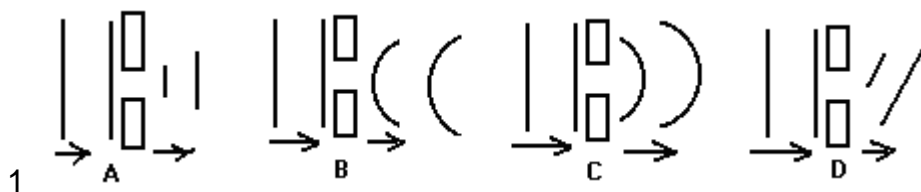
22. In the diagram below the wire XY is at right angles to the magnetic field.

Which of the following statements are correct?

(i) Current will flow in direction XY when the wire is moved upwards.

(ii) Current will flow in direction YX when the wire is moved upwards.

(iii) Current will flow when the wire is moved to the right.

A. (i) and (iii)   B. (ii) and (iii) C. (i) only   D. (ii) only

23. The image formed by the optical system of the human eye is.

A. Inverted and real.   B. Erect and real.

C. The same size as the object.   D. Erect and virtual.

24. Air is trapped in a vertical uniform tube by a 5cm thread of mercury as shown below forming a column of length 20cm. Take atmospheric pressure to be 75cm of mercury. The length of the air column when the tube is inverted is.

A. $L = \dfrac{(5+75)\,x20}{75-5}$ B. $L = \dfrac{5\,x\,20}{75}$ C. $L = \dfrac{75\,x\,20}{5}$ D. $L = \dfrac{(5+75)x\,20}{75}$
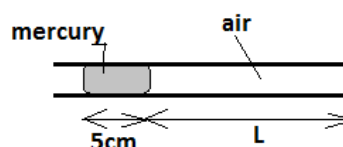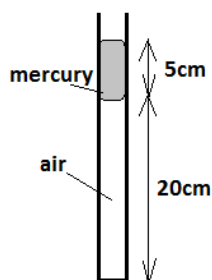
5

25. The diagram below shows a charged gold leaf electroscope.

When a negatively charged body is slowly brought near the cap the leaf will.

A. Diverge more.　　　　　　　　B. Diverge less.

C. Remain in the same position.　 D. Increase then decrease divergence.

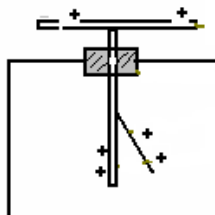26. Which of the following correctly represents the electric field pattern between a positively charged sphere and an earthed metal plate?
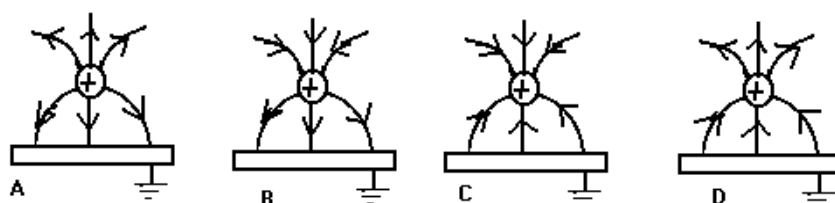
27. Lunar eclipse is when the

A. Sun is between the moon and the earth.

B. Moon is between the earth and the sun.

C. Earth is between the moon and the sun.

D. Moon is out of line with the earth and the sun.

28. An object is placed 6cm from a spherical mirror. The image is formed 10cm behind the mirror. Which of the following is true about the mirror and the image?

(i) Concave　(ii) Convex　(iii) Real image　　(iv) Virtual image

A. (i), (iii)　　　　　B. (i), (iv)　　　　　C. (ii), (iii)　　　　　D. (ii) and (iv)

29. Which of the following statements is correct?

(i) Surfaces which appear white reflect all colours

(ii) Red bodies absorb all colours and reflect red.

(iii) Black bodies appear black because they reflect all colours

A. (i)　　　　B. (i) and (ii)　　　　C. (i), (ii) and (iii)　　　D. (ii) and (iii)

30. While a car was traveling at constant velocity the brakes were applied. The graph bellow represents the motion.
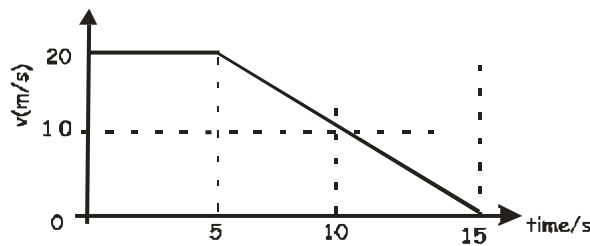
The distance traveled after the brakes were applied was.

A. 100m   B. 50m   C. 200m   D. 10m.

31. The diagram below shows a machine used to lift heavy loads.
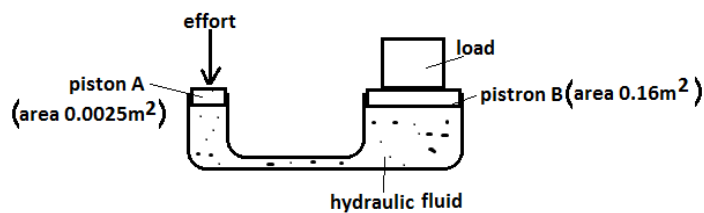
Find the effort required when the load is 600N.

A. $\frac{600 \times 0.16}{0.0025}$ B. $\frac{600 \times 0.0025}{0.16}$ C. $\frac{0.0025}{600 \times 0.16}$ D. $\frac{0.0025 \times 0.16}{600}$

32. Which of the following distance-time graphs represent a body retarding?
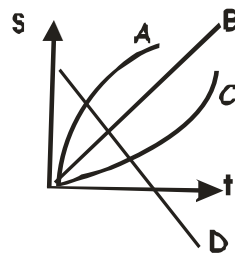
33. Boiling takes place.
(i) Inside the liquid.   (ii) At the surface of the liquid.
(iii) At boiling point only   (iv) At any temperature.
A (i) and (iii)   B (ii) and (iii)   C. (i) and (iv)   D. (ii) and (iv)

34. Forces acting on a block are shown bellow.

The change in momentum of the block after 3 seconds is.

7

A. 12 x 3 kgms^{-1}.   B. 17 x 3 kgms^{-1}.   C. 7 x 3 kgms^{-1}.   D. 17 ÷ 3 kgms^{-1}.

35.   Mechanical advantage of a simple machine,
       A. is always equal to velocity ratio.   B. Is always greater than velocity ratio.
       C. Is always less than velocity ratio.   D. Tells how much load an effort
overcomes.

36.   A ball is projected upwards from a high tower and afterwards it falls back to gound. Which
       of the following represents the velocity-time graph of its motion?
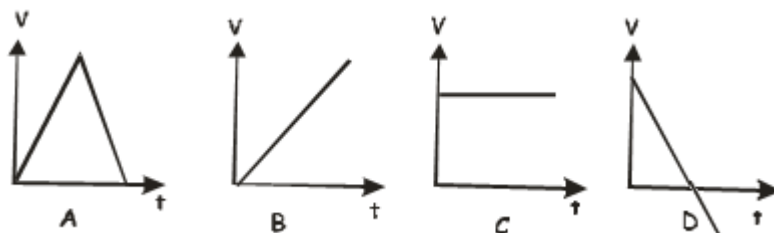
37.   The graph shows the motion of a body between two places. At what time was the body at
       rest?
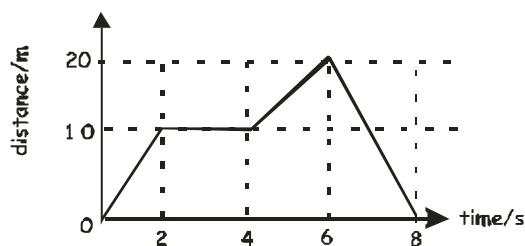
       A. Between 0s and 2s.   B. Between 2s and 4s.
       C. Between 4s and 6s.   D. Between 6s and 8s

38.   The figure below shows a U-tube containing three liquids alcohol, water and mercury. Find
       the density of alcohol.
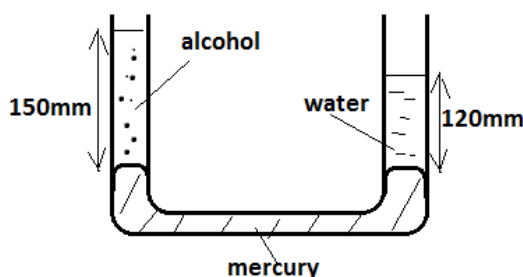
       A. 125kgm^{-3} B. 790kgm^{-3} C. 800kgm^{-3} D. 1250kgm^{-3}

39.   An alcohol thermometer is more suitable for measuring lower temperatures than a mercury
       one because:
       (i) Alcohol has a lower boiling point.   (ii) Alcohol has a lower freezing point.
       (iii) Alcohol is less dense.
       A (i)   B (i) and (iii)   C. (ii)   D. (ii) and (iii)

40.   Moment of a force is equal to.
       A. Force multiplied by the distance moved by the force.
       B. Force multiplied by its perpendicular distance from a point.
       C. Force multiplied by acceleration due to gravity.
       D. Force multiplied by velocity.

8

Section B

41. (a) The structure below shows wooden beams supporting a load L.

Identify the ties and struts. (2mark)

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 (b) Give reasons why bicycle frames are made of hollow metal pipes. (2 marks)

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42. (a) Distinguish between boiling and evaporation. (2marks)

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(b) A beaker containing alcohol is put on a surface that has some water. Air is then blown into the water using a straw. Water is observed to freeze around the beaker.

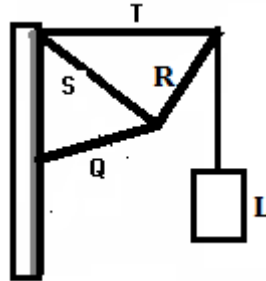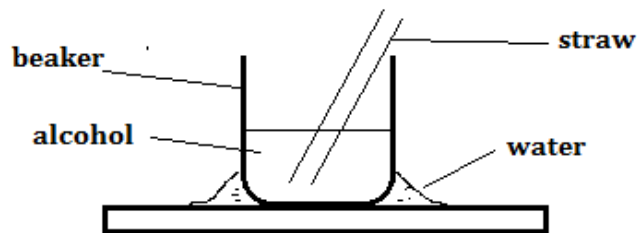Explain the observations. (2marks)

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43. (a) What is a stationary wave? (1mark)

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(b) Describe the characteristics of a stationary wave. (3marks)

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44. (a) Define the terms:
(i) Radioactivity. (1mark)

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(i) Half life. (1mark)

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(b) The graph below shows remaining mass of a radioisotope at various times.
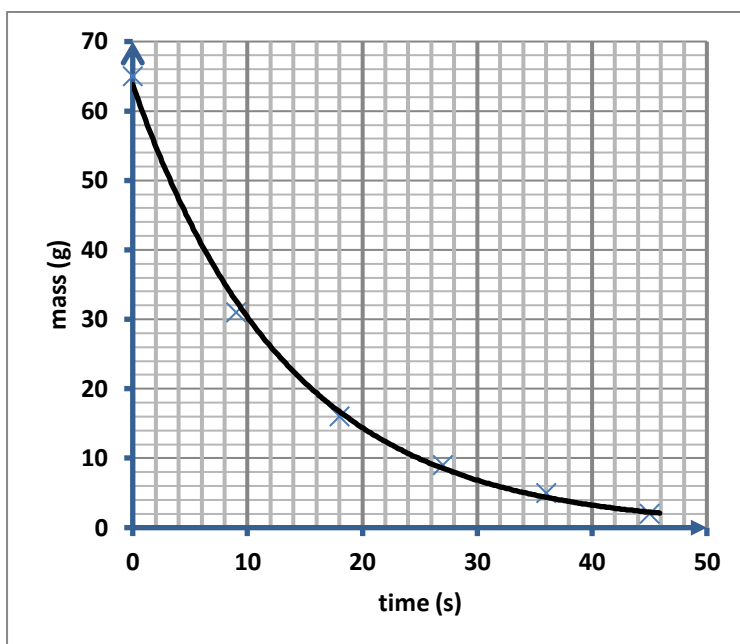
Use the graph to find half life of the isotope. (2marks)

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45. (a) Explain why mercury is preferred to water in a barometer. (2marks)

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(b) In the figure below, a mercury manometer is connected to a gas supply as shown.
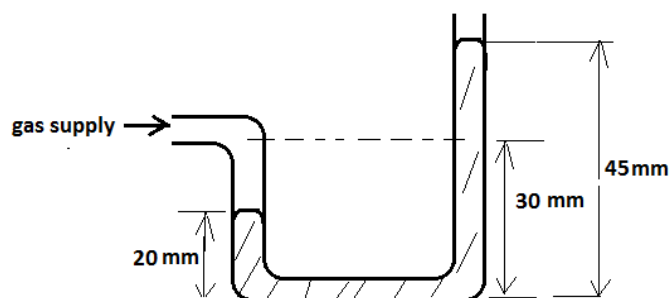
Find pressure of the gas supply in mm of mercury. (2marks)

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46.   (a) Distinguish between streamline and turbulent flow. (2marks)

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(b) Explain why a car should be streamlined. (2marks)

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47.   (a) Define specific latent heat of fusion. (1mark)

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(b) The graph below shows how temperature varies with time for a substance that is a solid at a temperature of -40ºC.
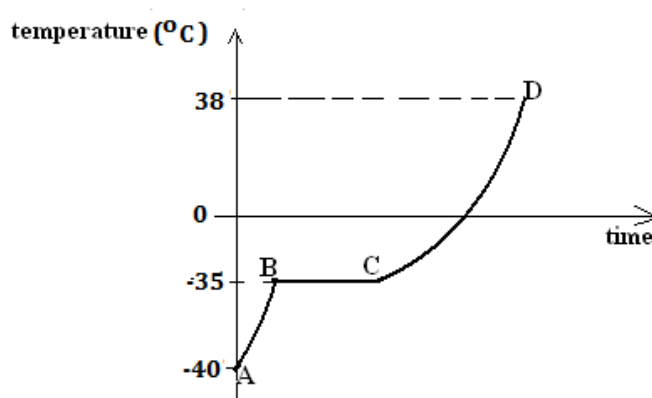
(i) What is the melting point of this substance? (1mark)

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(ii) Describe what is happening between points B and D. (2marks)

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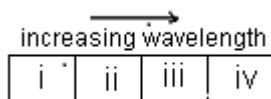……

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11

48.   (a)

increasing wavelength

| i | ii | iii | iv |

The figure above shows part of the electro-magnetic spectrum consisting of ultra-violet rays, X-rays, radio waves and visible light. Identify the bands.   (2marks)

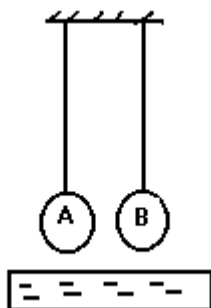i ……………………………………………………………………………………………………

ii……………………………………………………………………………………………………

iii……………………………………………………………………………………………………

iv……….……………………………………………………………………………………………

(b) Give two applications of radio waves.   (2marks)

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49.   (a) What is meant by electrostatic induction?   (1mark)

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(b) Two small neutral conducting balls A and B are hung on equal lengths of thread as shown below.

A negatively charged polythene rod is then raised slowly from under the balls.
State what is observed.   (1marks)

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Explain the observations above.   (2marks)

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50. (a) The diagram below shows an electro-magnet.
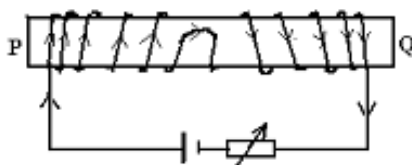
Identify the poles P and Q.
   (1mark)

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(b) Describe the factors that determine the strength of an electromagnet.   (3marks)

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