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535/1
PHYSICS
PAPER 1
July 2017
2 ¼ hours

UGANDA CERTIFICATE OF EDUCATION
MOCK EXAMINATION
PHYSICS
Paper 1
2hours 15minutes

Instructions:

- *Write your name, signature, centre/Index number clearly in the space above*
- *Section A contains 40 objective type questions. You are required to write the correct answer A, B, C or D against each question in the box on the right hand side.*
- *Section B contains 10 structured questions*
- *Answers are to be written in the spaces provided in the question paper*
- *Acceleration due to gravity = $10ms^{-2}$*
- *Specific heat capacity of water = $4200Jkg^{-1}K^{-1}$*
- *Specific latent heat of fusion of water = $3.5 \times 10^{5}Jkg^{-1}$*

FOR EXAMINERS USE ONLY

MCQ	Q41	Q42	Q43	Q44	Q45	Q46	Q47	Q48	Q49	Q50	Total

1. The graph in figure 1 describes motion of a body. Between which points is the body at rest?

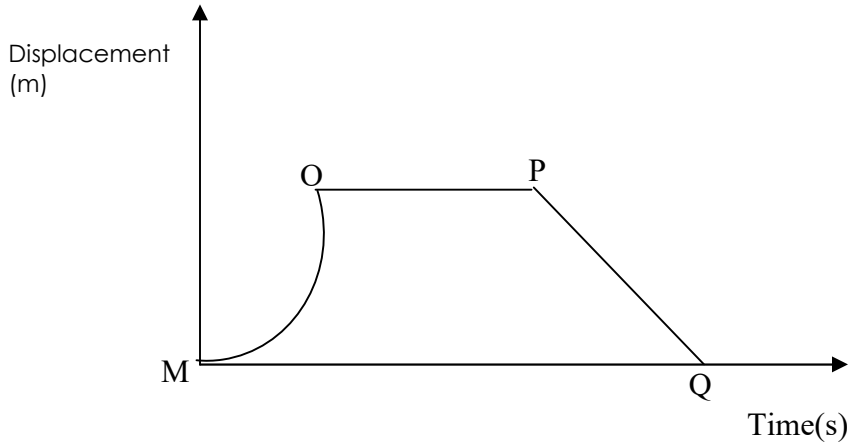


Fig. 1

A) MN B) NO C) OP D) PQ

2. A box of mass 80kg is tied at one end of a uniform piece of timber resting on two supports 1 m from each end as shown below.

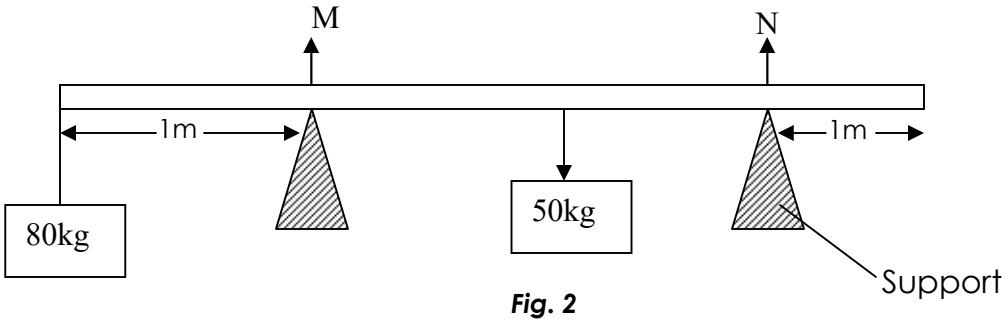


Fig. 2

If the piece of timber is 10m long and has a mass of 50kg. Find the force on each support.

	M	**N**
A	1150N	150N
B	800N	500N
C	150N	1150N
D	200N	1200N

3. A rainbow is an example of,

A) mirage B) diffraction
C) dispersion D) interference

4. When a current 2.0A flows through a coil in 1minute, a total of 720J of energy is converted to heat. Calculate the resistance of the coil.

A) 1.0Ω B) 180.0Ω C) 2.0Ω D) 3.0Ω

5. A body becomes negatively charged when
A) gains electrons B) loses electrons
C) gains protons D) loses protons

6. A radioactive material decays by loss of $\frac{15}{16}$ of its original quantity in 2hours. What is its half life?
A) 10minutes B) 45minutes
C) 30minutes D) 15minutes

7. A hollow glass sphere of mass 60kg floats in water such that $\frac{2}{3}$ of its volume is submerged in water of density 1g/cm^3. Find the volume in cm^3 of the sphere.
A) 20 B) 40 C) 90 D) 60

8. A notch on a material spreads more rapidly when the material is;
A) reinforced B) in tension
C) pre stressed D) in compression

9. A weight of 20N stretches a spring by 0.5cm. Calculate the extension when the applied weight is 60N.
A) 0.25cm B) 1.5cm C) 2.0cm D) 4.0cm

10. X-rays are;
A) particles with a positive charge
B) particles with a negative charge
C) electromagnetic waves
D) electrons of high speed

11. Which of the following is true about a standing wave?
i) the wave profile does not move
ii) it is formed when identical wave traveling in the same direction with equal speed overlap
iii) it is formed when waves of equal amplitude and speed moving in opposite directions overlap
A) (i) and (ii) only B) (i) only
C) (i) and (iii) only D) (ii) and (iii) only

12. State the energy changes which occur when the headteacher addresses a big crowd of students using a microphone.
A) sound energy ⟶ electric energy ⟶ sound energy
B) electrical energy ⟶ sound energy
C) chemical energy → sound energy → electrical energy →sound energy
D) chemical energy ⟶ kinetic energy ⟶ sound energy

13. A loud speaker rated 240V, 1.5kW works 10 hours a day in church. Find the daily cost running the speaker if the cost per unit electricity is shs. 380.

A) 3800/= B) 2400/= C) 570/= D) 5700/=

14.

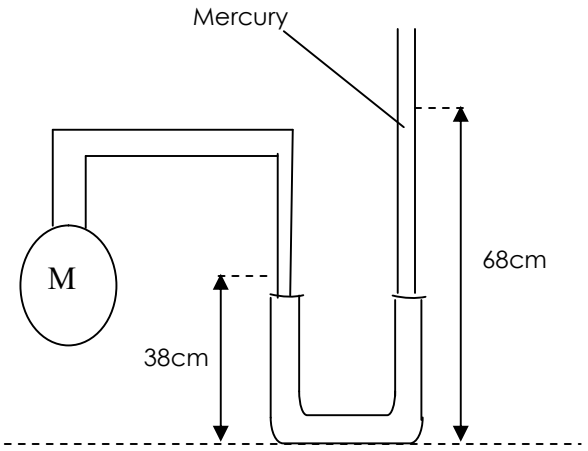


Fig. 3

In the figure 3 above, a fixed mass of dry gas is trapped in bulb M. Determine the total pressure of the gas in M, given that the atmospheric pressure is 760mm of mercury.

A) 114cm Hg B) 38cm Hg

C) 30cm Hg D) 46cm Hg

15. A lens of power 4 dioptres is used to focus an object at infinity. How far must the screen be placed from the lens so that a clearly focused image is seen.

A) 0.20cm B) 0.25cm C) 20cm D) 25cm

16. Two straight conductors near each other,

A) always repel each other

B) repel each other when no current flows in them

C) repel each other when they carry current in opposite

D) repel each other when they carry current in the same direction

17. Pieces of ice of mass 0.5kg at 0^0C are mixed with 3kg of water at 0^0C. How much heat is needed to convert the mixture to water at 10^0C?

A) 168kJ B) 126kJ C) 147kJ D) 315kJ

18. Which of the following shows the correct distribution of change on a positively charged hollow sphere.

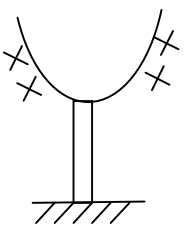
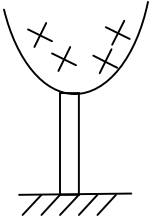
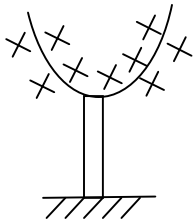
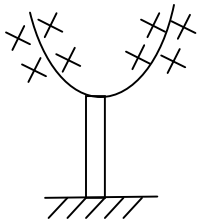
A)  B)  C)  D) 

Fig. 4

19. Two cells each of emf 2V and negligible internal resistance are connected as shown in fig 5 below.

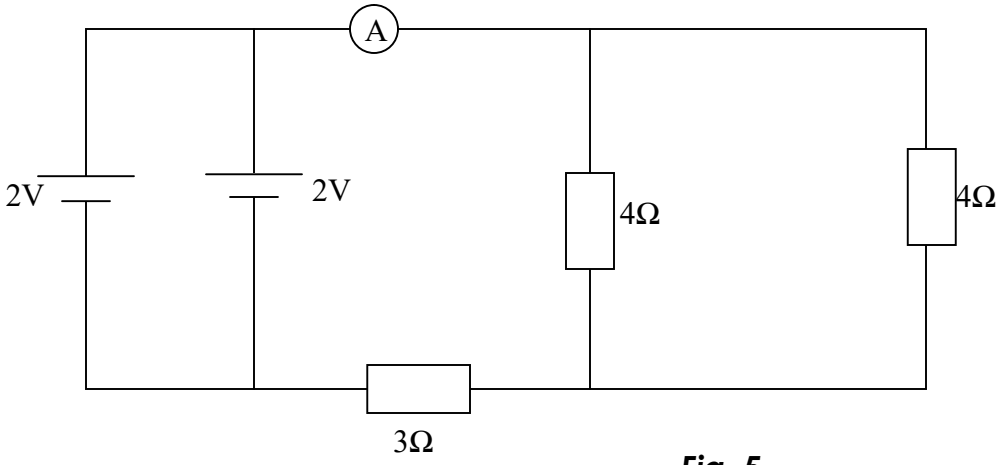


Fig. 5

What is the reading of the ammeter?

A) 0.18A B) 0.36A C) 40A D) 0.80A

20. The eclipse of the sun takes place when the shadow of the

A) earth falls on the moon B) sun falls on the moon

C) moon falls on the sun D) moon falls on the earth

21. Which two points are in phase?

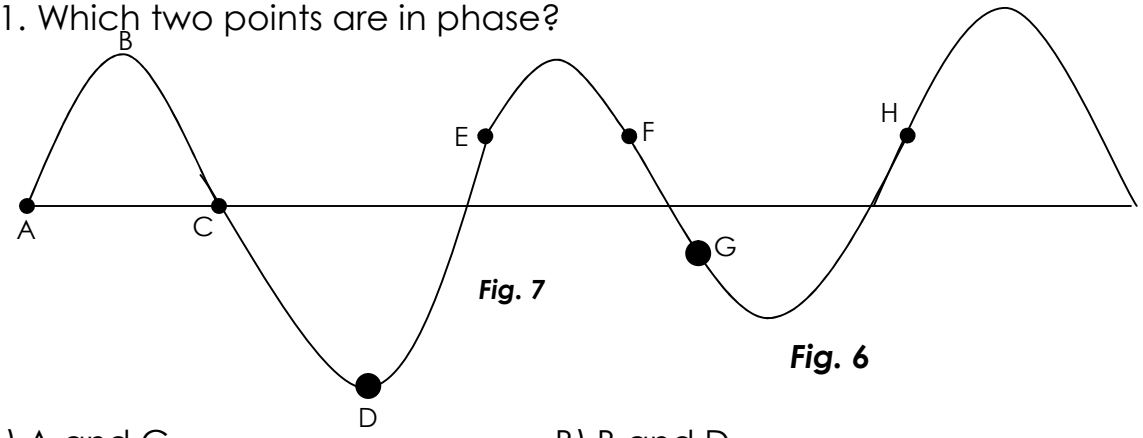


Fig. 7

Fig. 6

A) A and G B) B and D

C) C and E D) E and H

22.

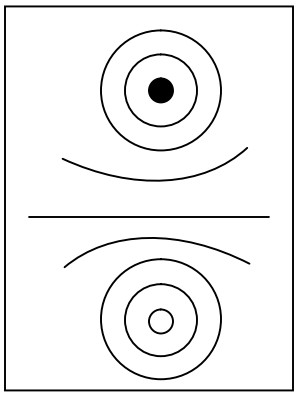


Fig. 7

The diagram in the figure 7 represents a magnetic field pattern caused by a

A) horse shoe magnet B) thin bar magnet
C) circular coil carrying a current D) long solenoid carrying a current

23. Which of the following would not increase the sensitivity of a moving coil galvanometer

A) winding more turns of wire on the frame
B) using a wire of higher resistance
C) using a stronger magnet
D) using a spring which is less stiff

24. A stone rests at a point 10m high. If its released from its position of rest, its kinetic energy just before landing will be;

A) 100J B) 10J C) 0.1J D) 1000J

25. A sensitive thermometer is one which

A) is sensitive to heat
B) can record big changes in temperature
C) can record small changes in temperature
D) has a large bore

26.

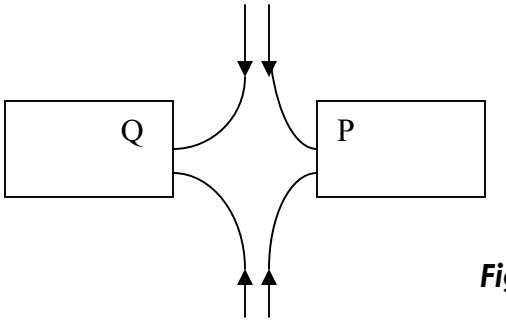


Fig. 8

Name the poles of Q and P of the bar magnets shown in figure 8 above.

	Q	P
A)	North	North
B)	South	South
C)	North	South
D)	South	North

27. Determine the force that is required to give a mass of 500,000mg an acceleration of $2 \times 10^{-2} ms^{-2}$.

A0 0.01N B) 10N C) 100N D) 10,000N

28. Figure 9 shows a cone resisting on a table. If it has a radius of 500mm and a mass of 400Dg, find the pressure it exerts on the table.

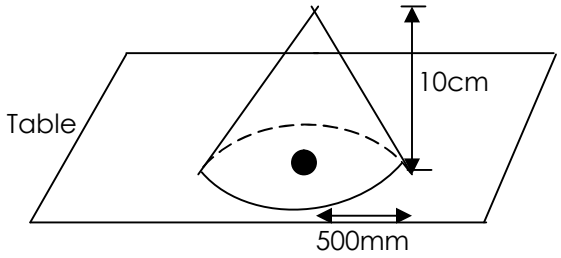


Fig. 9

A) $\frac{0.25\pi}{4\times10}Nm^{-2}$ B) $\frac{4\times10}{25\pi}Nm^{-2}$

C) $\frac{25\pi}{4\times10}Nm^{-2}$ D) $\frac{4\times10}{0.25\pi}Nm^{2}$

29.

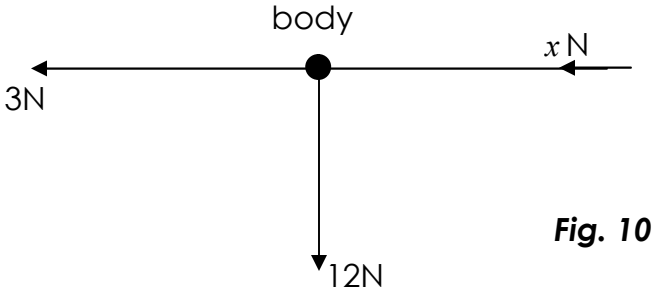


Fig. 10

From the figure 10 above, find the value of x if the magnitude of the resultant force is 13N.

A) 1N B0 2N C0 4N D) 5N

30. A ray of light travels from medium A to B as shown below

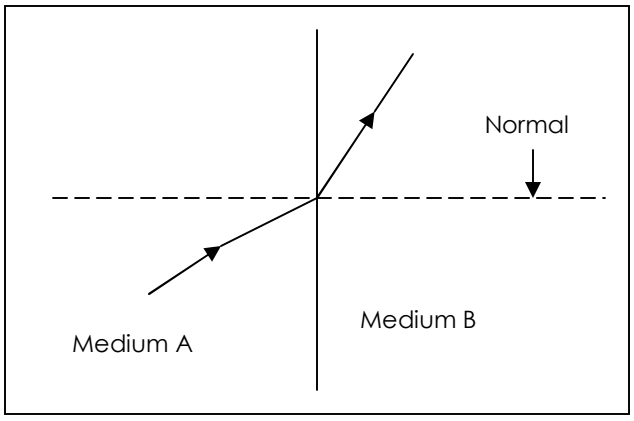


Fig. 11

Which of the following statements is true?

A) medium A is denser than medium B

B) light travels slower in medium B than in medium A

C) medium A is less dense than medium B

D) light travels slower in A than in B

31.

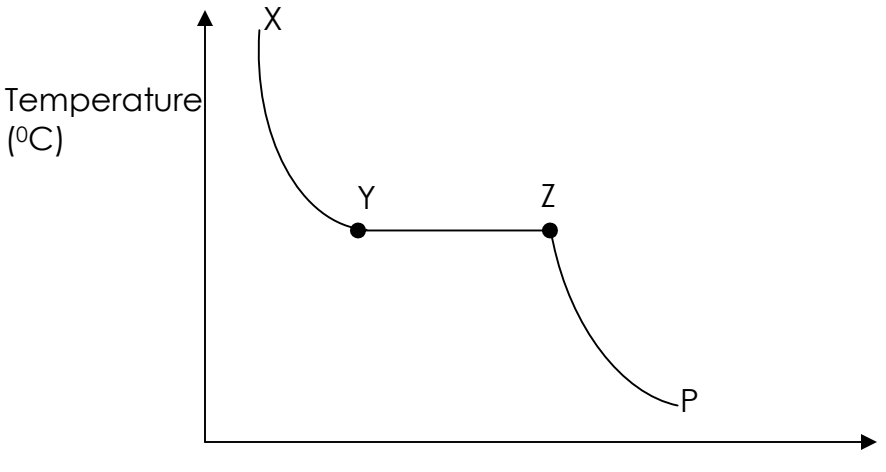


Fig. 12

The graph in figure 12 shows a cooling curve of a pure substance. The substance is all in solid state between

A) X and Y B) W and Y
C) X and Y D) Y and Z

32. A bimetallic strip operates on the principle that metals

A) are heat controllers
B) are good heat conductors
C) have different rates of expansion
D) have the same rate of expansion

33. A transformer has 200 turns on the primary coil and 20turns on the secondary coil. What is the output voltage if the input in the primary coil is 240V?

A) 12V B) 24V C) 120V D) 2400V

34. In the figure below, three slides of projectors each with a colour filter red, green and blue in a dark room are projected on a white screen.

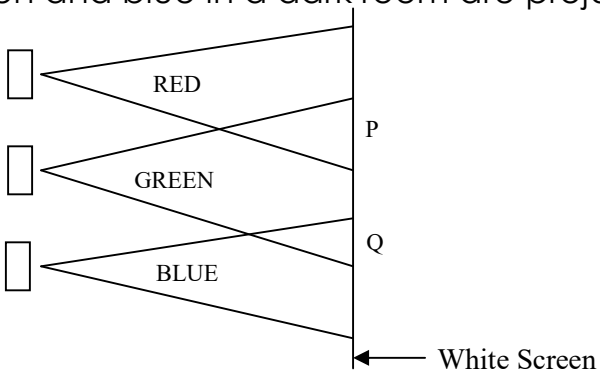


Fig. 13

What are the colours of P and Q

	P	Q
A)	Magnetic	yellow
B)	crayon	yellow
C)	yellow	crayon
D)	yellow	mangeta

35. The strongest audible frequency presenting a musical note is called
A) overtone B) harmonic
C) fundamental D) quality

36. A column of air 26.25cm long in a closed tube resonates to a surrounding tunning for k at the open end. If the velocity of sound in air is $336ms^{-1}$. What is the frequency of the folk?
A) 88Hz B) 320Hz C) 640Hz D) 1280Hz

37. Saturated vapour is obtained when
A) vapour is in with liquid
B) vapour is in dynamic equilibrium with its liquid
C) vapour obeys Boyle's law
D) liquid is vaporizing

38. Alternating current is preferred to direct current for transmission of power because;
A) it can be rectified B) its easier to generate
C) thinner conductor D) its safer

39. An alpha particle is incident on a nuclide X and produces a nuclide Y and two β-particles. The reaction is presented by
$^{88}_{37}X + ^{4}_{2}He \qquad ^{x}_{y}Y + 2\beta$
Which is correct
A) $x = 92,\ y = 37$ B) $x = 92,\ y = 40$
C) $x = 92,\ y = 35$ D) $x = 92,\ y = 41$

40. Which of the following are all brittle materials?
A) leather, rubber, thread
B) clay, glass, wood
C) glass, cast iron, stone
D) rubber, polyster, copper wire

SECTION B

41. a) Distinguish between a ***strut*** and a ***tie***. (1mark)

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b) i) Define ***reinforced concrete***. (1mark)

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ii) State two advantages of reinforced concrete that makes it a desirable building material. (2marks)

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42. a) Define;

i) ***Total internal reflection*** (1mark)

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ii) ***Critical angle*** (1mark)

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b) With the help of a ray diagram, show how a convex lens can be used as a magnifying glass. (2marks)

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34. a) State;

i) ***Lenz's law of electromagnetism***. (1mark)

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ii) ***Faraday's law of electromagnetism***. (1mark)

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b)

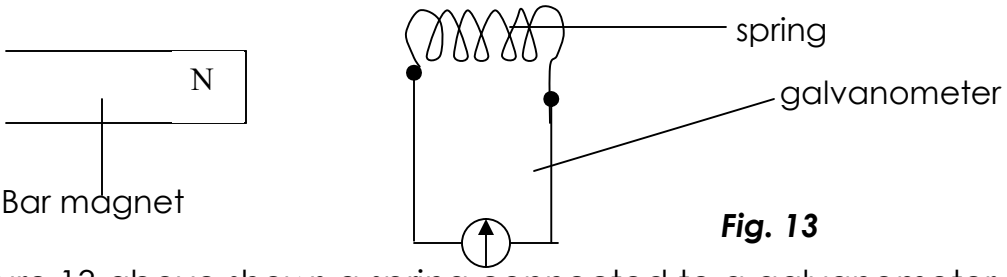

Fig. 13

The figure 13 above shows a spring connected to a galvanometer and placed near the north pole of a bar magnet.

i) State what is observed when the spring is moved towards and away from the pole of the magnet. (1mark)

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ii) How can you increase on the effect in b(i) above? (1mark)

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44. a)

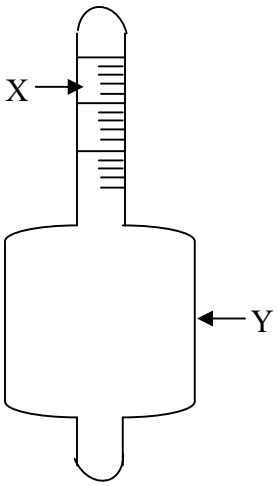

Fig. 14

The diagram shows a hydrometer. Give a reason for the shape of the parts labeled. (2marks)

i) X

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ii) Y

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45. a) What is meant by the term standing wave? (1mark)

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b) The figure 15 below shows plane waves approaching two narrow gaps on a barrier.

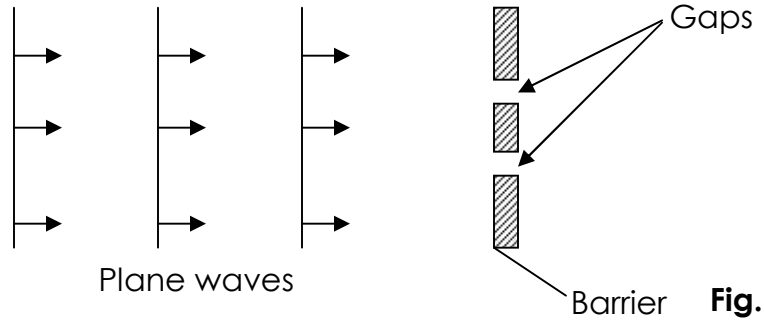

Fig. 15

i) Show on the diagram, the appearance of the waves after the barrier. (1mark)

ii) What is the effect of combining the two gaps to form a very small gap. (2marks)

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46. a) The specific heat capacity of water is 4200Jkg^{-1}K^{-1}. What is meant by the above statement? (1mark)

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b) State two reasons why water is used in the cooling system of a car engine? (2marks)

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c) What is the use of a vacuum in a thermos flask. (1mark)

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47. A symbol $^{237}_{93}Np$ denotes a neptunium nucleus.

a) What is the meaning of; (2marks)

i) 237

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ii) 93

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b) Write down a balanced nuclear equation showing the decay of $^{237}_{93}Np$ to a nuclide Y by emission of an alpha particle and gamma rays. (2marks)

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48. a) State two ways of increasing stability of a body. (1mark)

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b)

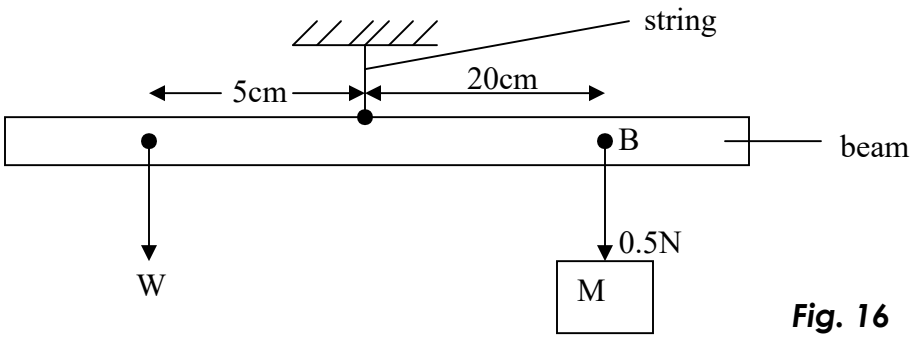

Fig. 16

The figure 16 above shows a beam of weight, W suspended on a string balancing with a mass of weight 0.5N hang at B. Calculate the tension, T in the string.

(3marks)

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49. A spherical metal ball is dropped into a liquid in a tall container.

a) Sketch a graph to show the variation of velocity of the ball with time.

(2marks)

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b) Explain the features of the graph. (2marks)

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50. a) State the principle of ***conservation of linear momentum***. (1mark)

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b) A car of mass 1 tonne moving at 25ms^{-1} collides with a stationary car of mass 500kg. After collision, the first car continues to move in the same direction with a velocity of 20ms^{-1}. Calculate the velocity of the second car after collision and state its direction. (3marks)

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***** END *****