UNEB U.C.E PHYSICS (PAPER 1) 2017

SECTION A

Answer all questions in this section

1. Energy from the sun reaches the earth by

A. interference
B. convection
C. conduction
D. radiation

2. A girder which is under tension is called a

A. strut
B. beam
C. wedge
D. tie

3. Thermionic emission is the giving off of electrons from a

A. heated metal
B. metal bombarded with energetic particles
C. metal irradiated with electro-magnetic radiation
D. metal subjected to a strong magnetic field.

4.Which one of the following electro-magnetic radiations can cause skin burn?

A. Cathode rays
B. Radio waves
C. Ultra violet radiations
D. Infra-red radiations

5. The force which keeps a body in a circular motion is called

A. centripetal force
B. centrifugal force
C. tension force
D. gravitational force

6. Gases are widely used to inflate tubes of tyres because

A. they are easily available
B. they are lighter than liquids
C. they have no smell and are colourless
D. their molecules are further apart and can be compressed.

7. Which one of the following factors affects pressure in a liquid?

A. Density of liquid container
B. Acceleration due to gravity
C. Cross sectional area of the container
D. Shape of liquid container.

8. Which one of the following parts of a mercury thermometer should be placed in contact with a body whose temperature is being measured?

A. Bore

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B. Stem
C. Bulb
D. Construction

9. A mirage is formed as a result of

i) refraction
ii) reflection
iii) diffraction

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

10. A negatively charged rod is brought near two metallic spheres in contact as shown in figure 1.

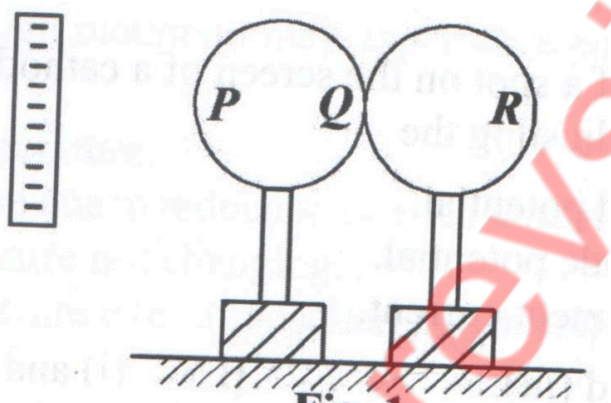

Fig. 1

What is the net charge at points P, Q and R?

	P	*Q*	*R*
A.	Positive	Positive	Negative
B.	Positive	Zero	Negative
C.	Positive	Negative	Zero
D.	Negative	Positive	Negative

11. Which one of the following is a set of good conductors of heat?

A. Silver, water and rubber
B. Copper, alcohol and silver
C. Rubber, wood and aluminum
D. Aluminum, copper and silver.

12. Glass tubes of different diameters are dipped in water and mercury as shown in figure 2

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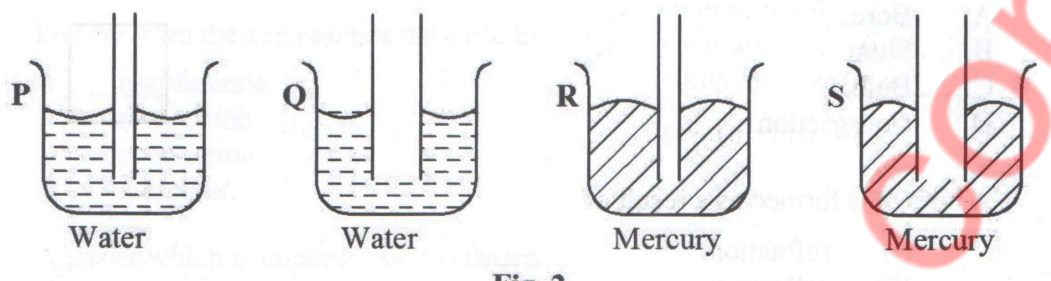

Fig. 2

Which one of the following shows the correct order of height of liquid in the tubes from lowest to highest?

A. R,S,Q,P
B. S,R,Q,P
C. Q,S,R,P
D. P,Q,R,S

13. The brightness of a spot on the screen of a cathode ray oscilloscope is determined by adjusting the

i) grid potential
ii) anode potential
iii) filament current

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

14. Three resistors R1, R2 and R3 are arranged as shown in figure 3.

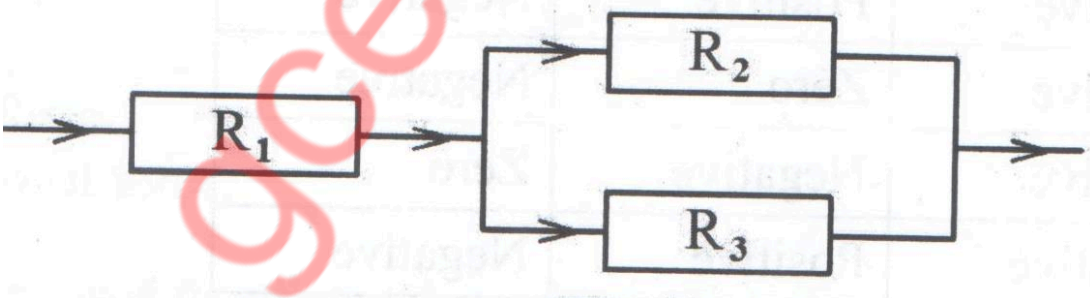

Fig. 3

Which one of the following expressions represents the effective resistance of R1, R2 and R3?

A. $R_1 + R_2 + R_3$

B. $\frac{1}{R1} + \frac{1}{R2} + \frac{1}{R3}$

C. $R1 \frac{R2\,R3}{R2+R3}$

D. $R1 \frac{R2+R3}{R2+R3}$

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15. The following devices convert electric energy to heat energy.

i) Cooker
ii) Electric iron
iii) Electric fan
iv) Refrigerator

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

16. When an object is placed in front of a concave mirror at a distance less than the focal length of the mirror, the image formed is

A. virtual, upright and magnified
B. virtual, upright and diminished
C. real, upright and magnified
D. virtual, inverted and magnified

17. A climber on top of a high mountain may experience nose bleeding because of

A. reduction in temperature
B. low blood pressure due to reduction of atmospheric pressure
C. atmospheric pressure not changing
D. excess blood pressure over atmospheric pressure

18.One advantage of connecting cells in parallel is that

A. they supply double the current
B. they supply half the current
C. their life span is prolonged
D. their internal resistance increases.

19. Which one of the following does not explain the increase in speed of sound in air with increase in temperature?

A. Air molecules moves faster as temperature increases.
B. Air molecules move closer together as temperature increases
C. Pressure of air increase with increase in temperature
D. Density of air decreases with increase in temperature.

20. The loudness of sound from a loud speaker can be increased by increasing the

i) surface area of the diaphragm
ii) resistance of the coil
iii) size of current flowing in the coil

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

21. Figure 4 shows a uniform meter rule of weight W acted upon by forces R1 and R2, and pivoted at the 25cm mark.

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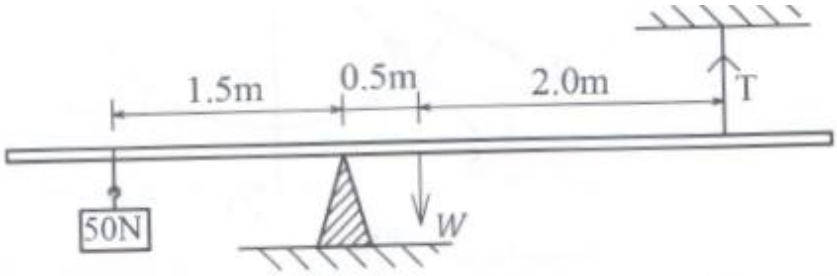

Fig. 3

Identify forces which produce clockwise moments

A. R_1 and R_2
B. R_1 and W
C. R_2 and W
D. R_1, R_2 and W

22. Telephone receivers reproduce the same voice of a person online because

i) similar sound waves are transmitted
ii) the diaphragm vibrates with the same frequency
iii) the magnetization of the electromagnets varies

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

23. A copper rod XY is placed in a magnetic field as in figure 5

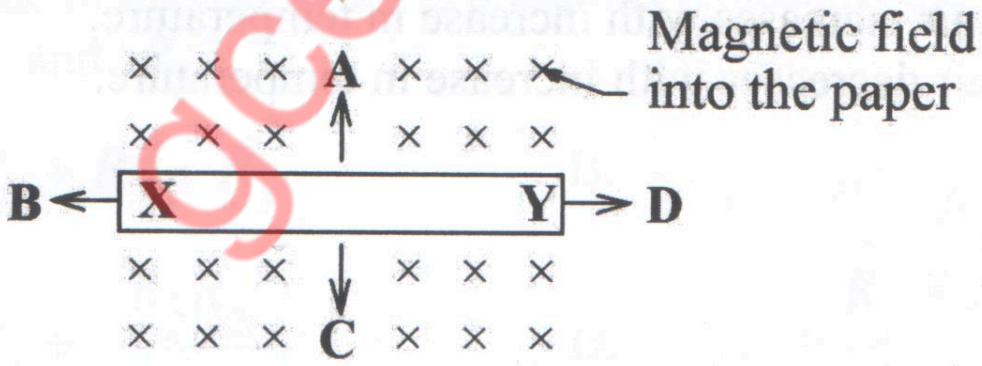

Fig. 5

If current flows through the rod from X to Y, in which direction will the force on the rod act?

A. Upward
B. To the left
C. Downward
D. To the right

24. A 10kg bag us raised from a height of 0.5m to a height of 2m in 2s. Find the power expended in lifting the bag.

A. 100W

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B. 75W
C. 10W
D. 7.5W

25.State what happens to the atomic number and mass number of radioactive nuclide decaying by emission of alpha particle followed by a beta particle.

A. Mass number reduces by 4and atomic number reduces by 1
B. Mass number increase by 4 and atomic number increases by 1
C. Mass number reduces by 3 and atomic number reduces by 2
D. Mass number increase by 3 and atomic number increases by 2

26. A spring of length 15cm extends to 23cm when 0.2kg mass is suspended from it. The spring constant is

A. $\left(\frac{0.2}{0.08 \times 10}\right) Nm^{-1}$

B. $\left(\frac{0.2 \times 0.08}{10}\right) Nm^{-1}$

C. $\left(\frac{0.2 \times 10}{0.08}\right) Nm^{-1}$

D. $\left(\frac{0.08 \times 10}{0.2}\right) Nm^{-1}$

27. White light is incident onto two filters as shown in figure

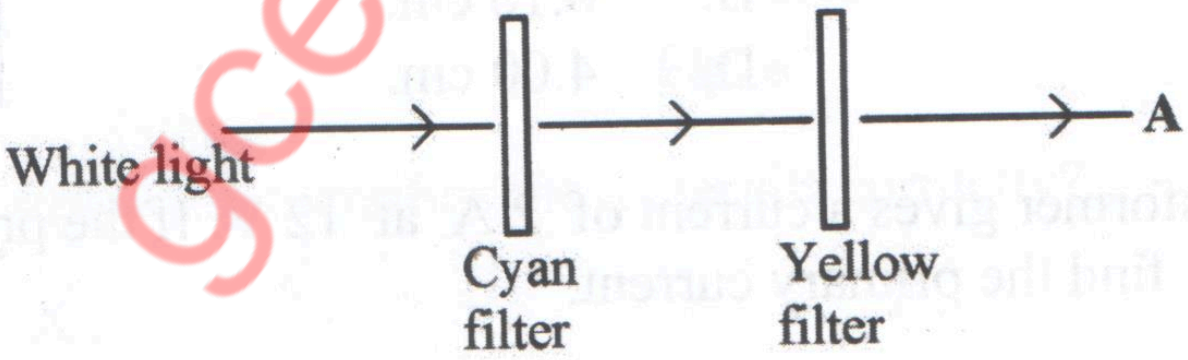

Fig. 6

6.

What is the color at A?

A. Red
B. Blue
C. Green
D. Cyan

28. The cost of running a deep freezer in 30 days is Shs12,000. If the cost per unit is Shs500, find the power rating of the freezer.

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A. $12000\,W$

B. $\frac{12000\times1000}{30\times24\times500}W$

C. $\frac{30\times24\times500}{12000}W$

D. $\frac{30\times24\times500}{12000\times1000}W$

29. A stone is projected vertically from the ground with a velocity of 25.0ms^{-1}. Find the maximum height the stone attains.

A. 31.25m
B. 62.50m
C. 150.00m
D. 625.00m

30. Figure 7 shows two waves produced by two strings vibrating at the same frequency.

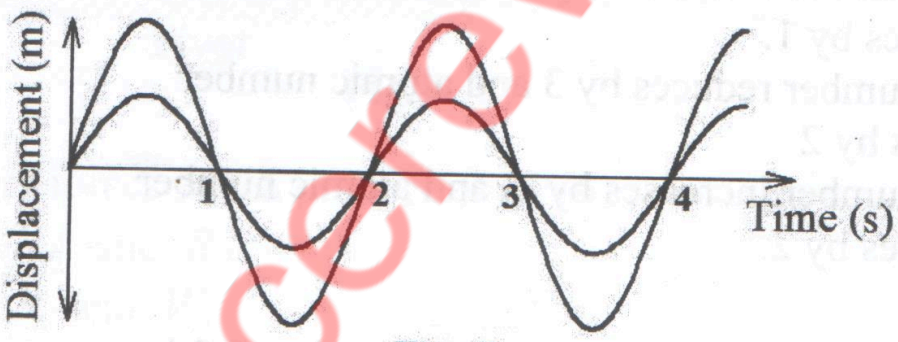

Fig. 7

The notes produced by the two strings are of

A. different quality
B. the same quality
C. different loudness
D. the same loudness

31. A metal rod extends by 0.2cm when its temperature is raised by 50C. If the heat capacity of the rod is 400 JK^{-1}, what is the extension produced when 1600 J of heat are absorbed by the rod?

A. 0.05cm
B. 0.16cm
C. 0.25cm
D. 4.00cm

32. A step-down transformer gives a current of 2A at 12V. If the primary voltage is 240V, find the primary current.

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A. $\left(\frac{240 \times 2}{12}\right)$ A

B. $\left(\frac{240}{12 \times 2}\right)$ A

C. $\left(\frac{12 \times 2}{240}\right)$ A

D. $\left(\frac{12}{240 \times 2}\right)$ A

33. When a wave is refracted,

i) its frequency decreases.
ii) its velocity changes
iii) its frequency remains constant
iv) its wavelength remains constant

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

34. A radioactive nuclide $^{235}_{92}X$ decaysby emission of an alpha particle. Find the number of neutrons in the daughter nuclide formed.

A. 141
B. 231
C. 142
D. 143

35. A car of mass 400 kg travelling at $30ms^{-1}$ is brought to rest in 15s by a constant braking force. Calculate the force.

A. 6000 N
B. 800 N
C. 450 N
D. 200 N

36. Figure 8 shows a graph of force against extension for three different materials X, Y and Z

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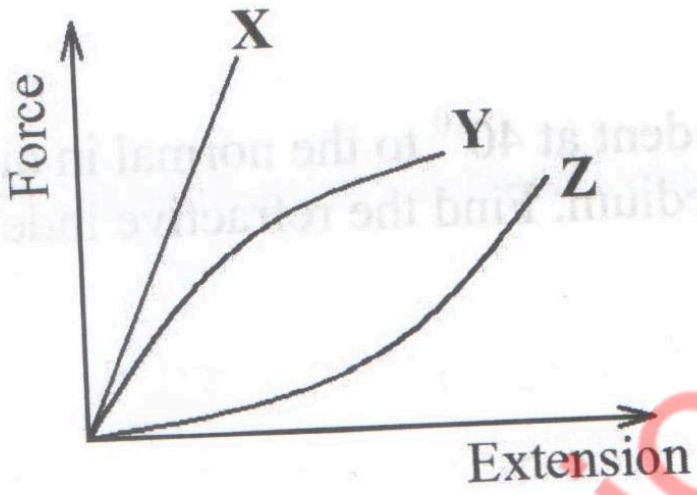

Fig. 8

Which of the following identifies the materials correctly?

	X	Y	Z
A.	Copper	Glass	Rubber
B.	Rubber	Copper	Glass
C.	Glass	Rubber	Copper
D.	Glass	Copper	Rubber

37. What is the minimum force that breaks a rod of cast iron of a rectangular cross section 4cm by 1cm, when a tensile stress of $2 \times 108\ Nm^{-2}$ is applied.

A. $\left(\frac{4\times10^{-4}}{2\times10^{8}}\right)N$

B. $\left(\frac{4\times10^{0}}{2\times10^{8}}\right)N$

C. $\left(\frac{2\times10^{8}}{2\times10^{-4}}\right)N$

D. $2 \times 10^{8} \times 4 \times 10^{-4}\ N$

In figure 9, the total current in the circuit is measured by connecting an ammeter in position.

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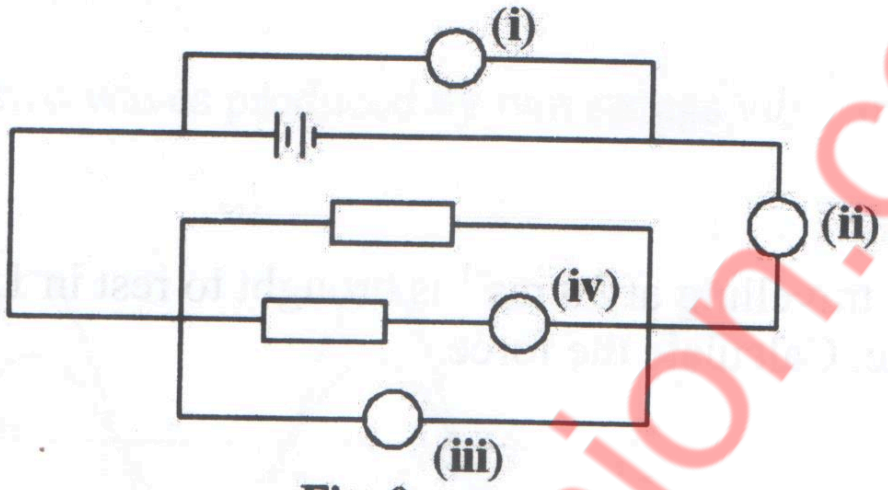

Fig. 9

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

39. A ray of light is incident at 400 to the normal in air and is refracted at 350 in some transparent medium. Find the refractive index of the medium.

A. 0.89
B. 0.94
C. 1.07
D. 1.12

40. A force of 10 N acts on a body of mass 2.0kg originally at rest. If the force acts on the body for a period of 5.0s, find the final velocity of the body.

A. 25.0 ms^{-1}
B. 20.0 ms^{-1}
C. 4.0 ms^{-1}
D. 1.0 ms^{-1}

SECTION B

Answer all questions in this section.

41. a) State one use of the following:

i. X- rays
ii. Cathode rays

b) Figure 10 shows the structure of an X-ray tube.

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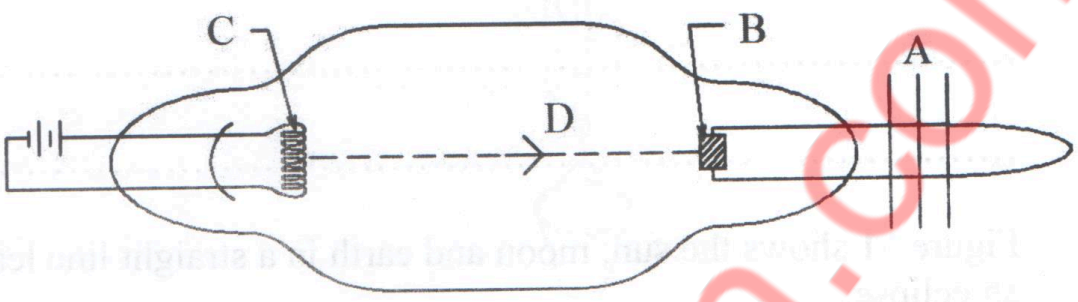

Fig. 10

Name the parts labeled **A,B,C,D**.

42. a) Explain why it is dangerous to overload vehicles with goods on the roof-rack.

b) A uniform meter rule of weight 0.8N is loaded by suspending 1N weight 10cm from 0.0cm mark.

i) Sketch the diagram for the set-up

ii) Determine where the loaded meter rule will balance

43. a) State the laws of reflection of light

b) Figure 11 shows the sun, moon and earth in a straight line leading to an eclipse.

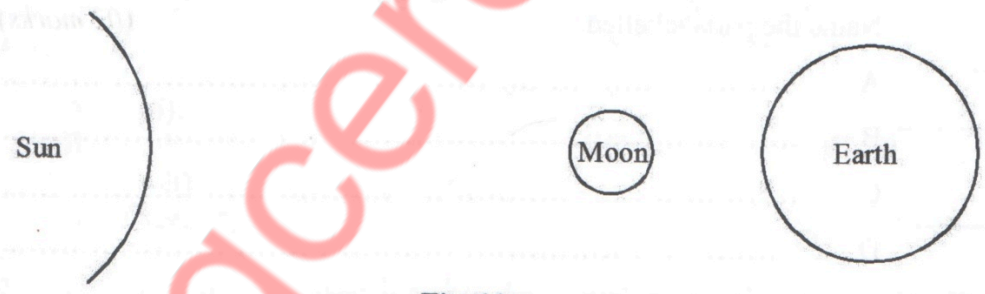

Fig. 11

i. Name the eclipse

ii. Draw light rys in figure 11 to show how the eclipse is formed

44. a) What is meant by efficiency of a machine?

b) An effort of 200N is used to lift a load of 640N using the pulley system in figure 12.

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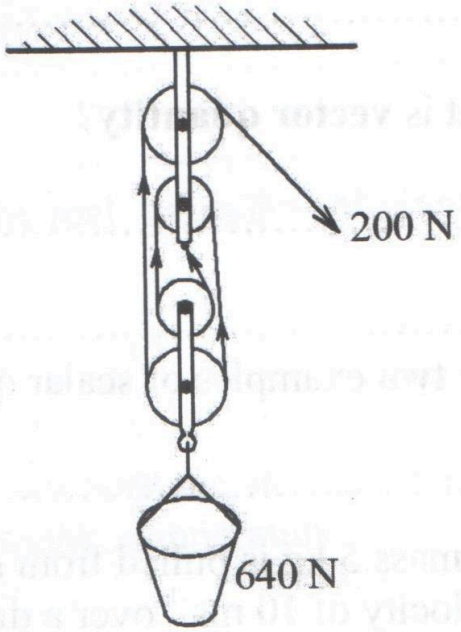

Fig. 12

Find the efficiency

45. a) Define frequency as applied to wave motion

b) Figure 13 shows a wave profile of a radio wave.

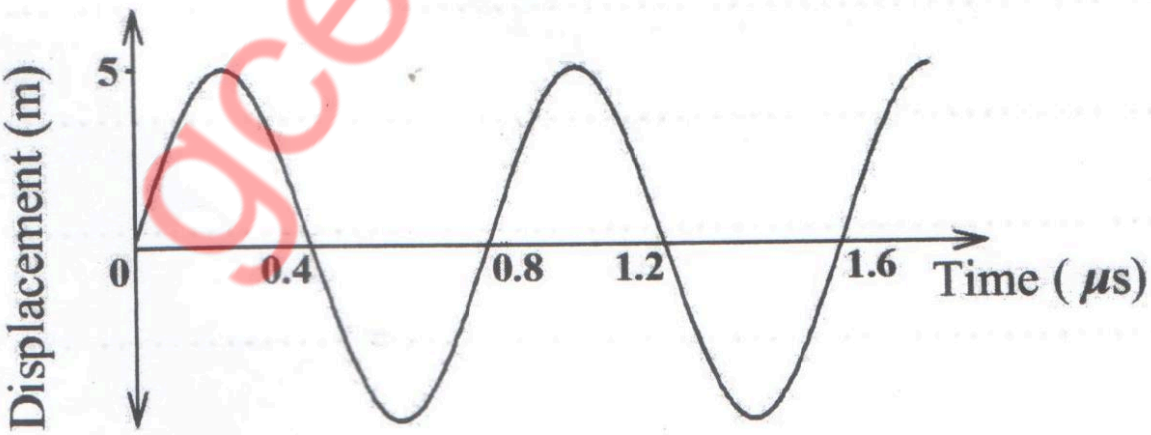

Fig. 13

i. Determine the amplitude of the wave

ii. Find the frequency of the wave

46. a) i) What is vector quantity?

ii) Give two examples of scalar quantities

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b) A block of mass 5kg is pulled from rest on a horizontal surface and attains a velocity of $10ms^{-1}$ over a distance of 4m. Find the resultant force on it.

47. a) State the fundamental law of electrostatics

b) When a charged glass rod is brought near a gold leaf electroscope, the leaf diverges but falls again when the rod is removed. Explain the observations.

c) State any two precautions that should be observed when working with an electrostatic device

48. a) i) State Boyle's law

ii) Give one reason why real gases do not obey Boyle's law

b) The graph in figure 14 shows how the volume of a fixed mass of gas varies with pressure at constant temperature.

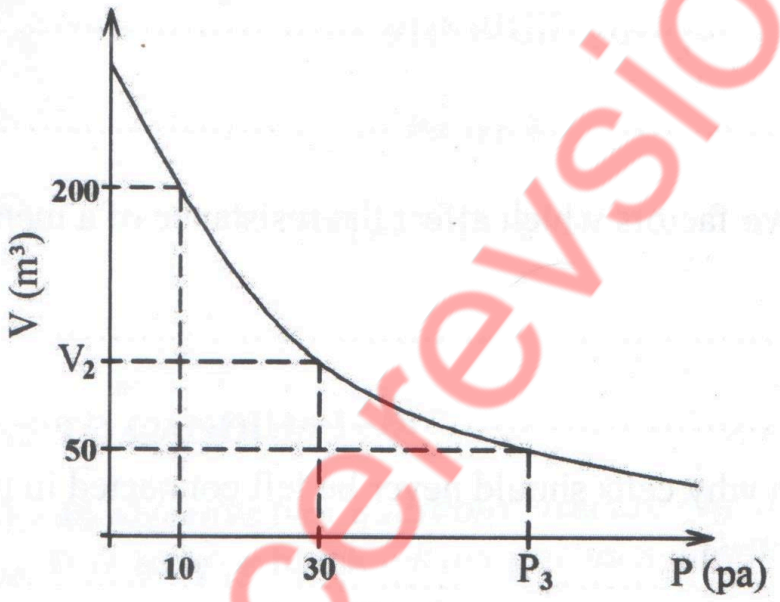

Fig. 14

Calculate the value V_2

49. a) What is meant by volume of a body?

b) Figure 15 shows the displacement method of measuring the volume of a piece of wood.

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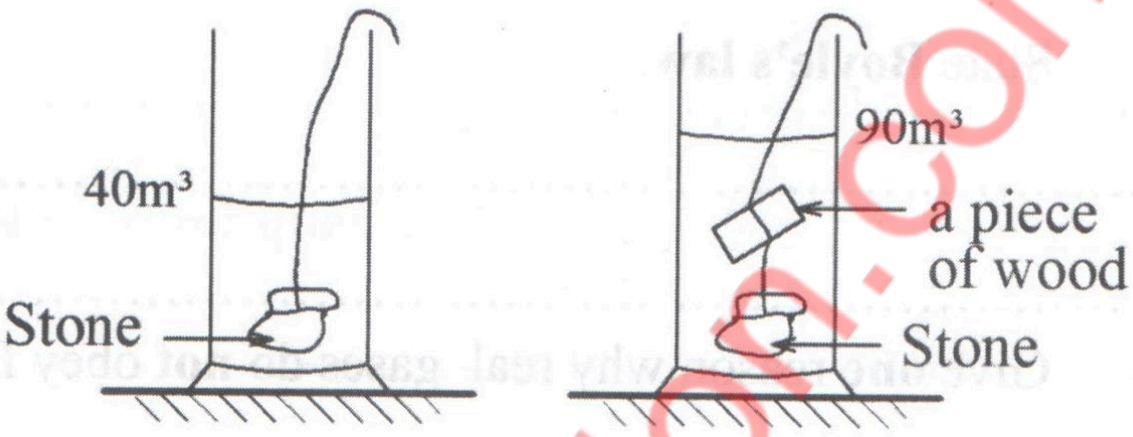

Fig. 15

Find a density of the wood if the piece has a mass of 40g.

50. a) State two factors which affect the resistance of a metal conductor.

b) Explain why cells should never be left connected in parallel.

c) The filament of a lamp is rated 120V, 30W. Calculate the resistance of the filament.

END

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