NAME……

STREAM……SIGNATURE……..

DEPARTMENT OF PHYSICS

END OF TERM ONE 2019

PHYSICS

Paper 1

2 hours 15 minutes.

A	
B	
TOTAL	

INSTRUCTIONS TO CANDIDATES.

- **Answer all questions in Section A and B.**
- *Use acceleration due to gravity* = $10ms^{-2}$

SECTION A: (40 MARKS)

Answer all questions from this section.

1. The following are effects of force on a body except;

   A. shape B. mass
   C. speed D. direction of motion

2. Which one of the following groups consists of vectors only?
   A. Force, weight, work, energy
   B. Velocity, displacement, acceleration, weight
   C. Momentum, power, work, energy
   D. Velocity, work, power, energy.

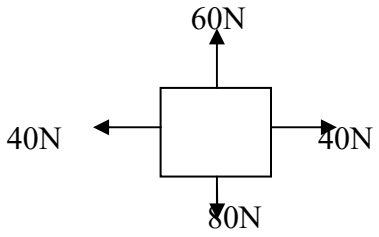
3. Liquid X of volume $0.5m^3$ and density $900kgm^{-3}$ was mixed with liquid Y of volume $0.4m^3$ and density $800kgm^{-3}$. What was the density of the mixture?
   A. $8500kgm^{-3}$ C. $770kgm^{-3}$
   B. $1889kgm^{-3}$ D. $856kgm^{-3}$

4. An object is placed 20cm in front of a plane mirror. If the object is moved a distance 5cm towards the mirror, find the distance between the object and the mirror.
   A. 30cm C. 40cm
   B. 10cm D. 35cm

5. A girl is standing in front of two mirrors inclined at an angle of 30^0 to each other. How many images of the girl can be seen?
   A. 11 B. 12 C. 9 D. 6

6. Figure 1 below shows forces of 80N, 40N, 60N and 40N act on a body.

Fig. 1



In which direction does the body move?

A. To the left
B. To the right
C. Downwards
D. Upwards

7. Soap is used to wash clothes because it;-

A. Increases surface tension allowing water to penetrate the dirt more easily.
B. Increases capillarity in the clothes.
C. Reduces surface tension allowing water to penetrate the dirt more easily.
D. Increases capillarity in the clothes.

8. An object is placed between the focal point and the centre of curvature of a concave mirror. Which of the following fully describes the image formed?

A. Real, inverted, magnified
B. Virtual, erect, magnified
C. Real, inverted, diminished
D. Real, erect, diminished.

9. Linear magnification is defined as the ratio of ;

A. Object distance to image distance
B. Object height to image height
C. Image distance to focal length
D. Image height to object height

10. Soft magnetic materials are materials which;

A. Can be magnified easily.
B. Can retain their magnetism for a long time
C. Can break easily
D. Cannot be attracted by a magnet.

11. Which of the following statements is NOT true about pressure in liquids?

A. It increases with depth
B. It is lowest at the surface
C. It is the same throughout the liquid
D. It acts equally in all directions.

12. Find the velocity ratio of an inclined plane of length 12m if the height from the ground is 3m.

A. 6 B. 2 C. 4 D. 3

13. In figure 2 below, a ray of light **AO** incident on a plane surface is reflected along **OB**, as shown below;-

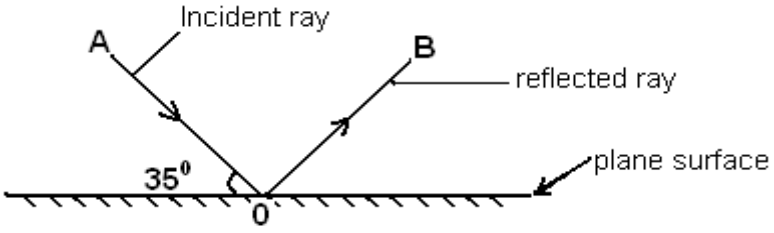


Fig. 2

The angle of reflection is;

A. 60^0 C. 40^0

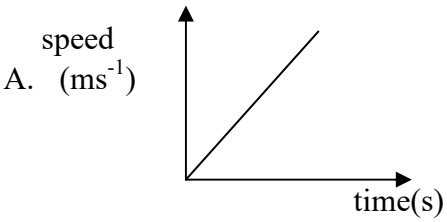
B. 35^0 D. 55^0

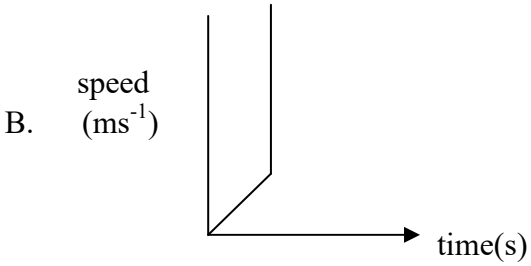
14. The force which holds water molecules together with the molecules of glass when water drops remain on glass is;-

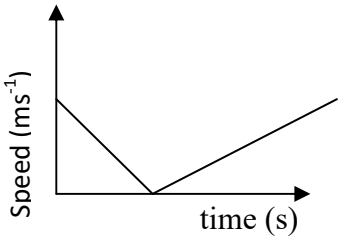
A. Cohesion C. Capillarity

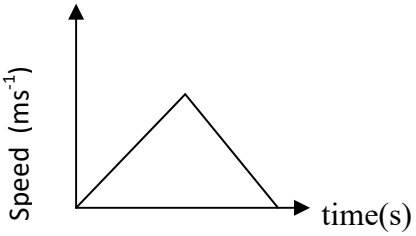
B. Adhesion D. surface tension

15. Which of the following graphs represents a speed against time graph for a body thrown vertically upwards?

A. 

B. 

C. 

D. 

16. Which one of the following apparatus is most sensitive in the measurement of length?

A. Metre rule

B. Engineer's calipers

C. Vernier calipers

D. Micrometer screw gauge

17. A body of mass 60kg weighs 390N on planet K. Which one of the following statements is true?

A. The mass of the body is less on earth than it is on K.
B. The acceleration due to gravity on K is less than it is on the earth.
C. The acceleration due to gravity on earth is less than it is on K.
D. The mass of the body is less on K than it is on earth.

18. A straight line through the origin of a velocity time graph shows that the;

A. Motion is a retardation
B. Velocity is uniform
C. The acceleration is uniform
D. Distance is increasing uniformly

19. The three fundamental physical quantities are;-

A. Mass, weight and force.
B. Mass, time and metre
C. Length, Mass and time
D. Length, Metre and second.

20. A solid of dimensions 4m by 3m by 2m weighs 240*kN.* Find the pressure exerted when it rests on a horizontal surface with its smallest surface.

A. 10 *kPa*
B. 20 *kPa*
C. 40 *kPa*
D. 1240 *kPa*

21.

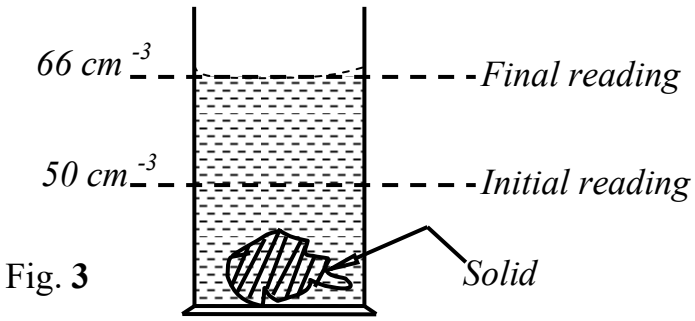


Fig. **3**

Figure 3 shows levels of water in a measuring cylinder before and after immersing a solid Y of mass 40g. Find the density of Y in kgm^{-3}.

A. 4000
B. 2500
C. 24000
D. 1400

22. It is difficult to start a punching bag moving and it is difficult to stop it once it begins to move. This tendency is called its;

A. Momentum
B. impulse
C. inertia
D. mass

23. A simple machine has a velocity ratio of eight and needs an effort 10N to lift a load of 50N. What is the efficiency of the machine?

A. 100% B. 62.5% C. 20% D.2.5%

24. 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

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

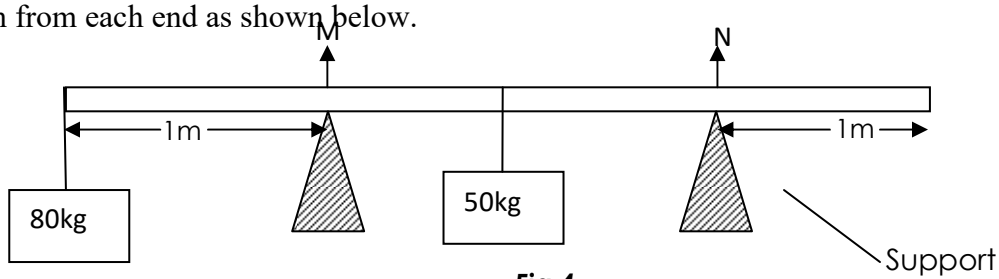


Fig.4

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

26.

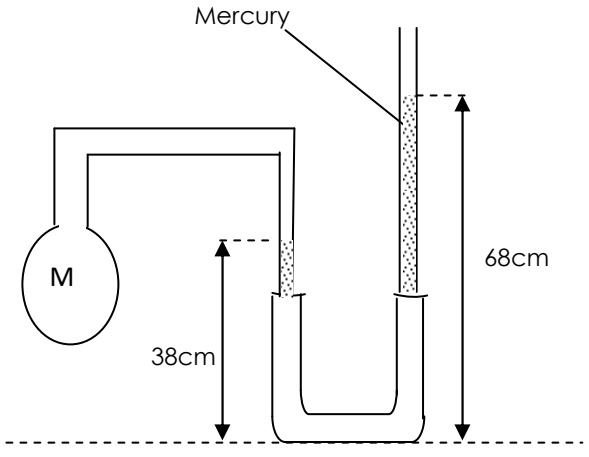


Fig. 5

In the figure 5 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. 106cm Hg
C. 30cm Hg D. 46cm Hg

27. Which of the following are reasons why water is not a good thermometric liquid?
(i) it expands irregularly
(ii) it is a poor conductor of heat
(iii) it wets glass

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

28. The stability of a body may be increased by?
(i) Raising its centre of gravity
(ii) Lowering its centre of gravity
(iii) Making its base narrow
(iv) Making its base wide.

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

29. 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

30. A stone of mass 100g 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

31. 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

32. A ticker timer is connected to the mains – supply of frequency 50HZ. Find the time it takes to print five consecutive dots.
A.0.08s B. 250s C. 10s D. 0.10s

33. In the crushing can experiment, the can collapses because

A. It is weakened by the hot water
B. Pressure outside is greater than pressure inside
C. Pressure inside is greater than pressure outside
D. Pressure inside is atmospheric.

34. Which one of the following is true about the periodic time in a simple pendulum?

A. It is independent of the length of the string.
B. It increases with the length of the string.
C. It increases with mass of the bob
D. It is independent of amplitude.

35. A body starts from rest and accelerated uniformly at a rate of $8ms^{-2}$.Find the time it takes to cover a distance of 100m.

A. 5.0s B. 25.0s C.12.5s D. 3.5s

36. The area between a velocity-time graph and the time axis for a moving body represents

A. distance
B. acceleration
C. momentum
D. velocity.

37. A school nurse applies a force of 30N to a syringe .Given that the cross sectional area of the tip of the needle is $1.0 \times 10^{-7} m^2$. Calculate the pressure produced at the tip of the needle.

A. 3.0×10^7 Pa B. 4.0×10^7 Pa

C. 3.0×10^8 Pa D. 2.5×10^8 Pa

38. A tank 2m tall and base area of 2.5 m^2 is filled to the brim with a liquid which exerts a force of 40000 N at the bottom. Calculate the density of the liquid.

A. $\frac{4000}{25 \times 2 \times 20}$ kg m^{-3} B. $\frac{40000}{2.5 \times 2 \times 10}$ kg m^{-3}

C. $\frac{40000}{25 \times 2 \times 10}$ kg m^{-3} D. $\frac{40000}{2.5 \times 2}$ kg m^{-3}

39. The stability of a bus is reduced when a heavy load is placed on its roof rack because;
    A. the total weight is increased.
    B. the pressure upon the tyres is increased.
    C. the maximum speed is reduced.
    D. the centre of gravity is raised.

40. The reason why black layers are used in a solar heating system is because they are.

    A. Bad emitters of heat. B. Bad absorbers of heat
    C. Good absorbers of heat D. Good reflectors of heat

SECTION B.

41. (a) State the principle of moments. (1 mark)

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(b) Three forces act on a uniform rod as shown in figure 6.

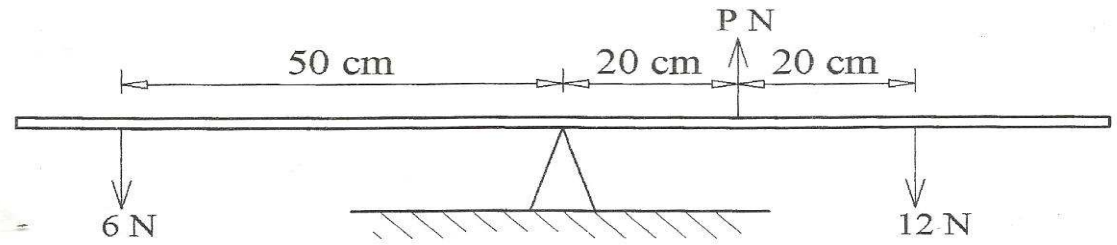

Fig. 6 If the rod balances horizontally, determine the value of P. (3 marks)

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42. (a) Define the terms***;***

(i) ***magnetic saturation***

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(ii) ***magnetic field***

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(iii) ***neutral point***

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(b) Draw the magnetic field pattern for the magnets below.

43. (a) Define a Joule. (01mark)

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(b) A stone of mass 500g is thrown vertically upwards with a velocity of $15ms^{-1}$. Calculate the potential energy at the greatest height. (3 marks)

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44. (a) Define the term efficiency of a machine. (1 mark)

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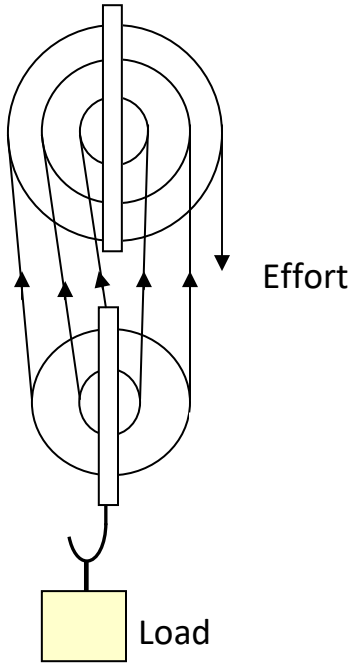
(b)



The block and tackle pulley system above has an efficiency of 80%. Calculate the load which it can be lifted by an effort of 10 N. (3 marks)

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45. (a) State **Archimedes's principle**. (1 mark)

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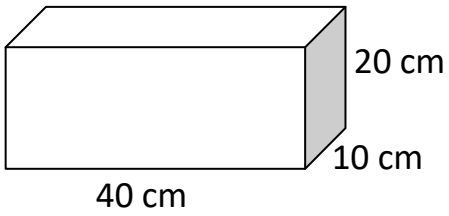
(b)



The figure 7 above shows a block made of a material whose density is 1250 kg m^{-3} and it measures 10 cm × 20 cm × 40 cm. Find;

(i) the mass of the block. (2 marks)

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(ii) the maximum pressure it exerts. (1 mark)

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46. (a) A person of mass 65 climbs up a ladder of height 8m in 10 seconds. Calculate the;

(i) work done *(01½ marks)*

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(ii) power developed *(01½ marks)*

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(b) State **two** forms of energy received directly from the sun. *(02 marks)*

(i): ……

(ii): ……

47. (a) Define the term ***velocity.*** (1mark)

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(b) A car moving with a uniform velocity of $30ms^{-1}$ accelerates uniformly to $65ms^{-1}$ in 30minutes. Calculate the distance it covers in this time. (3marks)

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48. (a) Define acceleration. (1mark)

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(b) Figure below shows a section of a tape used to study the motion of a body. The timer used has a frequency of 50Hz.

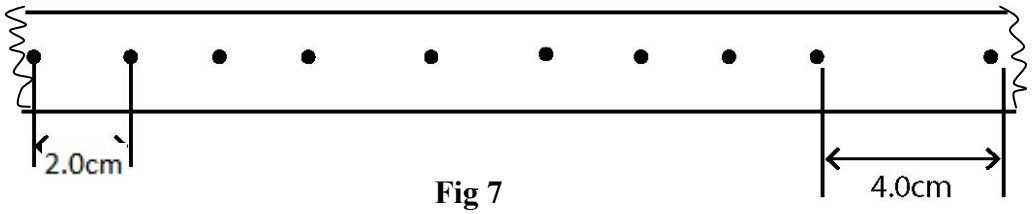

Fig 7

Determine the acceleration of the body. (3marks)

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49. (a) State any one assumption made when calculating the thickness of an oil molecule.

(1mark)

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(b) $0.01cm^3$ of an oil drop forms a film of radius 2cm on the surface of water. Determine the thickness of the molecule. (3 marks)

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50. (i) State Pascal's principle of transmission of pressure. (1 mark)

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(ii) State one assumption made in Pascal's principle. (½ mark)

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(b) The diagram in figure 9 shows the structure of a fore pump.

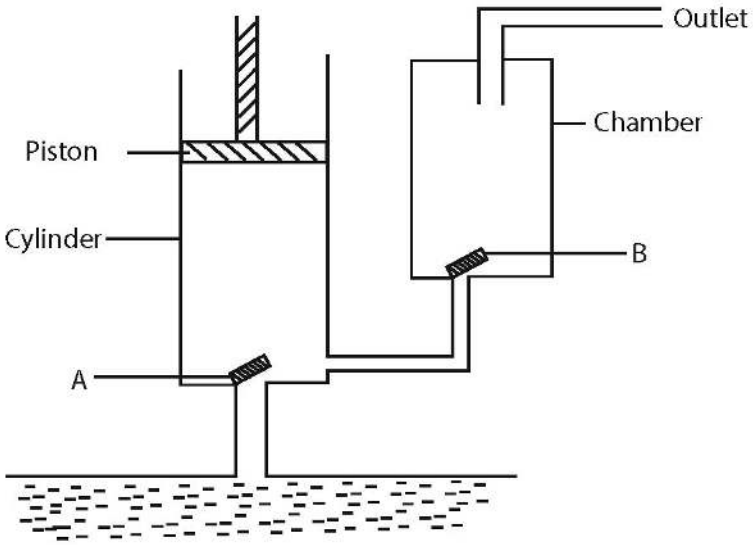

Fig 8

Outline what happens when the piston move downwards. (2marks)

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END.