

**MARKING GUIDE**

Name ..... Class/Number.....

**GHS****END OF TERM II EXAMINATIONS  
PHYSICS 1  
2 HOURS****S.3  
AUG 2016****Instructions:**

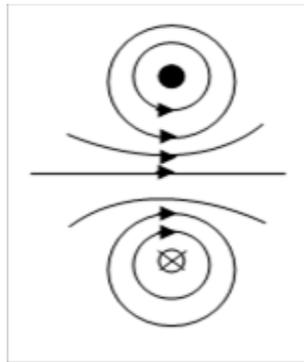
- Attempt **all** questions.
- Answers to questions in Section A should be written in the Table provided on page One.
- Answers to questions in Section B should be written in the space provided against each question.
- Assume where necessary;  
Acceleration due to gravity,  $g = 10\text{ms}^{-2}$

**SECTION A**

1.	A	6.	C	11.	D	16.	B	21.	D	26.	C	31.	B	36.	C
2.	B	7.	B	12.	C	17.	C	22.	A	27.	C	32.	C	37.	B
3.	C	8.	D	13.	C	18.	C	23.	D	28.	D	33.	A	38.	B
4.	C	9.	C	14.	B	19.	C	24.	B	29.	A	34.	B	39.	A
5.	C	10.	A	15.	B	20.	D	25.	B	30.	C	35.	C	40.	B

1. Gas leaking from a cylinder, at one corner of a room reaches another corner by way of
  - A. Diffusion
  - B. Evaporation
  - C. Brownian motion
  - D. Osmosis
2. A man takes one minute to lift 4 bags of sugar each of weight 50N through a height of 1.5m. Calculate the power expended.
  - A. 1.25W
  - B. 5.00W
  - C. 75.00W
  - D. 300.00W
3. The three fundamental units of measurements are
  - A. Mass, length, time
  - B. Mass, frequency, power
  - C. Metres, seconds, kilograms
  - D. Seconds, metres, grams
4. Capillary rise in a tube dipped in water is due to;

- A. Surface tension
- B. High vapour pressure
- C. Adhesive force being greater than cohesive force
- D. The atmosphere pressure acting on the surface of the water\



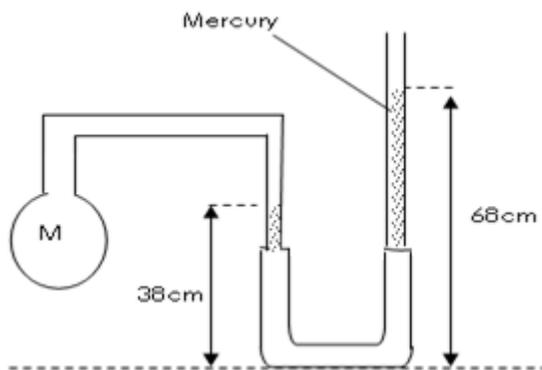
5. The diagram in the figure above represents a magnetic field pattern caused by a
- A. horse shoe magnet
  - B. thin bar magnet
  - C. circular coil carrying a current
  - D. long solenoid carrying a current
6. A school nurse applies a force of 30N to a syringe .Given that the cross sectional area of the tip of the needle is  $1.0 \times 10^{-7} \text{m}^2$ . Calculate the pressure produced at the tip of the needle.
- |                                 |                                 |
|---------------------------------|---------------------------------|
| A. $3.0 \times 10^7 \text{ Pa}$ | B. $4.0 \times 10^7 \text{ Pa}$ |
| C. $3.0 \times 10^8 \text{ Pa}$ | D. $2.5 \times 10^8 \text{ Pa}$ |
7. A rectangular block of metal weighs 5 N and measures  $2 \text{ cm} \times 3 \text{ cm} \times 4 \text{ cm}$ . What is the least pressure which it can exert on a horizontal surface?
- |                                     |                                     |
|-------------------------------------|-------------------------------------|
| A. $2.10 \times 10^{-7} \text{ Pa}$ | B. $4.17 \times 10^3 \text{ Pa}$    |
| C. $6.25 \times 10^{-5} \text{ Pa}$ | D. $8.30 \times 10^{-5} \text{ Pa}$ |
8. Water wets glass because its
- A. density is low
  - B. surface tension makes it spread out
  - C. molecules are elastic
  - D. adhesive force with glass is greater than its cohesive force.

9. 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
10. Which one of this material is NOT attracted by a magnet?
- A. Copper
  - B. Cobalt
  - C. Nickel
  - D. Iron
11. The increase in cross – sectional area of a conductor
- A. Increases its resistance
  - B. Increases its temperature
  - C. Decreases its temperature
  - D. Decreases its resistance
12. A block exerts a pressure of 40,000pa on the ground. Calculate its mass if its area in contact with ground is  $6.0 \times 10^{-4} \text{m}^2$
- A. 24 kg
  - B. 4.8 kg
  - C. 2.4 kg
  - D. 48 kg
13. 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
14. 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.
15. 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%

16. An object in unstable equilibrium continues to fall when slightly displaced because its
- (i) Centre of gravity is lowered
  - (ii) Center of gravity is raised.
  - (iii) Potential energy is reduced
  - (iv) Potential energy is increased.
- A. (i) , (ii) and (iii) only.                      B. (i) and (iii) only  
C. (ii) and (iii) only                              D. (iv) only
17. Current is measured by
- A. a battery    B. a voltmeter  
C. an ammeter                                        D. a motor
18. 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
19. Which of the following does not affect the rate at which a gas diffuses through a porous partition?
- A. Temperature                                      B. Size of gas molecules  
C. Volume of the gas                              D. Size of the pore.
20. Oil of volume  $1.0 \times 10^{-2}\text{cm}^3$  is dropped on the surface of clean water. If it spreads to form a circular patch of radius 4 cm, find the thickness of a molecule of oil.
- A.  $1.99 \times 10^{-4}\text{cm}$                                 B.  $7.96 \times 10^{-4}\text{cm}$   
C.  $1.26 \times 10^{-1}\text{cm}$                                 D.  $5.03 \times 10^1\text{cm}$
21. The kinetic theory of matter states that
- (i) All matter contains tiny particles called molecules.
  - (ii) Molecules of matter are in constant motion or vibration.



28. When a mass is hung from a spring balance and removed, the pointer on the spring balance does not return to the initial position because the
- spring is too short
  - extension of the spring was proportional to the mass
  - spring stretched to proportional limit
  - spring extended beyond the elastic limit.
29. Which of the following is a vector quantity?
- Displacement
  - Work
  - Energy
  - Pressure
30. Brownian motion experiment shows that molecules of gases are:
- stationary
  - in motion in one direction only
  - in constant random motion
  - more closely packed than molecules in liquids
- 31.



In the figure 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.

- 114cm Hg
  - 106cm Hg
  - 30cm Hg
  - 46cm Hg
- 32.



- C. The acceleration due to gravity on X is less than that on the earth.
- D. The mass of the body is less on X than it is on the earth.
37. In a convex mirror, the image formed is always
- A. real and upright                      B. virtual and upright
- C. real and inverted                      D. virtual and inverted
38. An object 6 cm high is placed 24 cm from a tiny hole in a pin-hole camera. If the distance from the pin hole to the screen is 8 cm, find the size of the image on the screen.
- A. 0.2 cm                                      B. 2.0 cm
- C. 18.0 cm                                      D. 32.0 cm
39. Diffuse reflection occurs when
- A. a parallel beam of light is reflected in all directions
- B. a parallel beam of light falls on a highly polished surface.
- C. a parallel beam of light is reflected as a parallel beam of light.
- D. the angles of incidence of the beam are equal to the angles of reflection.
40. A concave mirror of focal length 10 cm forms an erect image 30cm from the mirror. What is the object distance from the mirror?
- A. 7.5cm                                      B. 15.0 cm
- C. 10.0 cm                                      D. 1.5cm

### SECTION B

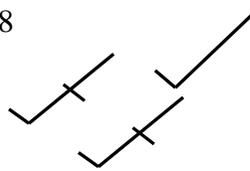
41. (a) Define the term  
Moment of a force **(01marks)**

***The moment of a force about a point is the product of the force and the perpendicular distance of its line of action from the point.*** ✓

- (b) State the principle of moments. **(01mark)**

***If a rigid body is in equilibrium, then the sum of the clockwise moments about any point is equal to the sum of the anticlockwise moments about the same point.*** ✓

- (c) A uniform plank of wood 4m long is pivoted at its mid-point and used as sea-saw. A girl who weighs 400N sits on one extreme and of

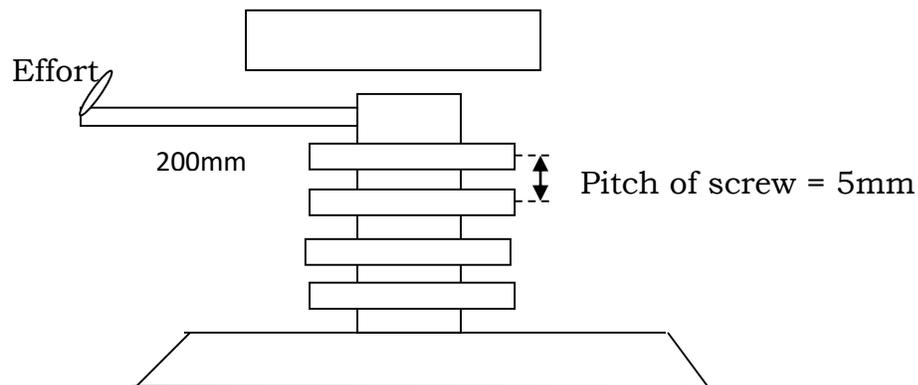


the plank. Where must a boy who weighs 800N sit if the sea saw is to balance? **(02marks)**

$$400 \times 2 = 800 \times x$$

$$x = 1m$$

42. A screw jack has a screw of pitch 5mm and the length of the handle is 200mm. it needs an effort of 30N to lift a load of 3000N.



- (a) Define the term pitch of a screw. **(01mark)**

***This is the distance between two successive/adjacent threads*** ✓

- (b) Calculate the

- (i) Mechanical advantage **(01mark)**

$$M.A = \frac{L}{E}$$

$$M.A = \frac{3000}{30}$$
 ✓

$$M.A = 100$$
 ✓

- (ii) Velocity ratio **(01mark)**

$$V.R = \frac{\text{circumference of the circle made by the arm.}}{\text{pitch}}$$

$$V.R = \frac{2\pi r}{p}$$

$$V.R = \frac{2 \times \frac{22}{7} \times 200}{5}$$
 ✓

$$V.R = 251.3.$$
 ✓

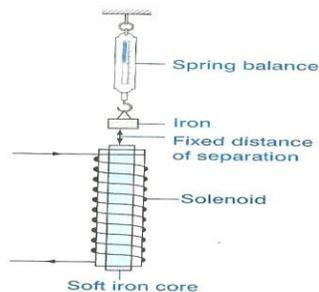
- (iii) Efficiency **(01mark)**

$$\begin{aligned}
 \text{efficiency} &= \frac{MA}{VR} \times 100\% \\
 \text{efficiency} &= \frac{100}{251.3} \times 100\% \\
 \text{efficiency} &= 39.8\%
 \end{aligned}$$

43. (a) Define the term an electromagnet.

**An electromagnet is devise formed when current is passed through a coil wound round a soft iron bar.**

(b) Figure below shows an arrangement that may be used to investigate how electromagnetic force varies with current.



(i) Why is the current passed through the solenoid?

**To magnetise the soft iron core.**

(ii) What happens to the iron suspended from the spring balance when a current is passed through the solenoid?

**It is attracted.**

(iii) What is observed on the spring balance when the current passing through the solenoid is varied?

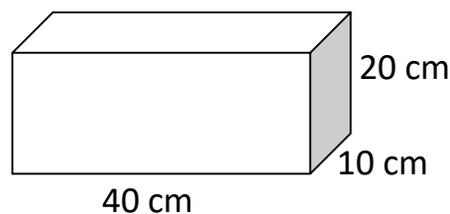
**The pointer moves up and down.**

44. (a) State Pascal's principle.

(1 mark)

**When a fluid completely fills a vessel, and a pressure is applied to it at any part of the surface, that pressure is transmitted equally throughout the whole of the enclosed fluid.**

(b)



The figure above shows a block made of a material whose density is  $1250 \text{ kg m}^{-3}$  and it measures  $10 \text{ cm} \times 20 \text{ cm} \times 40 \text{ cm}$ .

Find

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

$$\rho = \frac{m}{v} \quad \text{where } \rho \text{ is density, } m \text{ is mass and } v \text{ is volume.}$$

$$m = \rho \times v$$

$$m = 1250 \times 10 \times 20 \times 40 \times 10^{-6}$$

$$= 10 \text{ kg}$$

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

$$P = \frac{F}{A} \quad \text{where } F \text{ is force, } A \text{ is area and } P \text{ is pressure}$$

$$P = \frac{10 \times 10}{10 \times 20 \times 10^{-4}} = 5000 \text{ N}$$

45. (a) State two assumptions made in the oil film experiment.

(2 mark) **Any two**

1. **The film/patch is one molecule thick.**
2. **Intermolecular distance (space) is negligible**
3. **The molecules are standing perpendicularly on the water surface.**
4. **Oil drop is a sphere**
5. **The patch formed is a perfect circle.**

- (b) Given that the volume of an oil drop is  $5.24 \times 10^{-4} \text{ cm}^3$  and the diameter of the circular patch of the same drop on water is  $20 \text{ cm}$ , calculate the thickness of the oil molecule. (3 marks)

$$\text{thickness of oil molecule} = \frac{\text{volume of oil drop}}{\text{area of circular oil patch}}$$

$$t = \frac{5.24 \times 10^{-4}}{\pi r^2}$$

$$t = \frac{5.24 \times 10^{-4}}{\frac{22}{7} \times \frac{20}{2} \times \frac{20}{2}}$$

$$t = 1.7 \times 10^{-6} \text{ cm}$$

46. (a) (i) What is meant by the term elasticity? (1 mark)

**This is the ability of a body to recover its original size and shape after a distortion.**

- (b) A spring has a natural length of 12cm. when load x is suspended from it, its length increases to 22cm, and when a load of 250N is attached to it, the length increases to 27cm. Find the value of x.

$$F = ke$$

$$250 = 15k$$

$$k = \frac{250}{15} \text{ Ncm}^{-1}$$

$$F = \frac{250}{15} \times 10$$

$$F = 166.7 \text{ N}$$

47. (i) Define the term capillarity as used in Physics. (1 marks)

**This is the rise or fall of a liquid in a tube.**

- (ii) Give four applications of capillarity (4 marks)

- Use of a blotting paper ✓
- Use of a wick in paraffin stoves and lamps. ✓
- Use of a towel for drying. ✓
- Intake of water and nutrients by plants ✓

