

MARKING GUIDE

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CANDIDATE'S NAME

535/1

PHYSICS

Paper 1

AUGUST 2016

GAYAZA HIGH SCHOOL
PHYSICS
MOCK EXAMINATIONS
2HOURS 15MINUTES

INSTRUCTIONS

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 on the question paper.

Acceleration due to gravity, $g = 10ms^{-2}$.

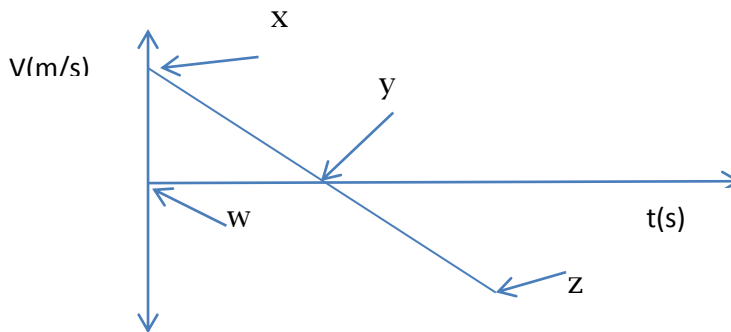
Specific heat capacity of water = $4200Jkg^{-1}K^{-1}$.

For Examiners' Use Only

Q.41	Q.42	Q.43	Q.44	Q.45	Q.46	Q.47	Q.48	Q.49	Q.50	MCQ	Total
4	4	4	4	4	4	4	4	4	4	40	80

SECTION A (40 MARKS)

1. An instrument used for measuring relative density of a liquid is called a
 A. Hydrometer B. Hypsometer C. Hygrometer D. Barometer. A
2. Which one of the following consists of non-renewable energy sources only?
 A. Oil and geothermal energy B. Oil and natural gas B
 C. Solar and Geothermal energy D. Natural gas and Solar energy
3. Which of the following radiations causes the body temperature to rise?
 A. Ultra Violet B. Gamma rays C. Infra-red D. X-rays C
4. The figure below shows a velocity -time graph for a stone thrown vertically upwards. Which point on the graph represents the stone at maximum height during its motion?



- A: W B: X C: Y D: Z C

5. An alternative unit that could be used for voltage is
 A. Joule per second B. Joule per coulomb B
 C. Coulomb per second D. Volt per metre
6. What is the cost of operating a flat iron rated 240V,960W for 5hours if a unit of electricity costs shs.750?
 A.3600/= B. 3,600,000/= C.36,000/= D. 5000/= A
7. A body of mass 0.5kg is released from the top of a building 20m tall. What is its kinetic energy after dropping through 6m?
 A.70 joules B.60 joules C. 80 joules D.30joules D
8. Local action in a simple cell is caused by the presence of
 A. hydrogen bubbles on the copper plate.

- B. impurities on the zinc plate
- C. zinc ions in the dilute sulphuric acid.
- D. zinc amalgam coating on the zinc plate.

B

9. During the power stroke of a four stroke petrol engine
- (i) the plug sparks
 - (ii) the piston moves up
 - (iii) both valves remain closed.
 - (iv) the piston moves downwards

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

D

10. Which factors affect melting point of a liquid?

- A. Pressure and Impurities
- B. Volume and mass
- C. Pressure and Mass
- D. Volume and impurities

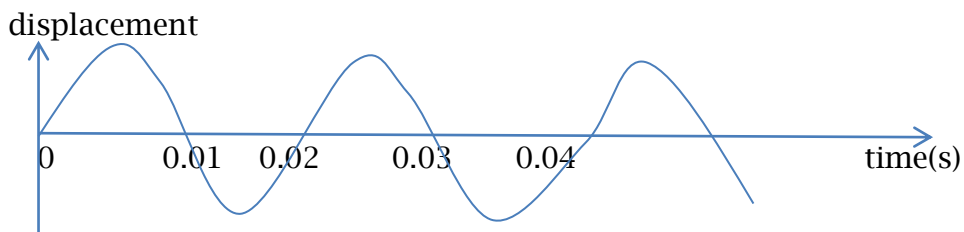
A

11. Pressure in a liquid depends on

- A. Area and density
- B. depth and density.
- C. volume and mass
- D. area and depth

B

12. The figure below shows a displacement against time graph for a wave whose speed is 25ms^{-1} . Calculate the wavelength of the wave.



- A. 0.02m
- B. 0.5m
- C. 5.0m
- D. 0.2m

B

13. Which of the following is a ferromagnetic material?

- A. Silver
- B. Diamond
- C. Iron
- D. Brass

C

14. A 12V,24W lamp is operated by a step down transformer that is connected to a 240V mains supply. Calculate the efficiency of the transformer if the current through the primary coil is 160mA.

- A. 19.2%
- B.40.0%
- C.50.0%
- D. 62.5%

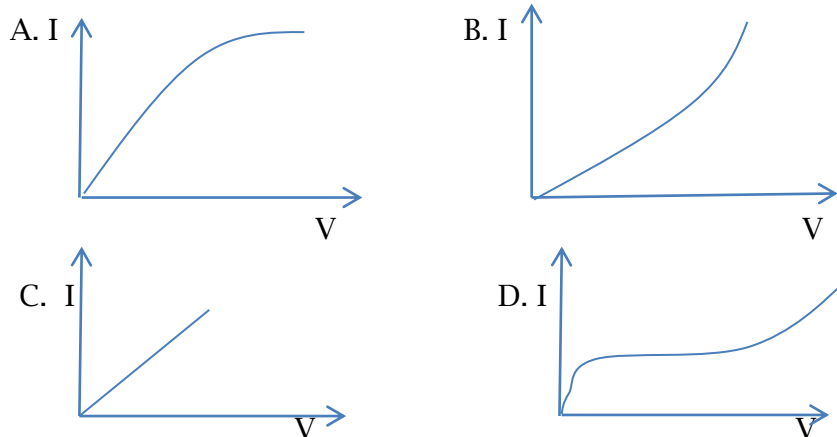
D

15. A charge of 6.0C crosses a point in a circuit in 1.5 seconds. What is the current in the circuit?

- A. 7.5A B. 0.25A C. 9.0A D. 4.0A

D

16. Which of the graphs below shows the variation of current with voltage for a thermistor?



B

17. Ultrasonic sounds are sounds which

- A. have a low frequency and can be heard by the human ear.
B. have high frequency and cannot be heard by the human ear.
C. are transverse in nature.
D. have high wavelength and can be heard by the human ear.

B

18. Which of the following machines belong to the same class of levers?

- A. Claw hammer, wheel barrow, bottle opener.
B. Tongs, fishing rod, nut cracker.
C. Nut cracker, wheel barrow, scissors.
D. Crowbar, sea saw, pliers

D

19. An electric bulb has a resistance of 960Ω and is connected to a 240V mains supply. Find its power rating.

- A. 60W B. 4W C. 75W D.100W

A

20. Which of the following is a vector quantity?

- A. Displacement B. Work C. Energy D. Pressure

A

21. What are X-rays?
 A. Electrons of high velocity B. Electromagnetic waves.
 C. Alpha particles of high velocity. D. Negatively charged particles. B
22. A.....is a device that safe guards an electrical appliance against damage from excess current.
 A. fuse B. plug C. Switch D. Transformer A
23. The ability of a material to withstand an external force without breaking is called?
 A. strength B. Ductility C. Stiffness D. Brittleness A
24. Which of the following is not an application of a bimetallic strip?
 A. electric thermostat B. Automatic flashing unit C
 C. Thermopile D. Bimetallic thermometer
25. Why are silver teapots preferred to other tea pots?
 A. Because silver is expensive and looks good.
 B. Because brightly polished objects retain their internal energy for a long period. B
 C. Because a lot of heat energy will be given a way and the tea will cool faster.
 D. Because silver is a good conductor of heat.
26. What is an overtone?
 A. A note of higher frequency than the fundamental note that accompanies the fundamental note.
 B. it is the first harmonic in a musical instrument. A
 C. A note produced by a tuning fork.
 D. A note produced when two notes of nearly equal frequency are sounded at the same time.

27.

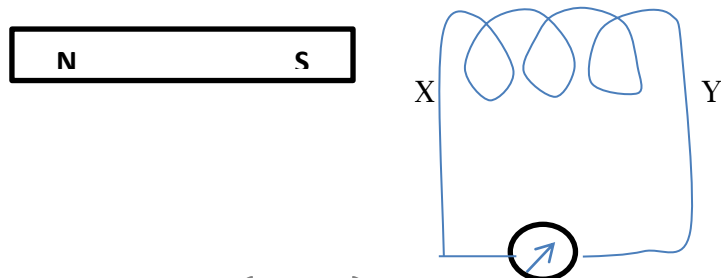
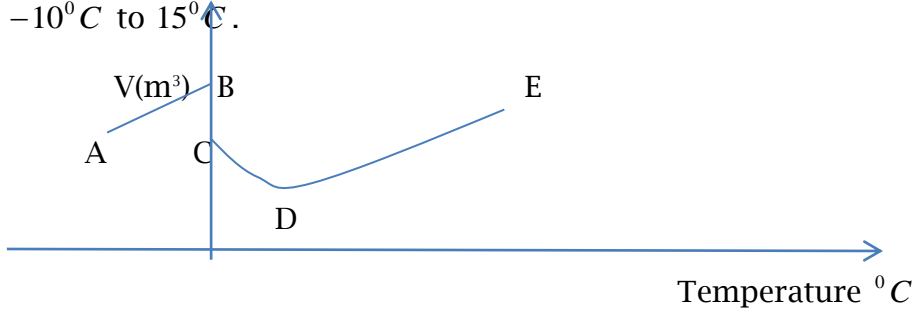


Figure shows a coil connected to a centre zero galvanometer, G. The poles produced at the ends X and Y of the coil when the South pole of a magnet approaches it, is

- A. X-North pole Y-South pole
- B. X-South pole Y- North pole
- C. X-North pole Y-North pole
- D. X-South pole Y-South pole

B

28. The graph in figure shows water which has formed ice being heated from -10°C to 15°C .



At what point does the substance have maximum density?

- A. E B. A C. C D. D

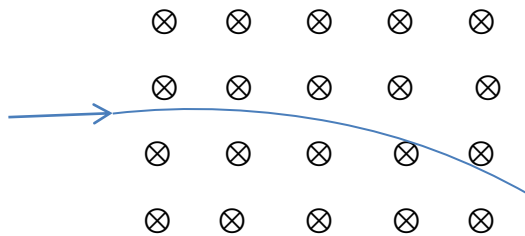
D

29. The process of using a material of low thermal conductivity to prevent heat loss is called,

- A. Cooling B. Absorption
- C. Contraction D. Lagging

D

30. The figure shows a path followed by a radiation from a radioactive material in a uniform magnetic field.



Identify the radiation.

- A. Alpha B. Beta C. Gamma D. X-rays

B

31. Nuclear fission occur when

- A. Uranium nucleus split into nuclides.

- B. Two deuterium atom come together. A
- C. A hydrogen molecule splits into two atoms.
- D. Uranium nucleus split into heavier nuclides
32. A substance emits particles spontaneously on its own by a process called,
- A. Thermionic emission B. Photoelectric emission.
- C. Nuclear reaction D. Radioactivity D
33. The symbol ${}_{92}^{235}\text{U}$ denotes the uranium nucleus. How many neutrons are in the nucleus ?
- A. 143 B. 92 C. 235 D. 327 A
34. A force of 20N causes an extension of 2.5cm on a material that obeys Hooke's law when it(the force) is supported by the material. Determine the extra weight needed to cause an extension of 4.5cm.
- A. 36N B. 16N C. 8N D. 10N B
35. We are able to hear sounds beyond corners because ofof sound waves.
- A. Refraction B. Diffraction C. Interference D. Reflection B
36. The figure below shows regions of the electromagnetic spectrum.

A	X-Rays	B	Visible Light	C	D
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The radiations represented by letters A,B,C and D respectively are.

- A. Gamma Rays, Infrared, Ultraviolet, Radio Waves
- B. Gamma Rays, Ultraviolet, Infrared, Radio Waves.
- C. Radio Waves, Infra-Red, Ultra-Violet, Gamma Rays. B
- D. Infrared, Ultraviolet, Gamma Rays, Radio waves.
37. Where must an object be placed so that the image formed by a converging lens will be erect?
- A. At infinity B. At the principal focus

C. Between the principal focus and the optical centre.

C

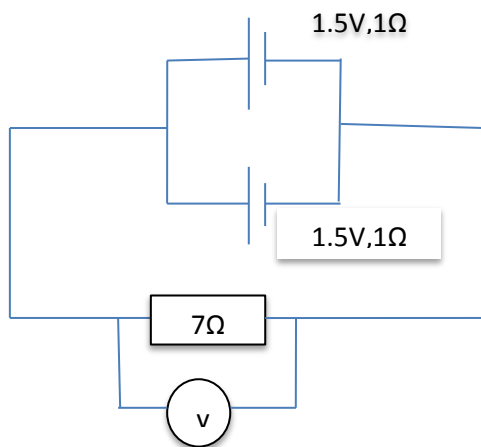
D. between F and 2F.

38. A column of air 26.25cm long in a closed tube resonates to a sounding tuning fork and produces a note of lowest frequency. If the velocity of sound in air is 336ms^{-1} , what is the frequency of the fork?

A. 256Hz B. 336Hz C. 1280Hz D. 320Hz

D

39. In the circuit below , determine the reading of the voltmeter.



What is the voltmeter reading?

A. 2.8V B. 1.4V C. 0.6V D. 1.5V

B

40. The work done in transferring one coulomb of charge from one point to another in a circuit is the

A. Power B. Current C. Potential Difference D. Electromotive force

C

SECTION B (40 MARKS)

- 41.(a) Define a **Primary cell** . (1)

It is a cell in which current is produced as a result of a non-reversible chemical change taking place between its components.

- (b) List two examples of a primary cell.

(i) *A dry cell* .(ii) *A Simple cell.* (1)

- (b) Give **four** precautions one should undertake while caring for lead cells.

- (i) **Level of acid should be inspected regularly and any loss from evaporation made with distilled water.**
- (ii) **Acid should never be added except when spillage has occurred.**
- (iii) **Lead cells must be charged regularly**
- (iv) **The cells should not be left uncharged for a long time** (2)
- (v) **They should not be “short circuited”**

42.(a) Define **upper fixed point** of a thermometer. (1)

It is the temperature of steam from boiling water under standard atmospheric pressure of 760mmHg.

- (b) Explain why a clinical thermometer should;
 - (i) have a thin walled glass bulb. (1)

for quick response to small temperature changes.

- (ii) not be sterilized in boiling water. (1)

A clinical thermometer has a small range of temperature from about 35°C to 42°C when placed in boiling water whose temperature is 100°C it bursts or breaks because of excessive heat acquired.

(c) The mercury thread has lengths 5.0cm and 20cm at the ice and steam points what is its length at a temperature of 60° C?

$$\theta = \frac{l_{\theta} - l_0}{l_{100} - l_0} \times 100^{\circ}C \quad \longrightarrow \quad 60 = \frac{l_{60} - 5}{20 - 5} \times 100$$

$$l_{60} - 5 = \frac{60 \times 15}{100} = 9 \quad \longleftarrow \quad \longrightarrow \quad l_{60} = 14cm$$

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

It is a wave profile that does not transfer energy from one point to another.

or

A wave formed when two progressive waves of the same frequency and amplitude but travelling in opposite directions superpose.

(b) Write down any two properties of stationary waves. (1)

- (i) **Nodes occur at zero displacements and antinodes occur at maximum displacement.**
 - (ii) **Particles between nodes are in phase.**
 - (iii) **Particles between successive nodes vibrate with different amplitudes.**
 - (iv) **Distance between successive nodes or anti nodes is $\frac{\lambda}{2}$.**
 - (iv) **Distance between node and next antinode is $\frac{\lambda}{4}$.(any two of the above)**
- (c) A student, standing between two vertical cliffs 480m from the nearest cliff, shouted. She heard the first echo after 3s, and the second echo 2s later. Calculate the velocity of sound in air and the distance between the cliffs. (2)

$$v = \frac{480}{1.5} = 320ms^{-1}$$

$$\text{Time taken to reach the second wall} = \frac{3+2}{2} = 2.5 \text{ seconds}$$

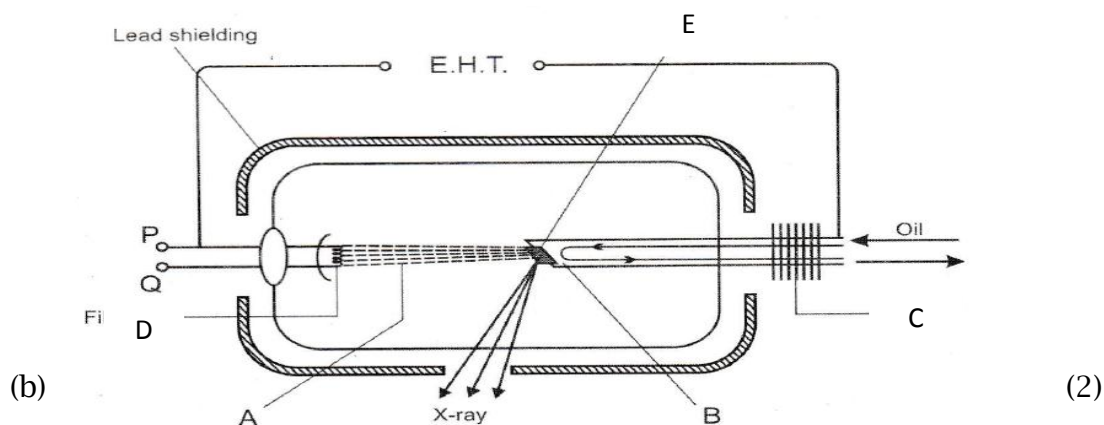
$$\text{Distance of second wall from student} = 2.5 \times 320 = 800m$$

$$\text{Total distance apart} = 480 + 800 = 1,280m$$

44.(a) The figure below shows the features of an x-ray tube.

Name the parts labelled A, B, C and D (2)

- A **fast moving electrons** B **Copper anode**
- C **Cooling fins.** .D **filament cathode.**



(i) Used to see a fractured bone or a dislocated bone/joint in the body..

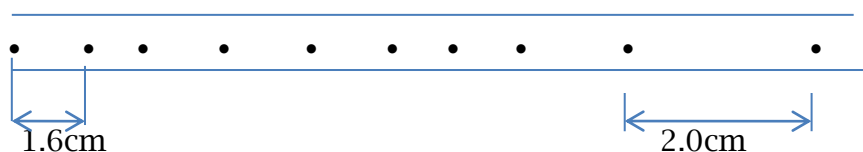
(ii) Treatment of cancerous cells(Radiotherapy)

(iii) Locating swallowed objects. E.g. a coin

45.(a) Define **acceleration**. (1)

Rate of change of velocity with time.

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



Determine the acceleration of the body in ms^{-2} . (3)

$$v_1 = \frac{1.6}{0.02} = 80cms^{-1}$$

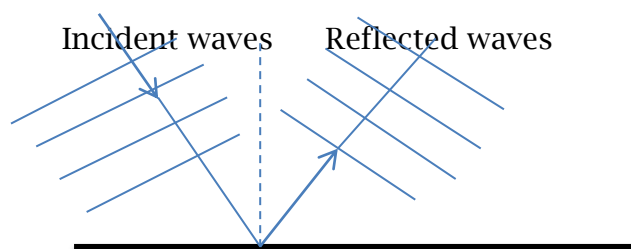
$$v_2 = \frac{2.0}{0.02} = 100cms^{-1}$$

$$a = \frac{v_2 - v_1}{t} = \frac{100 - 80}{8 \times 0.02} = \frac{20}{0.16} = 125cms^{-1}$$

46.(a) Define **amplitude** as applied to waves. (1)

Maximum displacement of wave particles from the equilibrium position or rest position.

(b) The waves below are incident on a reflecting surface. Draw the direction of the reflected waves. (1)



- (c) What happens to the speed, wavelength, frequency of waves as they move from deep water to shallow water? (1)

The wavelength of waves reduces as they move from deep to shallow water, their velocity also reduces, frequency remains the same and their direction changes.

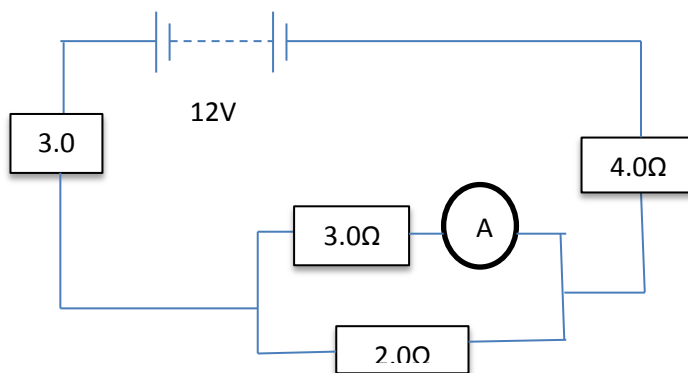
- 46.(a) Define **electromotive force** of a cell. (1)

It is the potential difference across the terminals of a cell when it is producing no current. or

Work done per coulomb of electricity conveyed round a circuit in which the cell is connected. or

It is the ratio of power generated by the battery to the current it delivers.

- (b) Four resistors are connected across a 12V battery of negligible internal resistance as shown in the figure below.



- (i) Determine the reading of the ammeter. (2)

$$\text{Resistance of parallel arrangement} = \frac{3 \times 2}{3 + 2} = \frac{6}{5} = 1.2\Omega$$

$$\text{Total resistance} = 3 + 1.2 + 4 = 8.2\Omega$$

$$\text{Total current } I = \frac{E}{R + r} = \frac{12}{8.2} = 1.46A$$

$$\text{P.d across parallel arrangement} = 1.46 \times 1.2 = 1.752V$$

$$\text{Ammeter reading} = \frac{1.752}{3.0} = 0.584A$$

(ii) the power dissipated by the 2Ω resistor. (1)

$$\text{Power} = I^2 R$$

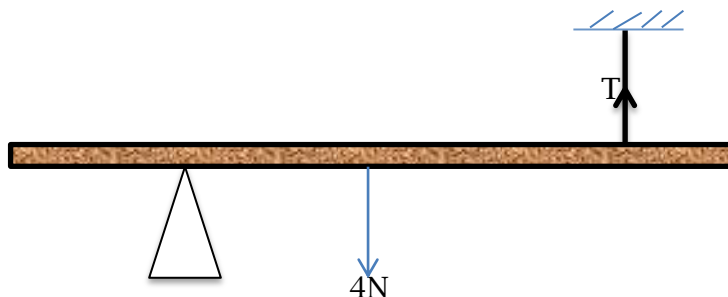
$$I = 1.46 - 0.584 = 0.876\text{A}$$

$$P = 0.876^2 \times 2 = 1.53\text{W}$$

47. (a) State the **principle of moments**. (1)

When a body is in equilibrium, the sum of clockwise moments about a point is equal to the sum of anti-clockwise moments about the same point.

(b) The figure below shows a **uniform meter rule** of mass 400g pivoted at 5cm mark and held horizontally by a vertical thread at the 95cm mark.



Determine the

(i) **tension** in the thread. (2)

Sum of clockwise moments = sum of anticlockwise moments

$$4 \times 45 = T \times 90$$

$$180 = 90T$$

$$T = 2\text{N}$$

(ii) **reaction** at the pivot. (1)

$$R + T = W.$$

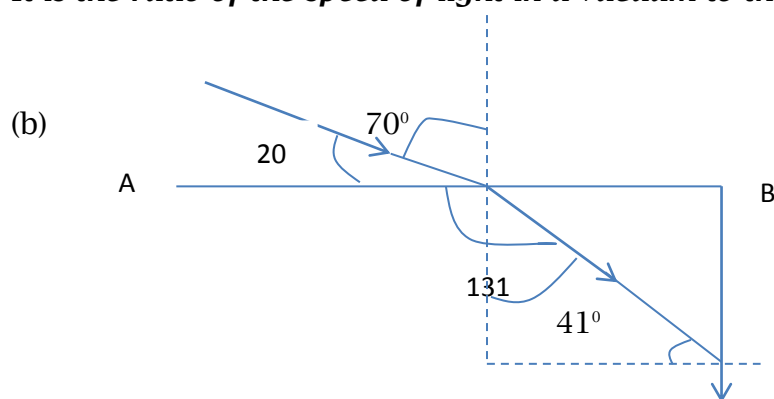
$$R + 2 = 4$$

$$R = 2\text{N}$$

49.(a) What is meant by **refractive index** of a material? (1)

Refractive index is the ratio of the sine of the angle of incidence to the sine of the angle of refraction for a ray travelling from a vacuum to a medium. Or

It is the ratio of the speed of light in a vacuum to the speed of light in a medium.



The figure shows the path of a ray of light through one corner of a glass block.

Find the angle of

(i) Incidence

$$\left(\frac{1}{2}\right) \dots$$

$$90^\circ - 20^\circ = 70^\circ.$$

(ii) refraction on face AB

$$\left(\frac{1}{2}\right)$$

$$131^\circ - 90^\circ = 41^\circ.$$

(b) Mark on the diagram the critical angle, calculate its value, and that of the refractive index of the block. (2)

$$90^\circ - 41^\circ = 49^\circ$$

$$n \sin 49^\circ = 1 \times \sin 90^\circ$$

$$n = \frac{1}{\sin 49^\circ} = 1.325$$

50.(a) What is **electromagnetic induction**?

(1)

This is when a current/emf is induced in a conductor as a result of changing magnetic field linking the conductor.

(b) A bar magnet induces an e.m.f in a coil, what factors affect the magnitude of the induced e.m.f? (1)

- *Speed at which the magnet moves towards the coil.*
- *Number of turns of the coil.*
- *Strength of the magnet.*

(c) State two energy losses in a transformer. (2)

- *Resistance in the conducting wires.*
- *Eddy currents*
- *Flux leakage*
- *Hysteresis loss*

'Success under construction'

END