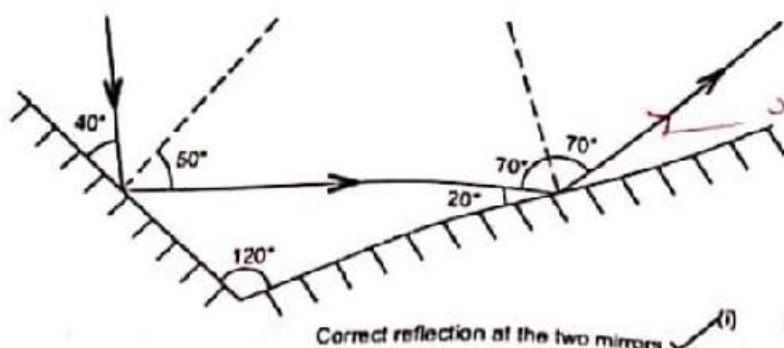


232/2 MS

SECTION A (25 marks)

1.



✓

Second part

(2 marks)

Correct reflections at the two mirrors. ✓

Angle of reflection = 70° ✓If 0° is missed
 $\frac{1}{2}$ mark.

2.

An uncharged body will also cause a decrease on the divergence of the leaf. *Conductor*

(1 mark)

OR

Both positively charged body and an uncharged body cause a decrease in divergence. *Conductor / do not conduct*

3.

- Do not cross one another.

~~not~~ *force/They repel each other**other sides*

(2 marks)

- They are complete loops.

*under constant state of tension**attractive*Direction of field is from North to South. *N to S*

- They are normal to the surface at the poles.

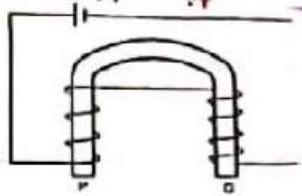
perpendicular

- They are closer at the poles and far

*apart away from the poles**concentrations of field lines*

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232/2 MS

4.		+ - + direction contradicts; vertical; I down.	(1 mark)
(b)	- Increasing the number of turns in the coil. - Increasing the current (or number of cells).	no of cells I/p.d.	(2 marks)
5.	Increasing speed increases the frequency of the sound causing an increase in the pitch (higher pitch).	not mentioned explanation pitch increase first.	(2 marks)
6.	Polarization occurs.	local action or def.	(1 mark)
7.	$I = \frac{V}{R}$ $= \frac{1.5}{2 + 0.5}$ $= 0.6A$	$I = E$ $R + t$ $= 1.5$ $2 + 0.5$ $0.6A$	(3 marks)
8.	- To sterilize medical equipment - To kill cancerous cells and malignant growths in the body.	Radiotherapy treat Cancer	(2 marks)
9.	During the first half cycle of the input signal, current flows in the first diode, while the second diode does not. During the second half cycle of the input signal, current flows in the second diode, while first diode is reverse biased. When the currents through the two diodes are combined a fully rectified wave signal is obtained as the output signal.	reverse biased, first diode conduct second does not.	(3 marks)
10.	By increasing the heating current in order to produce more electrons.	temp. of cathode, heating increasing the filament current	(1 mark)
11.	- Fuse in the neutral wire instead of the live wire. - Switch to lamp on the neutral wire instead of live wire. - Connection of lamp B on Live wires only.	2 (spur) the error. Bulb B's short circuit	(2 marks)

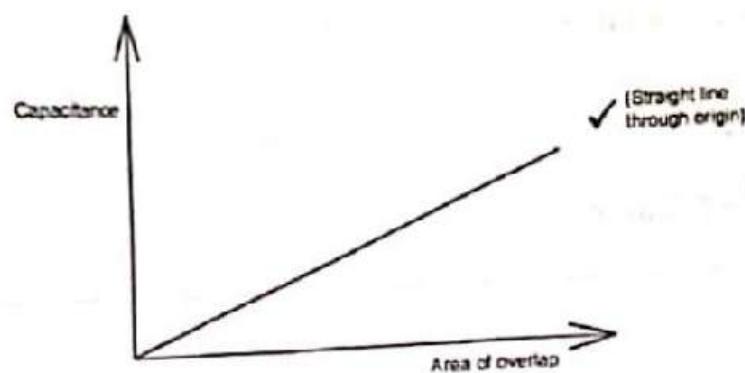
${}_2^4\text{He}$ \times dmg

Helium after \times
Helium above \sim dmg .

12.	Alpha particle. ✓ / Helium nucleus / Helium ion	(1 mark)
13.	Shows the object as being further than it actually is. ✓ / produces diminished images / farser	(1 mark)
14.	Infrared ✓ / IR	(1 mark)

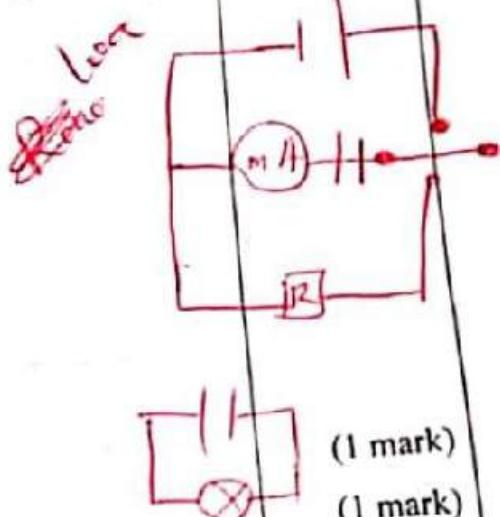
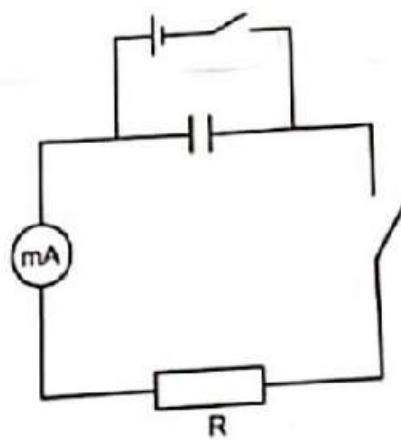
SECTION B (55 Marks)

15. (a)

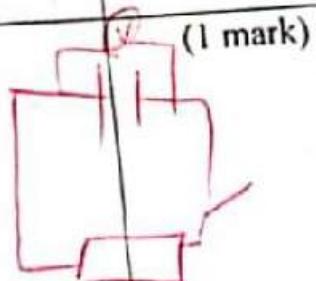
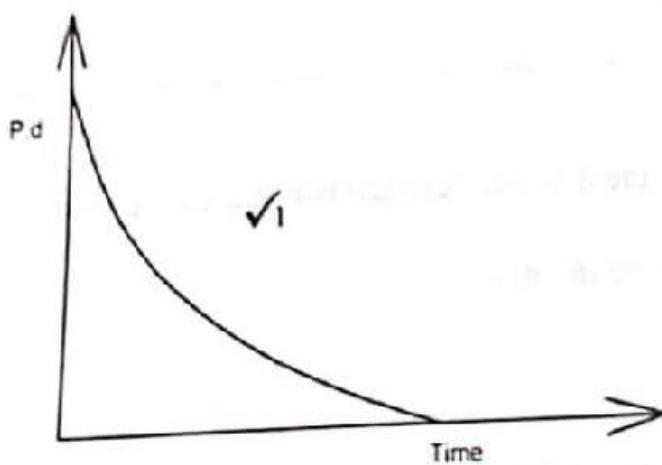


(1 mark)

(b) (i)

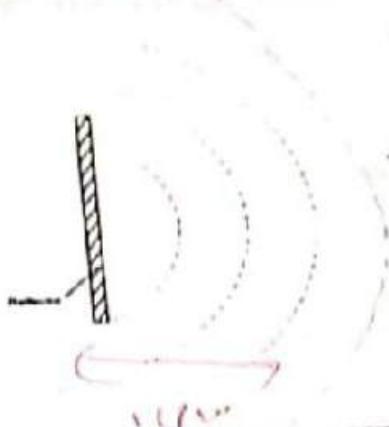
(1 mark)
(1 mark)Milliammeter and resistor ✓
Cell and switch ✓

(ii)



(1 mark)

(c)	<p>(i)</p> $C_{parallel} = 2 + 3 = 5\mu F \checkmark$ $\frac{1}{C_i} = \frac{1}{5} + \frac{1}{4} \checkmark$ $C_T = \frac{20}{9} = 2.22\mu F \checkmark$	$\frac{5+4}{5\times 4} = 2.22\mu F$ $\frac{1}{C} = \frac{1}{5} + \frac{1}{4} \checkmark$	(3 marks)
	<p>(ii)</p> $Q = CV \checkmark$ $= 2.22 \times 10^{-6} \times 6 \checkmark$ $= 1.332 \times 10^{-5} C \checkmark$	$Allow for E \checkmark$	(2 marks)
	<p>(iii)</p> $V = \frac{Q}{C}$ $= \frac{1.33 \times 10^{-5}}{4 \times 10^{-6}} \checkmark$ $= 3.33 V \checkmark$	$v_p = \frac{1.33 \times 10^{-5}}{5 \times 10^{-6}} = 2.667$ $6 - 2.667 = 3.336 V$	(2 marks)
16. (a)	<p>(i)</p> <p>Amplitude is the maximum displacement of a particle from the mean position.</p>		(1 mark)
	<p>(ii)</p> <p>Wavelength is the distance between two successive points in a wave which are in phase.</p> <p>OR</p> <p>Distance between two successive crests or troughs in a transverse wave/between rarefaction or compressions in a longitudinal wave.</p>		(1 mark)

(b) (i)		(3 marks)
(ii)	<p>(I) Wavelength = $\frac{\text{distance}}{\text{number of waves}}$</p> $= \frac{15}{4} \checkmark$ $= 3.75\text{cm} \checkmark$ <p>(II) $f = \frac{v}{\lambda}$</p> $= \frac{40}{3.75} \checkmark$ $= 10.67\text{Hz.} \checkmark$	$\therefore \frac{15}{3} = 5\text{cm} \checkmark$ $\therefore \frac{40}{5} = 8\text{Hz.} \checkmark$ $\therefore \lambda = 1.5\text{cm} \checkmark$ $0.67\lambda = 1\text{cm} \checkmark$ $3.67\lambda = 5\text{cm} \checkmark$ $\therefore \lambda = \frac{5}{3.67} \text{cm} \checkmark$
(c)	<p>(i) (I) - due to constructive interference ✓ (II) - due to destructive interference ✓ (ii) The fringes get closer ✓</p> <p>OR</p> <p>When the frequency is higher the wavelength reduces hence the fringe separation decreases.</p> <p><u>More fringes are formed or</u></p>	<p>1 mark from top</p> <p>1 mark from the rest</p> <p>1 mark</p>

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The path length is an odd multiple of half wavelengths. It is not white light - not white

more dark and bright formed.

		48% but allow E.T.
17. (a)	<p>(i) Critical angle = 42° ✓ since the angle of refraction is 90°.</p> <p>(ii) $\sin c = \frac{1}{n}$</p> $n = \frac{\sin 90}{\sin 42} \\ = 1.424$	(1 mark) E.T. fine (2 marks)
(b)	<p>Refractive index = $\frac{\text{real depth}}{\text{apparent depth}}$ ✓</p> $\therefore \text{apparent depth} = \frac{15}{1.32} \\ = 11.36 \text{ cm} \checkmark$	(3 marks)
(c)		(2 marks) must have 2 rays may or may not
(d)	<p>(i) - Eye has a variable focal length while the focal length of camera lens is fixed. ✓</p> <p>- Image distance from the lens is almost constant in the eye while in a camera it can be varied. ✓</p> <p>- Eye views multiple images while the camera takes only one photograph at a time. ✓</p> <p><i>Converging lens be zoomed out eye lens can't</i></p> <p><i>Eye lens is muscular while Camera lens is plastic</i></p> <p><i>(Any two correct @ 1 mark each)</i></p> <p>(ii) Ciliary muscles. ✓</p>	(2 marks) that is eye (1 mark)

18. (a)	Place the bar magnet inside a solenoid placed in an East, West direction then pass an alternating current through the solenoid with the the magnet slowly from the solenoid while the s is still passing. ✓	(2 marks)
(b)	<ul style="list-style-type: none"> Suspend each of the bars through its centre of gravity and set it swinging in a horizontal plane about a vertical axis through its centre. ✓ The magnetized bar will always come to rest in a north-south direction. ✓ 	(2 marks)
(c)	<p>(i) The galvanometer pointer first deflects then moves back ✓ when the switch is closed a current builds up in coil X and due to change in flux linkage an emf is induced ✓ in coil Y making an induced current flow through the galvanometer during the time current in coil X is rising. When current through coil X is steady no induced current flows through the galvanometer since there is no change in flux ✓ linkage.</p> <p>Therefore pointer deflects back. ✓</p> <p>(ii) Pointer deflects in the opposite direction ✓ and back to zero (mark) (momentarily) (mark)</p> <p>(iii) Magnitude of deflection increases. ✓</p>	(4 marks)

- becomes higher (has a higher deflection) (larger deflection)
defection doubles. Should be expressed
 ① All numerical answers should be at least 4 s.f.
 - do not accept fractions for units or with
 ② do not penalise units or signs. A candidate goes ahead correctly,
 ③ include formula but goes back if substitute and award.
 ④ ignore the wrong formula
 ⑤ Don't penalise capital units of Hz.
 - full words - start small letter but
 penalise.
 ⑥ Spelling of word wrongly - don't penalise

<i>Value \downarrow</i> <i>Mass \downarrow</i>	<i>Half-life \downarrow</i> <i>Mass/Size \downarrow</i> <i>Azotin to decrease by half</i>	<i>Decay rate \downarrow</i> <i>Decay \downarrow</i>
Mass	19. (a)	(1 mark)
	Half life is the time taken for half the number of nuclides initially present in a sample to decay.	
	(b)	(1 mark)
	(i) Expansion cloud chamber	
	(ii) Due to collisions between the radiations from the radiation source and the air molecules.	(1 mark)
	(iii) When the piston is pulled down air expands hence cools. The ions form nuclei for condensation upon cooling on which the saturated alcohol vapour condenses to water .	(3 marks)
	(c)	
	(i) - The work function of the metal - Energy of incident radiation frequency/wavelength.	
	(ii) I Energy = $eV = 1.6 \times 10^{-19} \times 2.21$ $= 3.54 \times 10^{-19}$	(1 mark)
	II $E = hf$ $f = \frac{E}{h}$ $= \frac{3.54 \times 10^{-19}}{6.63 \times 10^{-34}}$ $= 5.33 \times 10^{14} \text{ Hz}$	
		(2 marks)

⑥ Incase of correct answer but expressed with wrong unit (Ans)
no unit - award 1 mark.

⑦ Click on error transfer.

⑧ parallel work which is not cancelled mark it

first attempt and ignore the rest.

(Cancelled work in case of parallel is not

Cancelled but in parallel work - mark it

⑨ Multiple ^{ED 2019} The National Examinations Council