LANJET CLUSTER EXAMINATION
232/2
PHYSICS PAPER 2
DECEMBER 2020
MARKING SCHEME

SECTION A

1. Parabolic reflectors do not form a caustic curve;
   - The filaments can be arranged so as to have parallel beams to help see far and a set of others to enable see near / directed downwards ;
   Any one (1 mrk)

2. This causes buckling of the plates as this is short circuiting;

3. A will have positive charge while B negative; when charged rod is brought near A positive charges are attracted towards it while the negative charges are repelled to B
   On separation while strip is near A, B goes with negative charge and A remains with the positive;
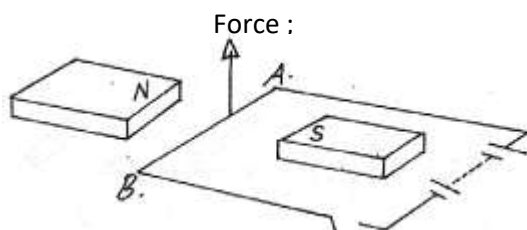
4. $E = IR + Ir$ *Formula of substitution give 1 mark*
   $3.0 = I \times 3.5 + I \times 0.5$;
   $\therefore I = 0.75A$;

5. $\dfrac{Vs}{Vp} = \dfrac{Ns}{Np}$

   $\dfrac{Vs}{250} = \dfrac{1}{10}$;

   $\therefore Vs = 25V$;
   Now $V_{Lm} = 4/5 \times 25$;
   $= 20\ V$;

6.

Force :

   NB force (arrow) must touch the wire / conductor

7. $W - \dfrac{V^2}{R} t$;

   $= \dfrac{240^2}{480} \times 4 \times 60$;

            $= 28{,}800J$;

8. $n = \dfrac{Real\ Depth}{Apparent\ depth}$

   $1.47 = \dfrac{R.d}{6.8cm}$

   $R.d = 6.8cm \times 1.47$

   $= 9.996cm$

9.

   $V = \dfrac{25}{t}, \Rightarrow S = \dfrac{Vt}{2}$

   $S = \dfrac{330 \times 0.6}{2} = 99m$

10. Introduction of controlled amounts of impurities into the lattice of a pure semi-conductor in order to Enhance its electrical conductivity;

11. Radio waves; Infrared; x –rays and Gamma rays

   ⟶

   Decreasing wavelength

12. Magnetism is <u>easily induced in them;</u> the dipoles of the

   Keepers form <u>a closed loop with those</u> in the magnets

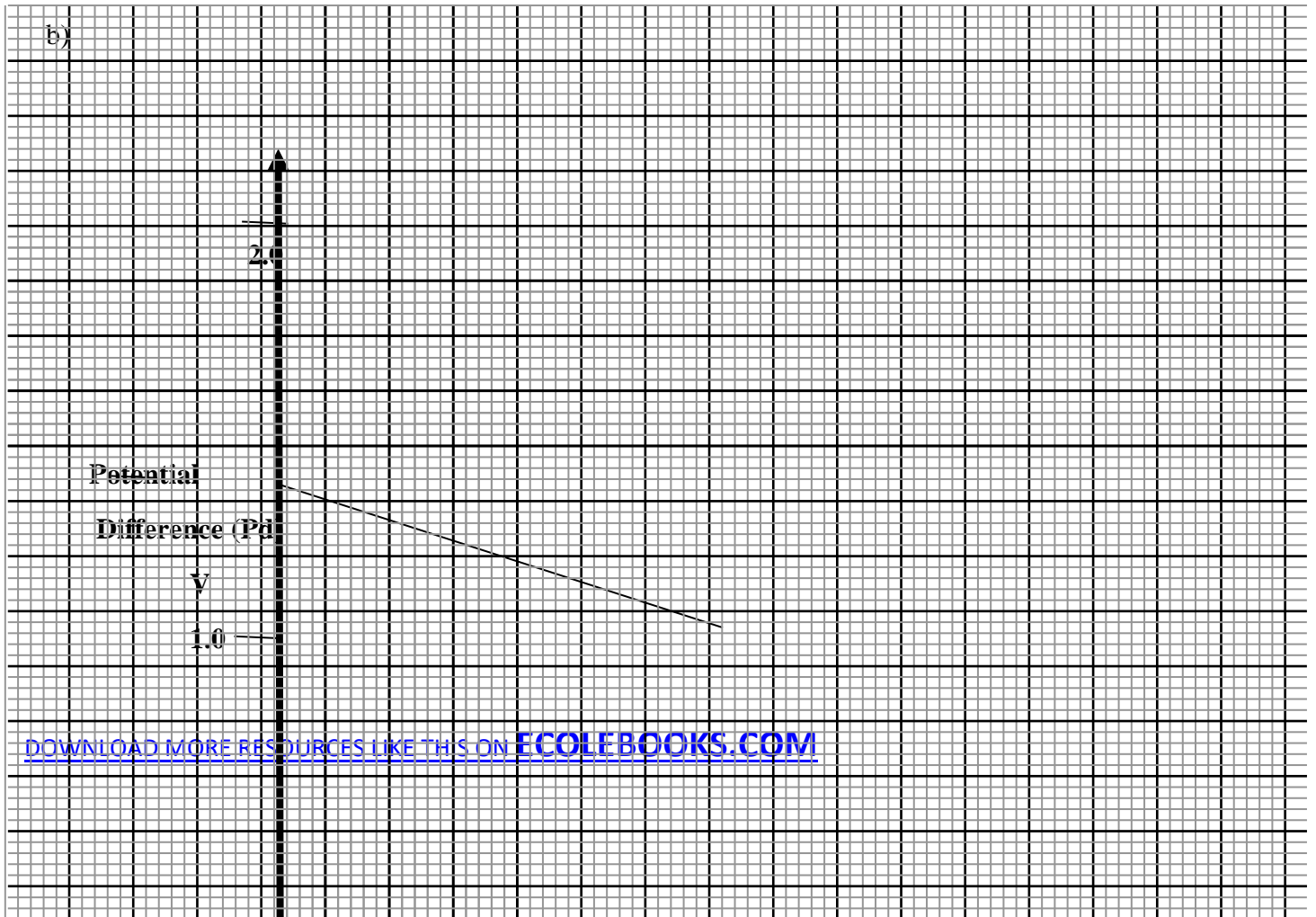   Hence protecting the magnets from being demagnetized;

13.

Time base doubled

Original wave form
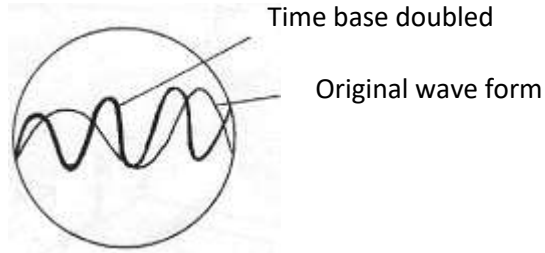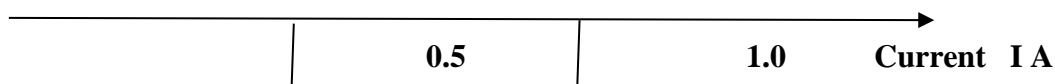
SECTION B

14.(a)   **(1 mark)**

Where no current is flowing through/ where there is voltage drop a cross the source is equal to e.m.f

b)

2.0

Potential

Difference (Pd)

V

1.0

—

$$\longrightarrow$$

| | 0.5 | | 1.0 | **Current I A** |

(i)   E= V + Ir

(ii)   **Gradient (R)** **$\underline{1.475 - 1.05}$** **=** **$\underline{0.425}$** **=** **0.53125 Ω**

0.8- 0   **0.8**   **(2 marks)**

(b)   **From the graph current flowing when pd is 0.70 is 60.MA**

Pd across R = 6.0 – 0.7 = 5.3v

R = 5.3 V   36mA

= 147Ω   (3 marks)

(c)   **Parallel circuit**   **1/30 + 1/20 = 5/60 or 60/50**

R = 12 Ω

Total resistance = 10 + 12 = 22Ω   (2 marks)

(ii) $l = {}^{V}/_{R} = {}^{2.1}/_{22} = 0.095A$ **(1 mark)**

(iii) Reading of the voltmeter

V = lR   **= 10 x 2.1**

22   = 0.95 (2 marks)

15.(a)
Lamp lights
When s is closed soft iron get magnetized it repels magnet that pushes contact and closes it.
Current flows lighting the bulb.

(b) (i)
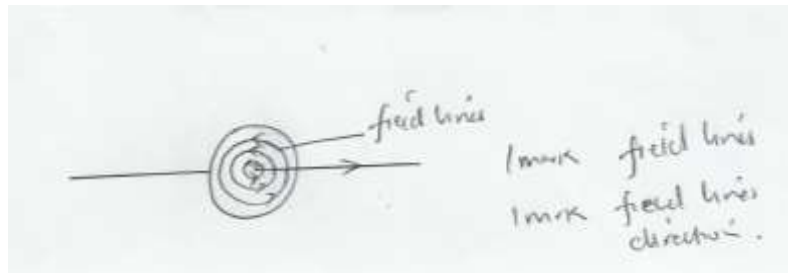
(ii)
Right hand grip rule
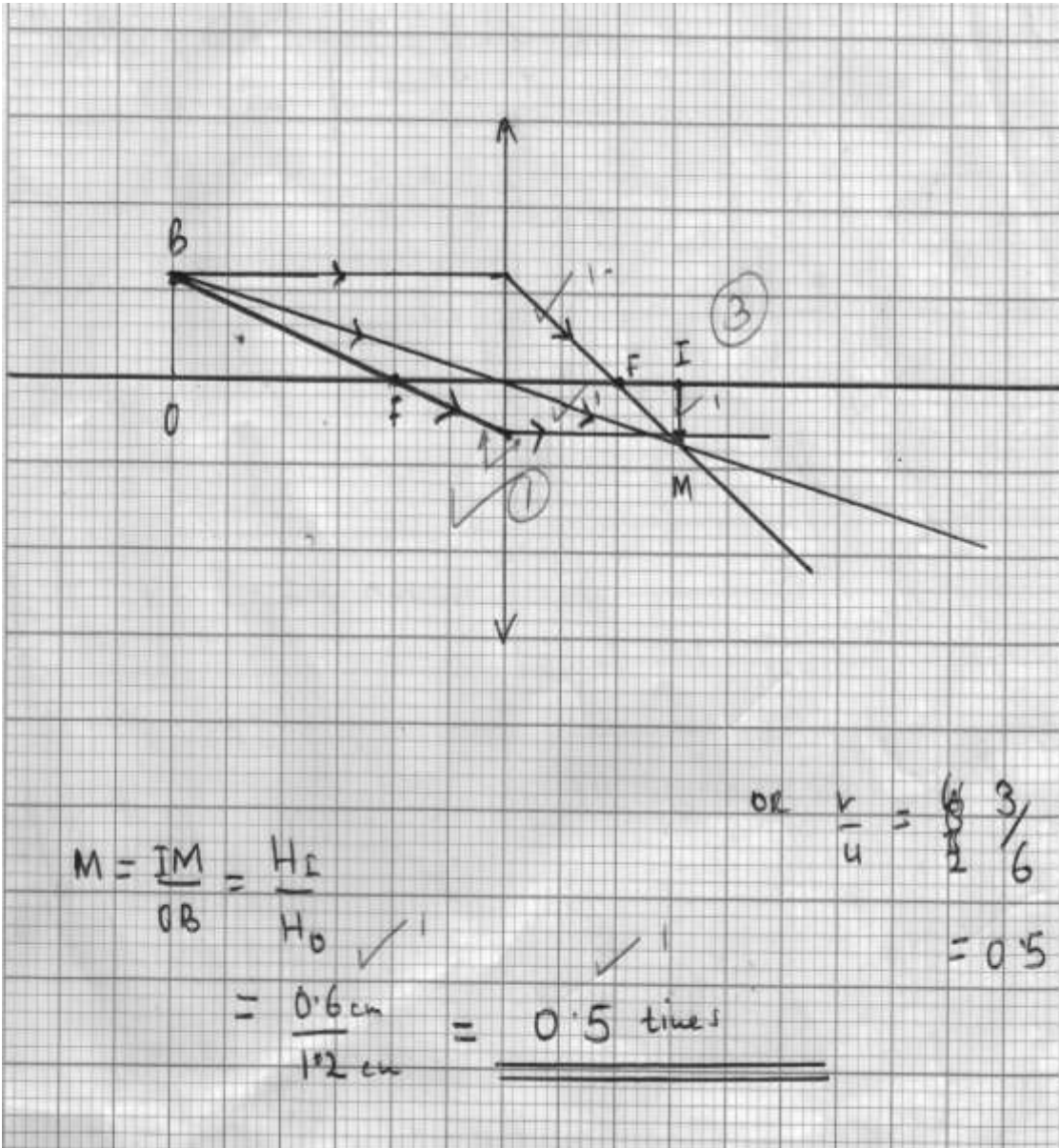Maxwell – cork screw rule

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iii)

- Electric bells
- Magnectic locks
- Loudspeakers
- Relays
- Motors and generators

16. a) i)   A – Grid✓1

        B – Electron gun✓1

    ii)   C – Vertical deflection of beam of   electrons✓1

         D – Horizontal deflection of beam of   electrons✓1

   iii) By thermionic emission or heating the   filament✓1

   iv) To prevent ionization of electrons as   they move to the anode✓1

  b) i) $E = ev$✓1

        $E = 1.6 \times 10\text{-}19 \times 80000$✓1

          $= 1.28 \times 10^{-14}$ J✓1

    ii) $\frac{1}{2} mv^2 = 1.28 \times 10^{-14}$✓1

        $v^2 = \frac{2 \times 1.28 \times 10^{-14}}{9.11 \times 10-31}$

$$v = \frac{\sqrt{2 \times 1.28 \times 10{-14}}}{9.11 \times 10{-31}} \checkmark 1$$

$v = 2.23 \times 10^8 \text{ ms} \checkmark 1$

17. (a) GRAPH

$$M = \frac{IM}{OB} = \frac{H_I}{H_0}$$

$$= \frac{0.6 cm}{1.2 cm} = 0.5 \text{ times}$$

$$OR \quad \frac{v}{u} = \frac{3}{6} = 0.5$$

(b) (i)

$$u = 6cm$$
$$f = 8cm$$
$$v = ?$$

$$\frac{1}{f} = \frac{1}{u} - \frac{1}{v}$$

$$\frac{1}{v} = \frac{1}{f} - \frac{1}{u}$$

$$= \frac{1}{8} - \frac{1}{6} = \frac{3-4}{24}$$

$$\frac{-1}{24}$$

$$v = -24cm$$

(ii)
Hand lens / magnifying glass

(iii)
- Image formed is
- Virtual
- Erect/upright
- Magnified

18. (a)

The direction of the induced current is always as to oppose the change producing it.

(b)
X   carbon brush
Y   split ring

(c)
Speed of rotation
Number of turn of the coil
Strength of the magnet

(d)

$$I_S = 13.5$$
$$V_S = 480$$
$$V_p = 240$$
$$Ɛ = 80\%$$
$$P = IV$$
$$= 13.5 \times 48 = 64.8 \text{ watts}$$

$$80 = 648$$

$$100 = x$$

$$\Rightarrow \frac{648 \times 100}{80} = 810 \; watts$$

$$IV = 810$$

$$I \times 240 = 810$$

$$I = \frac{810}{240} = 3.375A$$