



G.C.E A/L Examination July - 2019

Field Work Centre

Grade - 12 (2020)

Physics

Marking Scheme

M.C.Q

01) 3	06) 3	11) 2	16) 4	21) 5
02) 1	07) 4	12) 1	17) 1	22) 4
03) 5	08) 2	13) 2	18) 2	23) 1
04) 5	09) 4	14) 2	19) 5	24) 5
05) 2	10) 1	15) 3	20) 5	25) 3

$$25 \times 2 = 50$$

Structured Essay

01.

a) i. 610g ——— ①

ii. 0.1g ——— ①

b) i. Screw should be adjusted to make indicator to show zero reading ——— ①

c) i. M_R ——— ①

ii. M_P / M_Q ——— ①

d) i) 156.6g ——— ①

ii) $100 \times 4 = M_2 \times 2$ ——— ①
 $M_2 = 200g$

e) i) $500 + 610 = 1110g$ ——— ①

ii) 500g ——— ①

iii) $500 \times 4 = M \times 20$ ——— ①

$\therefore M = 100g$

02.

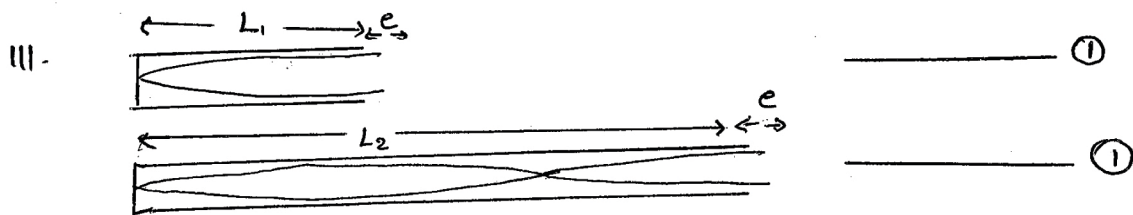
i. standing wave ——— ①

ii. 512 Hz

Resonance length found as smaller

Pure resonance state can be obtained. ——— ①

Can hear sound with high amplitude



1) $V = F \lambda$
 $V = 4F(l_1 + e)$

$\frac{\lambda}{4} = l_1 + e$ ——— ①

2) $V = \frac{4F}{3}(l_2 + e)$ $\frac{3\lambda}{4} = (l_2 + e)$ ——— ①

3) $\frac{V}{4F} - \frac{3V}{4F} = l_1 - l_2$

$V = 2F(l_2 - l_1)$ ——— ①

iv. a) In A, high amount of water vapour may found in the air when compared with B.

$v \propto \frac{1}{\sqrt{M}}$ $\therefore$ Relative molecular mass decrease. ——— ①

b) To ensure whether tuning fork vibrates with its own frequency OR to make free and random vibration ——— ①

c) It can vibrate continuously ——— ①

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03.

- a) 1) Mass of air } — ①
 a) Volume of air }

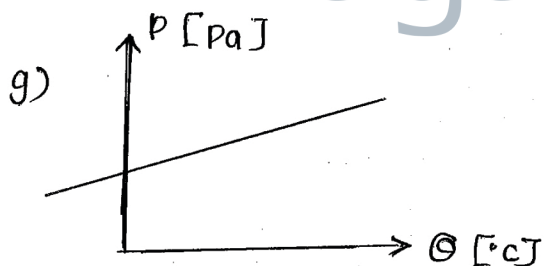
b) To decrease the volume of air not in the temperature of water — ①

c) Draw thermometer and stirrer } both — ①
 Name " " " " }

d) Glass is a poor conductor of heat. So we should allow some time to the air in glass bulb to attain the temperature of water — ①

e) By ensuring pressure meter shows constant reading — ①

f) 1) stir well using the stirrer } — ①
 Control OR remove bunsen flame }



(h) $\frac{2 \times 10^5}{400} = \frac{P}{450}$
 $P = 1.25 \times 10^5 \text{ Pa}$

i) Yes,

When temperature decreases, the water vapour in air may be saturated — ①

j) Obtain pressure readings in two instances while increasing pressure and decreasing the pressure. And obtain the average value — ①

04.

i. The image could have formed behind the eye — ①

ii. To observe the image clearly — ①

iii. Marking u and v — ①

Marking z — ①

iv. The image and the pin must move together when the eye is moved left to right — ①

v. 1) $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$ — ①

2) Graph — ①

3) Inverse value of intercept — ①

b) 1) $\frac{1}{-f} = \frac{1}{-f_1} + \frac{1}{f_2}$ — ①

ii) $f_R = 10\text{cm}$ — ①

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Essay

01.

a) 1. Law of floating ——— ①

$$2. mg = V\rho g \text{ ——— } ①$$

$$10^5 \times g = V_0 \times 10^3 \times g$$

$$V_0 = 100 \text{ m}^3 \text{ ——— } ①$$

$$3. \text{ I. } (1 \times 10^5 + m) g = (V_0 + 2 \times 5) 1000 \times g \text{ ——— } ①$$

$$1 \times 10^5 + m = 110 \times 1000$$

$$\begin{aligned} m &= 1.1 \times 10^5 - 1 \times 10^5 \\ &= 10000 \text{ kg} \text{ ——— } ① \end{aligned}$$

II. Volume of water that should be removed = 10 m^3

$$t = \frac{10 \text{ m}^3}{0.5 \text{ m}} = 20 \text{ minutes} \text{ ——— } ①$$

4. Mass of extra water = 10×1000

$$F = ma$$

$$10^5 = (10^5 + 10^4) \times a \text{ ——— } ①$$

$$a = \frac{10^5}{10^4 \times 11} \times \frac{10}{11} \text{ ms}^{-2} = 0.909 \text{ ms}^{-2} \text{ ——— } ①$$

b/ i. AV ——— ①

ii. $F = \frac{2AV^2}{l}$
 $= 2AV^2$ ——— ①

iii. $F = 2AV^2$
 $= 2 \times 2 \times (10)^2 \times 1000$
 $= 4 \times 10^5 \text{ N}$ ——— ①

iv. $F = ma$

$4 \times 10^5 = (10^5 + 10^4) a$ ——— ①

$a = \frac{4 \times 10^5}{1.1 \times 10^5}$
 $= 3.63 \text{ ms}^{-2}$ ——— ①

v. $F = ma$

$4 \times 10^5 = 10^5 a$ ——— ①

$a = 4 \text{ ms}^{-2}$ ——— ①

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02.

a) I, $V = \sqrt{\frac{T}{m}} \quad \text{--- ①}$

II, $\frac{\lambda}{2l} = 1$
 $V = f \lambda$
 $\sqrt{\frac{T}{m}} = f \times 2l$

$$f = \frac{1}{2l} \sqrt{\frac{T}{m}} \quad \text{--- ①}$$

III. When cross - surface area decreases, mass per unit length decreases. Therefore frequency decreases. --- ①

IV. $V = f \lambda$

I. $= 650 \times 0.6$
 $= 390 \text{ m s}^{-2} \quad \text{--- ①}$

II. $V = \sqrt{\frac{T}{m}}$

$390 = \sqrt{\frac{T}{0.8 \times 10^{-6} \times 4000}} \quad \text{--- ①}$

$$(390)^2 = \frac{T}{8 \times 10^{-4}}$$

$$T = 121.68 \text{ N} \quad \text{--- ①}$$

III. $390 = 750 \times \frac{1}{2l}$
 $\lambda = 0.26 \text{ m} \quad \text{--- ①}$

IV. $f = \frac{1}{2l} \times V$

$$= \frac{1}{2l} \times 390$$

$$= 1950 \text{ Hz} \quad \text{--- ①}$$

$$b/x. V = \sqrt{\frac{\gamma R (273 + \theta)}{M}} \quad \text{--- ①}$$

II. Relative molecular mass of air may be decreased
concentration of water vapour in air may be increased
--- ①

$$\text{III } dB = 10 \log \frac{P/4\pi r^2}{I_0}$$

$$20 = 10 \log \frac{P/4\pi r^2}{10^{-2}}$$

$$\frac{P}{4\pi r^2} = 10^{-10}$$

$$P = 4 \times 3 \times 10^2 \times 10^{-10} \quad \text{--- ①}$$

$$= 1.2 \times 10^{-7} \text{ W}$$

$$\text{IV} \cdot 30 = 10 \log \frac{P \times n \times 100}{4\pi r^2 \times 10^2} \quad \text{--- ①}$$

$$I_0$$

$$30 = 10 \left[\log \frac{P/4\pi r^2}{I_0} + \log \frac{n \times 100}{1000} \right]$$

$$30 = 20 + 10 \log n$$

$$10 = 10 \log n$$

$$n = 10 \quad \text{--- ①}$$

V. By using resonance method --- ①

VI. Temperature increases

Tension decreases

Therefore by increasing tension in strings

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03.

I. Generation of electricity
Supply hot water to town areas } — ②

II.

a) $50 \times 10^6 = \frac{1}{2} mv^2$

$$50 \times 10^6 = \frac{1}{2} \times m (10^3)^2$$

$$m = 100 \text{ kg} \quad \text{--- ①}$$

b) $H = m (s\theta + L) \quad \text{--- ①}$

$$= 100 (4000 \times 100 + 2 \times 10^6)$$

$$= 4 \times 10^7 + 2 \times 10^6$$

$$= 42 \times 10^6 \text{ J} \quad \text{--- ①}$$

c) From the heat energy of earth — ④

d) $\frac{Q}{t} = \frac{kA(\theta_1 - \theta_2)}{d} \quad \text{--- ①}$

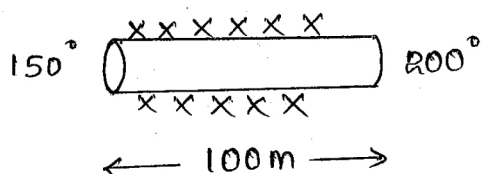
$$= \frac{500 \times 1 \times 20}{0.1}$$

$$= 10^5 \text{ J} \quad \text{--- ①}$$

e) $4.2 \times 10^6 = 10^5 \times A \quad \text{--- ①}$

$$A = 420 \text{ m}^2 \quad \text{--- ①}$$

F)



$$\frac{Q}{t} = \frac{k_A (\theta_1 - \theta_2)}{d} \quad \text{--- (1)}$$

$$= \frac{1000 \times 1 \times 30}{100}$$

$$= 300 \text{ Wm}^{-2} \quad \text{--- (1)}$$

$$\text{No. of rods} = \frac{42 \times 10^6 \text{ Wm}^{-2}}{300 \text{ Wm}^{-2}} = 14 \times 10^4 \text{ rods} \quad \text{--- (1)}$$

g) $\left(\frac{m'}{t}\right) \times 5 (70 - 20) = 42 \times 10^6 \quad \text{--- (1)}$

$$\left(\frac{m'}{t}\right) = \frac{42 \times 10^6}{4000 \times 50}$$

$$= 210 \text{ kg s}^{-1} \quad \text{--- (1)}$$

$$\text{Total} = \text{Part I} + \text{Part II}$$

$$= 50 + \frac{70}{50} \times \text{mark.}$$

$$= 100\%$$

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