MINEDUC
MUSANZE DISTRICT ADVANCED LEVEL EXAMINATION/ 2nd TERM/2024
DISTRICT COMPREHENSIVE ASSESSMENT, 2023-2024

SUBJECT: PRACTICAL PHYSICS/20marks

S6 COMBINATIONS:

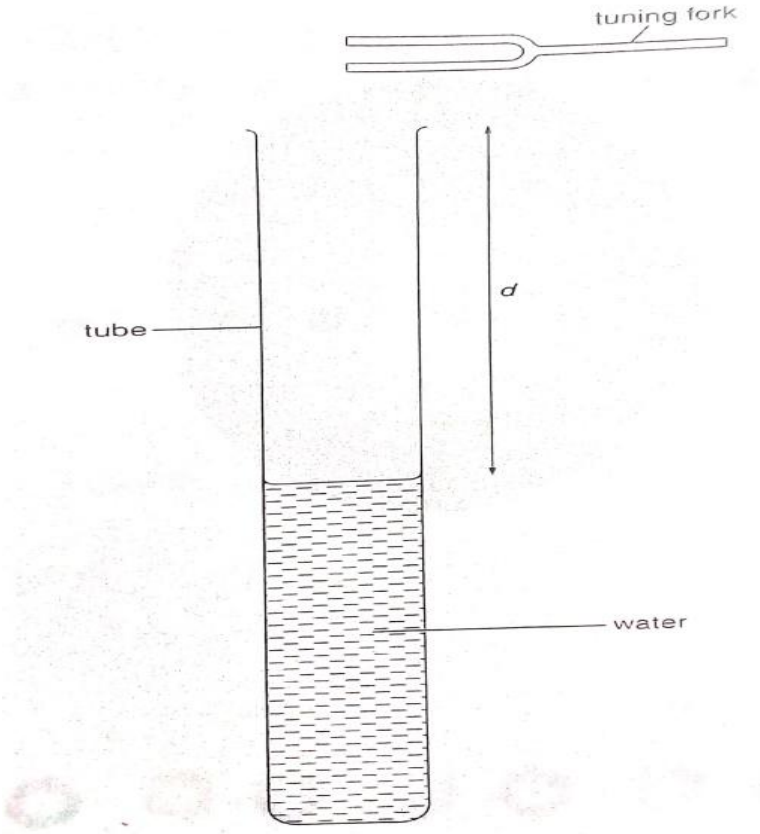
PHYSICS-CHEMISTRY MATHEMATICS	**(PCM)**
MATH-PHYSICS-COMPUTER SCIENCE	**(MPC)**
PHYSICS-CHEMISTRY-BIOLOGY	**(PCB)**
MATH- PHYSICS- GEOGRAPHY	**(MPG)**
PHYSICS- ECONOMICS- MATHEMATICS	**(PEM)**

Duration:1h30

I**NSTRUCTIONS:**

Do not open this question paper until you are told to do so.
This paper consists of **one** compulsory question **(20marks)**
You may use a non-programmable calculator, geometric set and a ruler 30cm long.
Use only a **blue** or **black** pen and **pencil**.

A student is investigating resonance of the air column in a tube using a tube and tuning fork as shown below.



For different tuning forks, the water level is adjusted until resonance occurs. For each tuning fork, the frequency **f** of the sound and the distance **d** are recorded. It is suggested that **f** and **d** are related by the equation $\mathbf{4}(\boldsymbol{d}+\boldsymbol{k})=\frac{\boldsymbol{v}}{\boldsymbol{f}}$ where **v** is the speed of sound in air and **k** is a constant.

a.Identify the dependent and independent variables in this experiment **/2marks**

b. Assume that a graph **d** on y-axis against $\frac{\mathbf{1}}{\boldsymbol{f}}$ on x-axis is a straight line.

(i) Use the equation $\mathbf{4}(\boldsymbol{d}+\boldsymbol{k})=\frac{\boldsymbol{v}}{\boldsymbol{f}}$ to express d in terms of $\frac{\mathbf{1}}{\boldsymbol{f}}$, **v** and **k**.**/1mark**

(ii) From the answer **b)(i)** determine expressions for gradient/slope **m** and y-intercept $\mathbf{y_o}$ in terms of **v** and **k** respectively.**/2mark**

c. Values of **f** and **d** are given below.

f/Hz	**d/cm**	$\frac{1}{f}$**/10^{-4}s**
320	24.5	
340	23.0	
378	20.5	
428	18.0	
476	16.0	
516	15.0	

Calculate and record values of $\frac{1}{f}$**/10^{-4}s** in the above table. **/3marks**

N.B: $\frac{1}{f}$**/10^{-4}s** means that $\frac{1}{f}$**/** is calculated to 4 decimal places. Example $0.0003=3x10^{-4}$, in the table write only 3 because **10^{-4}** is mentioned in the table.

d)(i) use the graph paper to plot a graph of **d/cm** against $\frac{1}{f}$**/10^{-4}s** .

Draw the straight line of the best fit. **/8marks**

(ii) Determine the gradient/slope **m** of the line of best fit.**/1mark**

(iii) Determine the y-intercept **y_o** on the line of the best fit.**/1mark**

e) Using your answers **d)(ii)**, **d)(iii)** determine values for **k** and speed **v**.**/2marks**

END