THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL

CERTIFICATE OF SECONDARY EDUCATION EXAMINATION,

NOVEMBER 1992

031/2

PHYSICS PAPER 2

ALTERNATIVE TO PRACTICAL

(For both School and Private Candidates)

TIME: 3 Hours

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1. This paper consists of sections A, B and C.
2. Answer ALL questions in each of the three sections.
3. Read each question very carefully
4. Wherever calculations are made, you are expected to show ALL steps involved systematically.
5. Each question in each section carries ten marks.
6. Remember to write your Index Number on every page of your answer book provided.
7. Wherever applicable, use the following:

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

$\pi = \frac{22}{7}$

This paper consists of 6 printed pages.

SECTION A

Answer ALL questions in this section.

1. A spring with its upper end fixed was hanged vertically alongside a millimeter scale. When various masses were hung from it the lower end of the spring gave the following readings:

Mass (Kg)	0	0.020	0.04	0.06	0.08	0.10
Reading(mm)	110	121	129	139	151	161
Force (N)						
Extension(mm)						

(a) From the table, calculate the corresponding values for Force (N) and Extension(mm) and fill in the blanks.

(b) Plot a graph of Extension against Force.

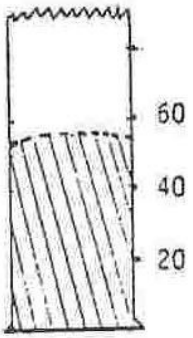
(c) Use your graph in (b) above to find the

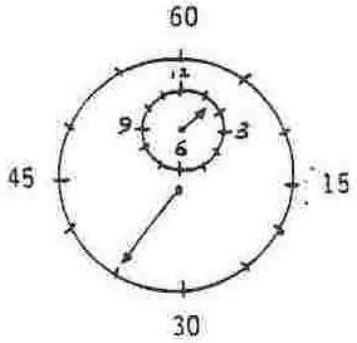
(i) Extension for a mass of 0.45kg

(ii) Scale reading of the spring when a force of 0.15 N is applied.

2. (a) Given a micrometer screw gauge, a pair of callipers vernier scale and a metre rule, which of the three instruments will be the most suitable to measure the diameter of a wire of approximately 0.058cm?

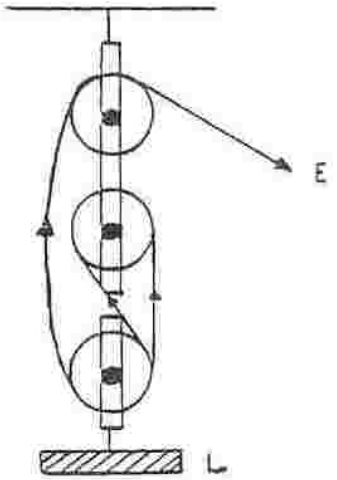
(b) Read and record the reading for each of the following diagramatically represented apparatus.





(c) Name the liquid in apparatus P.

3.

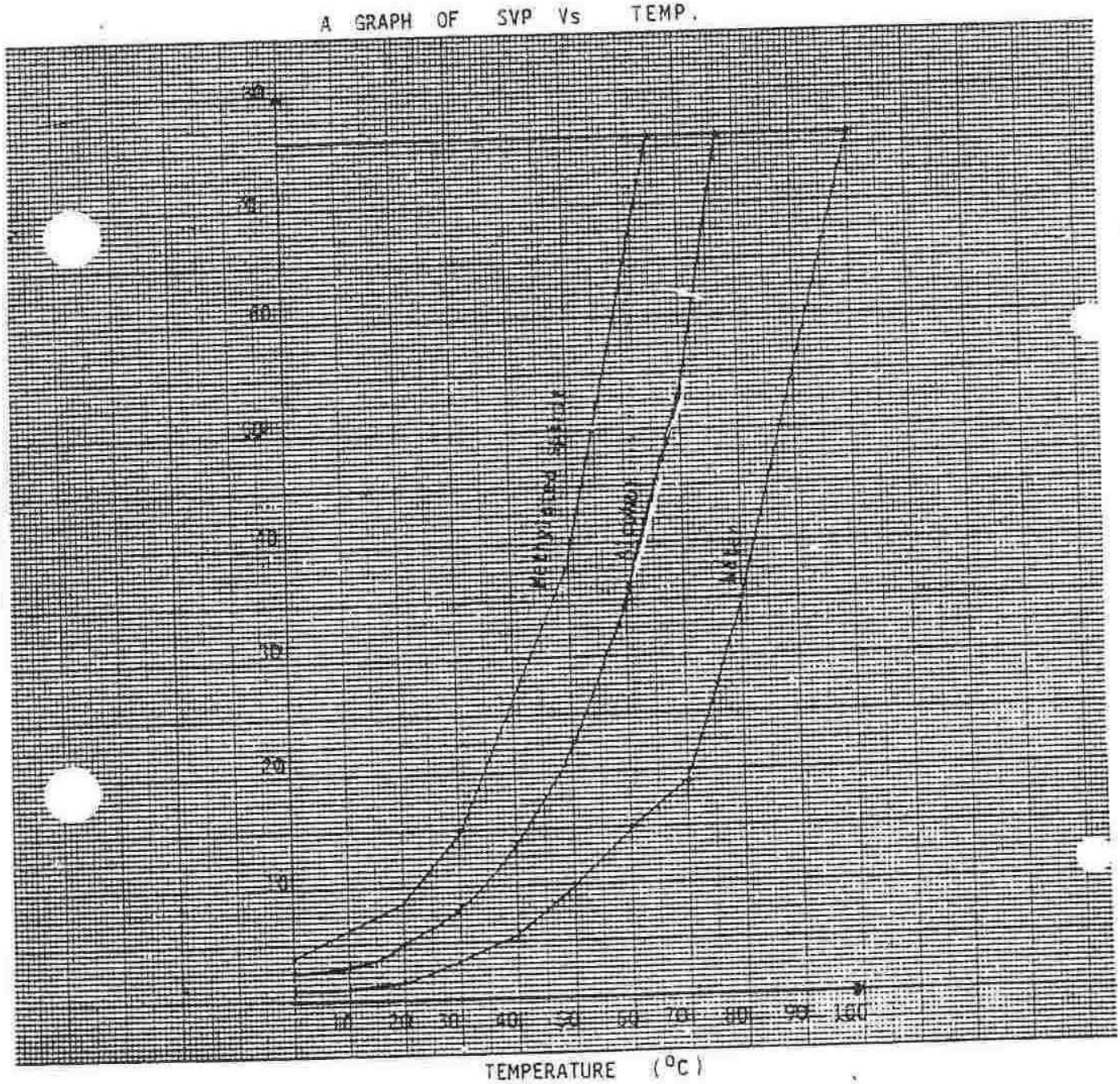


The above diagram represents a simple pulley system.

(a) Determine the velocity ratio (V.R) of the pulley system.

(b) Given that the mechanical advantage of the pulley system is 2.4, determine its efficiency.

4. The graphs below were obtained by plotting saturated vapour pressures against their corresponding temperatures.



(a) Which of the three liquids is the most volatile?

(b) From the graphs read and record the boiling points of methylated spirit and alcohol.

(c) What is the pressure obtained at a boiling point of water?

SECTION B

Answer ALL questions in this section.

5. An object 5cm high was placed 30cm away from a convex lens of focal length 10cm. By graphical method find the

   (a) distance of the image from the lens

   (b) size of the image

   (c) magnification of the image.

6. In an experiment to verify Snell's law, rays of light were traced through a glass block and the results obtained were tabulated as shown below.

i	r	sin i	sin r
30^{o}	19		
40^{o}	25		
50^{o}	30		
70^{o}	38		

   (a) Complete the table

   (b) Use your completed table in b(a) above to plot the graph of sin i against sin r.

   (c) Determine the slope from your graph.

   (d) Use your graph to determine the relationsnip between sin i and sin r.

7. In order to tune a string with a series of tuning forks, the tension of the vibrating string was kept constant and its length varied. The results obtained from this experiment were recorded as follows:

Frequency of Fork, f(Hz)	256	288	320	384	512
Length of String, l (cm)	78.1	69.5	62.5	52.1	39.1

   (a) Obtain a graph of frequency, f against length, l.

   (b) Use your graph in 7(a) above to determine the relationship between frequency, f and length of string, l.

   (c) Find the frequency of an unmarked fork which was tuned with 41.8cm of the string.