CARIBBEAN EXAMINATIONS COUNCIL

SECONDARY EDUCATION CERTIFICATE EXAMINATION

PHYSICS

Paper 032 – General Proficiency

Alternative to SBA

2 hours 10 minutes

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

1. You MUST use this answer booklet when responding to the questions. For each question, write your answer in the space provided and return the answer booklet at the end of the examination.

2. ALL WORKING MUST BE SHOWN in this booklet, since marks will be awarded for correct steps in calculations.

3. Attempt ALL questions.

4. The use of non-programmable calculators is allowed.

5. Mathematical tables are provided.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

1. A researcher investigated the relationship between the temperature and pressure of a fixed mass of gas by supplying it with heat energy at constant volume.

(a) Complete Table 1 by

(i) looking at the trend and choosing a suitable value for the temperature reading

(ii) reading the corresponding pressure values from the graph on page 3.

TABLE 1

Pressure/mm Hg						
Temperature/K	100	150	200	250	300	

(7 marks)

(b) From the graph calculate the amount by which the pressure changes when the temperature changes by 1 K.

_____

_____

_____

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_____

_____

(5 marks)

(c) Determine the temperature in Celsius when the presure of the gas is 750 mm Hg.
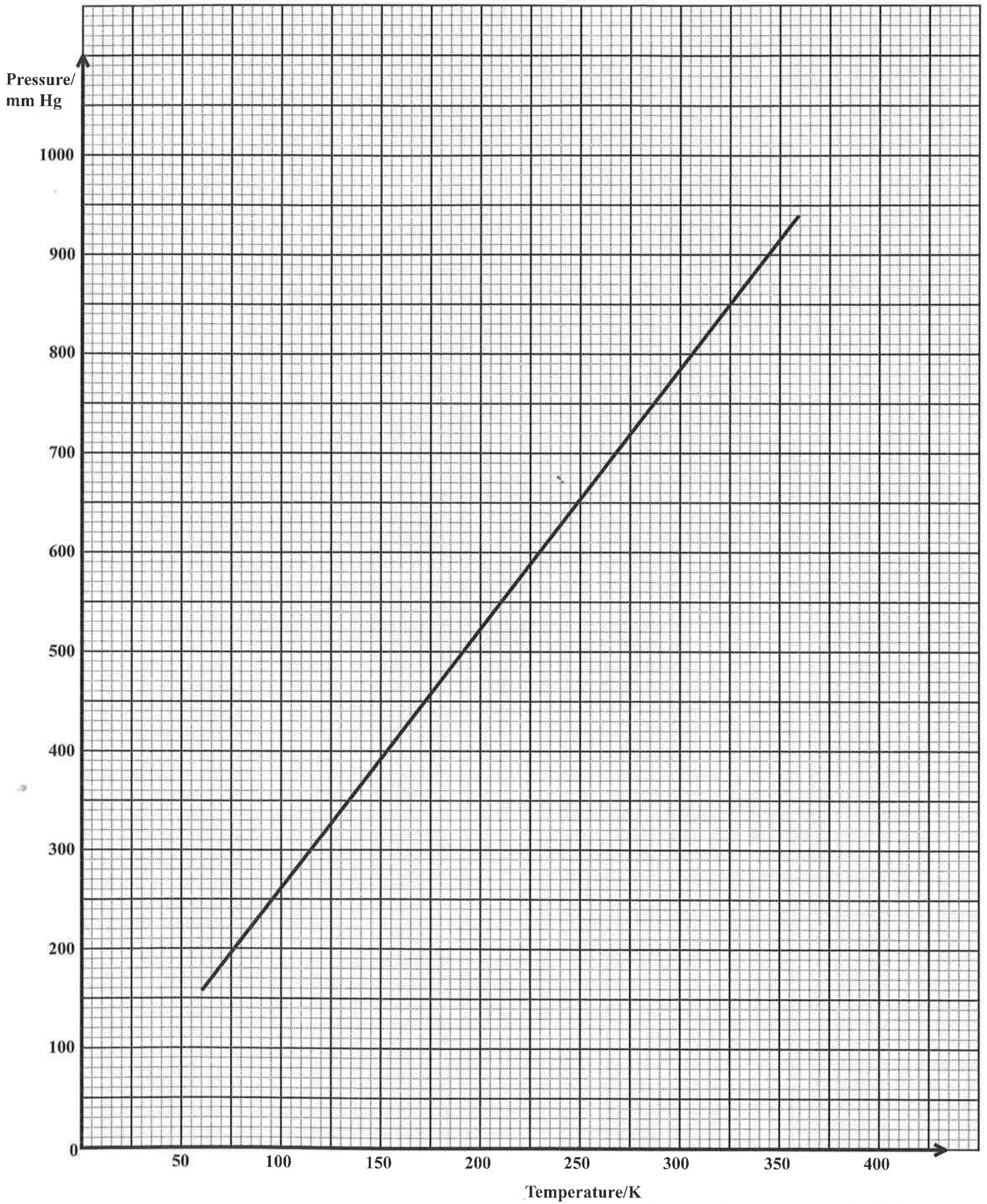
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(4 marks)

(d) Use the graph to determine the pressure in mm Hg when the temperature is

(i) 50 K

_____

(ii) 400 K

_____

(4 marks)

Total 20 marks

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Pressure/ mm Hg vs Temperature/K

2.   A group of fifth form physics students was given a School-Based Assessment to

  –   investigate the relationship between voltage, V, and current, I, for a resistor at constant temperature

  –   draw a V–I graph and hence calculate the resistance, R, of the resistor.

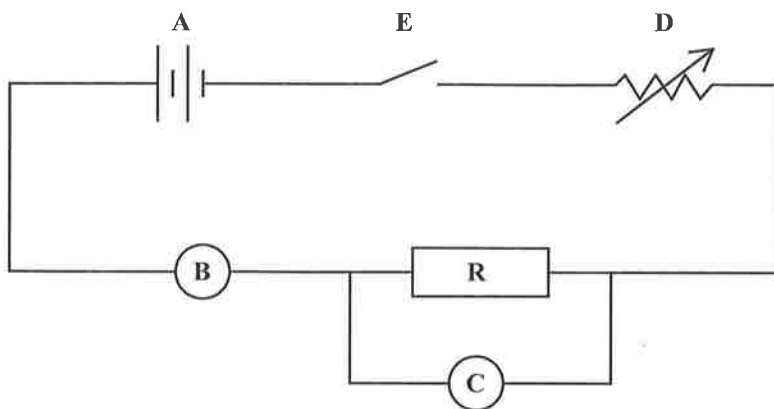 (a)   Figure 1 shows a circuit diagram of the apparatus used.

Figure 1. A circuit diagram

In Table 2 write the name of EACH of the components represented by the letters A – E as shown in Figure 1.

TABLE 2

Letter	Name of Component
A	
B	
C	
D	
E	

(5 marks)

  (b)   The results of the group's activity are recorded in Table 3.

TABLE 3

Voltage (V/V)	Current (I/A)
0.40	0.11
0.60	0.19
0.80	0.25
1.00	0.33
1.20	0.39
1.70	0.56

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(i)   Plot a graph of V/V against I/A on page 7. Begin both axes at zero, the origin.

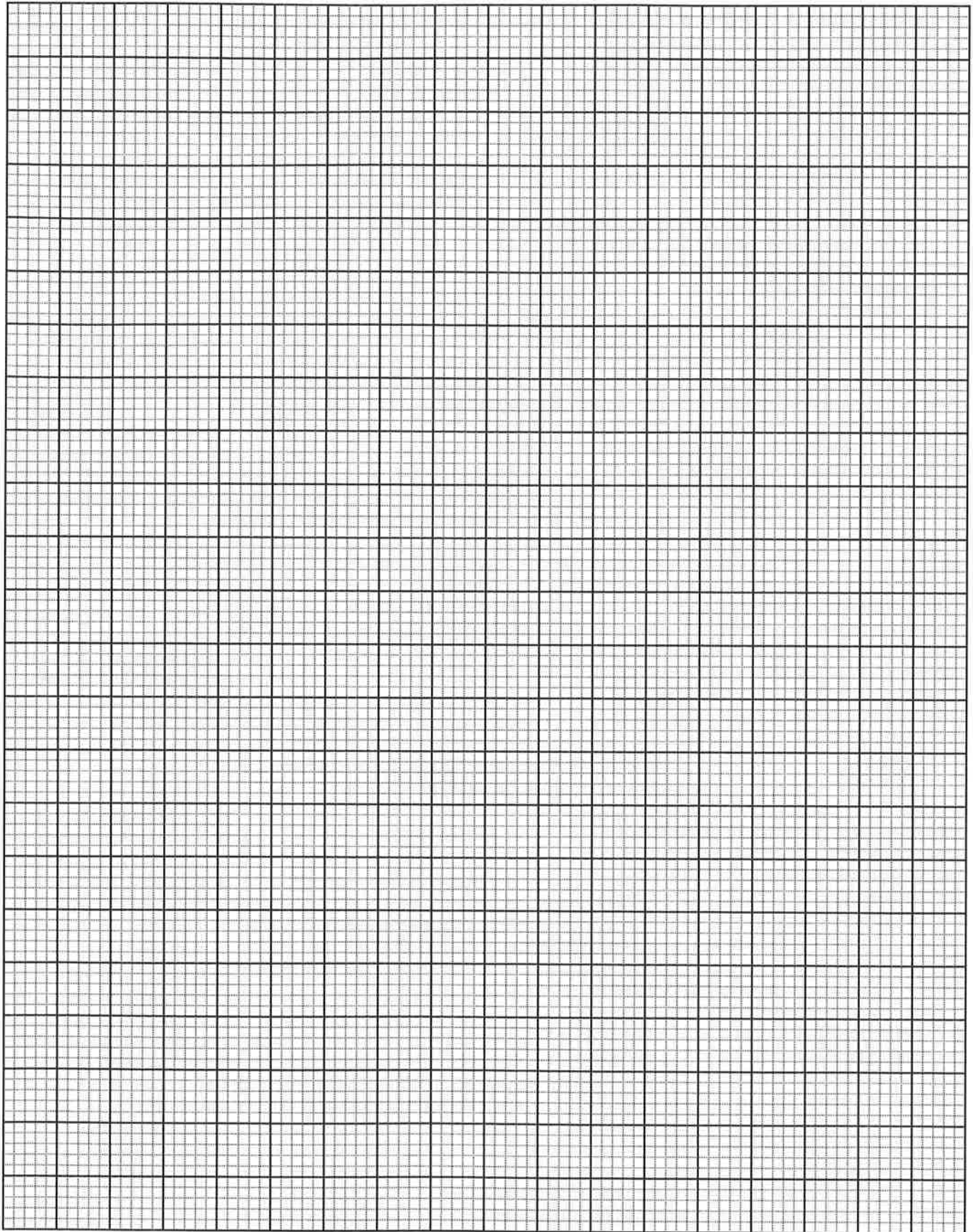**(6 marks)**

(ii)   Calculate the gradient of the line.

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_____

_____

_____

(4 marks)

(iii)   Use the gradient to determine the resistance, R, of the conductor.

_____

_____

_____

(1 mark)

(iv)   The present resistor is now replaced by another resistor. The circuit is closed. The voltage is recorded as 1.9 V and current as 0.48 A. Calculate the resistance of this new resistor.

_____

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(3 marks)

Total 19 marks

3. A student is provided with three unlabelled radioactive sources: an alpha emitter, a beta emitter and a gamma emitter.

Design an experiment to help the student identify EACH radioactive source based on its range in different media.

Your answer should include:

(a) A list of the apparatus you would need

(b) A description of the procedure you plan to use

(c) One safety precaution the student should employ

(d) An account of how the student would use the observations to identify EACH type of source

    a)   Apparatus

_____

_____

_____

_____

(3 marks)

    b)   Procedure

_____

_____

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_____

(3 marks)

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c)   Safety precaution

_____

_____

(1 mark)

d)   Conclusion

_____

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_____

_____

(2 marks)

Total 9 marks

END OF TEST

IF YOU FINISH BEFORE TIME IS CALLED, CHECK YOUR WORK ON THIS TEST.