SIR ARTHUR LEWIS COMMUNITY COLLEGE

DIVISION OF TECHNICAL EDUCATION AND MANAGEMENT STUDIES

EXAMINATION SESSION	:	May 2001 Examination
TUTOR	:	Mr. A. Daniel
PROGRAMME TITLE	:	Architectural Technology Construction Engineering
PROGRAMME CODE	:	ART340/COE341
COURSE TITLE	:	Physics I (Paper 2)
COURSE CODE	:	PHY312
CLASS	:	Year 1
DATE	:	May 2001
COMMENCEMENT TIME	:	2:10 p.m.
DURATION	:	1 Hour 40 minutes
ROOM	:	TRT L1
INVIGILATOR	:	

INSTRUCTIONS:

See following page

SIR ARTHUR LEWIS COMMUNITY COLLEGE
DIVISION OF ARTS, SCIENCE AND GENERAL STUDIES

End of Semester Two Examinations- 2001

PHYSICS 220

PAPER 2

Time: 1 Hour 40 Minutes

Additional Material Provided

1. List of Physical Constants
2. Graph Paper

Instructions to Candidates

Do not turn the page until you are told to do so.

Answer all four questions.

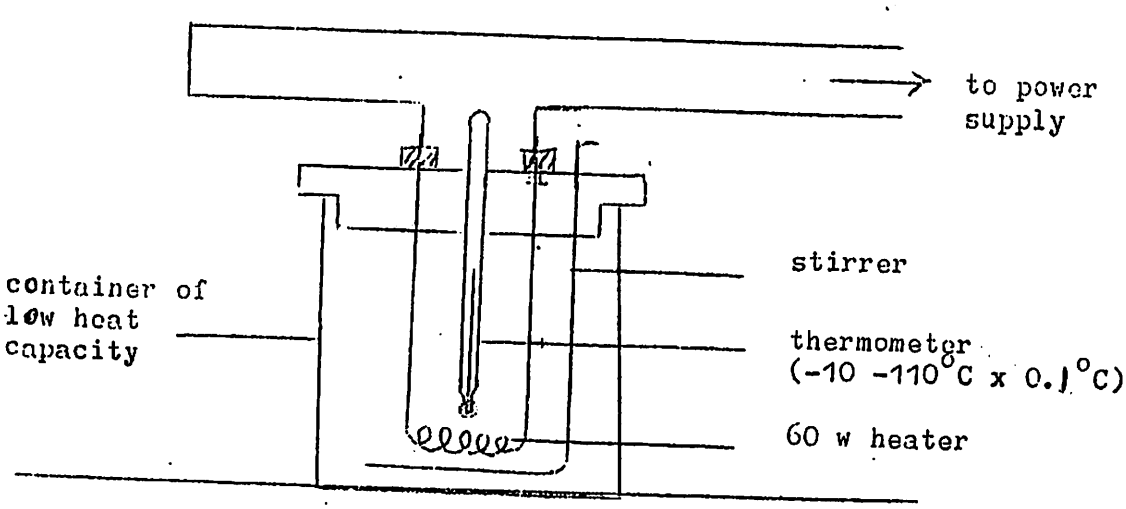
No more than 30 minutes should be spent on question 1.

For numerical answers all working should be shown.

The intended marks for questions or parts of questions are given in brackets ( ).

1.

In an experiment to determine the specific heat capacity of a liquid, a student used a 60 w heater and the apparatus shown in the diagram below.



Her results were presented as follows:

Mass of container and stirrer 82.50 g
Mass of container, stirrer and liquid 231.5 g

TIME /MIN	TEMPERATURE /°C
0	30.0
1	36.0
2	41.5
3	49.5
4	60.0
5	62.7
6	68.0
7	73.7

(a) State the purpose of the stirrer. (1 mark)

(b) Suggest a material, which will be suitable for the container. (2 marks)

(c) (i.) Plot a graph of temperature against time using the readings given . (7 marks)

(ii) Find the slope of the graph. (3 marks)

(iii) Use the slope of the graph along with the other information given in the question to calculate a value for the specific heat capacity of the liquid. (4 marks)

(d) (i) Which ONE of the readings is clearly a mistake? (1 mark)

(ii) What do you think could have caused this error? (2 marks)

2. (a) With the aid of fully – labeled diagrams, explain the difference between refraction and diffraction as applied to light waves. Indicate the conditions required for producing each effect. (8 marks)

(b) A circular wave-front is created by dropping a stone into a lake. Suggest TWO reasons why the amplitude of the wave-front decreases as it spreads out.

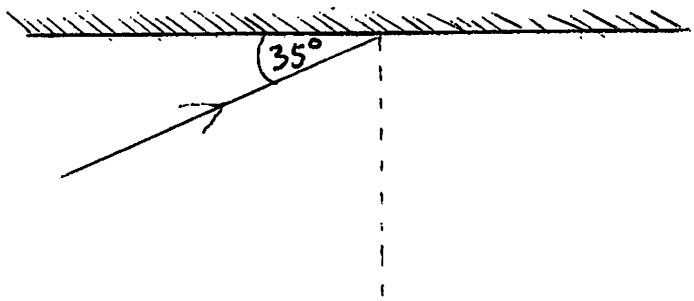
(2 marks)

(c) During a thunderstorm the sound of thunder is first heard about five seconds after a lighting flash. The speed of sound is 340 m/sec.

(I) Why is the thunder heard after the lighting is seen?
(ii) Estimate how far from the observer the flash occurred.

(5 marks)

(d) (i) The angle between an incident ray and a plane mirror is 35°. From the diagram, calculate the angle of incidence.



(ii) Hence, state the angle of reflection.

(iii) A girl stands 5 metres away from a large plane mirror. How far must she walk to be 2 metres away from her image? State your reasoning.

(5 marks)

3.

(a) State:-

(i) Archimedes principle; and

(ii) The law of floatation

(2 marks)

(b) (i) What is meant by pressure?

(ii) A rectangular block of dimensions 4 cm x 5 cm x 10 cm has a mass of 600 g. Calculate the maximum and minimum pressure exerted by the weight of the block when it lies on its faces.

(8 marks)

(c) (i.)With the aid of a diagram, explain how a liquid barometer works.
(ii) Why is mercury often used in a liquid barometer?

(10 marks)

4. (a) A sealed box with two terminals may contain one of the following: a wire coil, a filament lamp, a diode.

   (i.) Draw a circuit diagram to show how you would measure the current – voltage characteristic of the device in the box. Do not attempt to state the ranges of the instruments you would use.

   (ii.) Briefly describe the experiment you would perform to obtain the current- voltage characteristic.

   (iii.) Sketch the current-voltage graphs you would expect to obtain for each device. Label your sketches clearly.

(14 marks)

(b) An electric kettle has a heating element rated at 2 kW when connected to a a 250 V electrical supply. Calculate

   (i) the current that would flow when the element was connected to a 250 V supply,

   (ii) the resistance of the element,

   (iii) the heat produced by the element in 1 minute.

(6 marks)