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Examination
Number here

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LEAVING CERTIFICATE EXAMINATION, 1992

PHYSICS — ORDINARY LEVEL

THURSDAY, 18 JUNE — AFTERNOON 2.00 to 5.00

Answer **all** questions in Section A.

Answer **two** questions from Section B and **three** questions from Section C.

SECTION A (120 marks)

Answer each question in this section.

Each question carries the same number of marks.

Write your answers in the spaces provided.

Write your examination number at the top.

Be sure to return this section of the examination paper, enclosing it in the answer book you use in answering Sections B and C.

1. Answer *five* of the following items, (i), (ii), (iii), etc. In the case of each item write the letter corresponding to the correct answer in the box provided.

(i) A mass of 2 kg is moving with a velocity of 3 m s^{-1} in a certain direction. The kinetic energy of the mass is

- A. 3 J
- B. 6 J
- C. 9 J
- D. 18 J
- E. 36 J.

Answer (6)

(ii) Fig. 1 shows a rigid bar which is in equilibrium and is supported at its centre of gravity. The mass X is

- A. 25 kg
- B. 10 kg
- C. 2.5 kg
- D. 0.4 kg
- E. 0.1 kg.

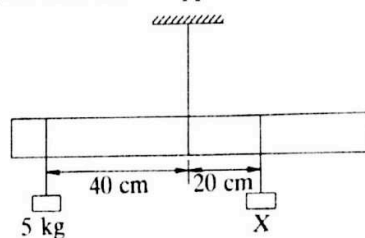


Fig. 1

Answer (6)

(iii) Boyle's law states that for a fixed mass of gas at constant temperature

- A. pressure is proportional to volume
- B. pressure is inversely proportional to volume
- C. pressure is proportional to volume squared
- D. pressure is proportional to temperature
- E. pressure is proportional to temperature on the Kelvin scale.

Answer (6)

(iv) When a 1000 W electric heater operates for 5 hours the number of kilowatt-hours used is

- A. 5
- B. 50
- C. 200
- D. 500
- E. 5000.

Answer (6)

(v) A transformer is a device which can convert

- A. a low a.c. voltage to a low d.c. voltage
- B. a low a.c. voltage to a high d.c. voltage
- C. a low d.c. voltage to a high d.c. voltage
- D. a high d.c. voltage to a low d.c. voltage
- E. a high a.c. voltage to a low a.c. voltage.

Answer (6)

(vi) When chemical reactions take place as a result of a current flowing through a liquid the process is called

- A. electromagnetism
- B. electromotive force
- C. electromagnetic induction
- D. electrolysis
- E. electrostatics.

Answer (6)

2. Answer *five* of the following.

(i) Define momentum.
.....(6)

(ii) State Newton's Universal Law of Gravitation.
.....(6)

(iii) The angle between geographic north-south and magnetic north-south at a point is called the magnetic
.....(6)

(iv) Give *two* ways in which heat may be transferred from one point to another.
.....(6)

(v) What is the photoelectric effect?
.....(6)

(vi) State *one* difference between nuclear fission and nuclear fusion.
.....(6)

3. Answer *five* of the following.(6)
- (i) Name *two* primary colours.(6)
- (ii) What are complementary colours?(6)
-(6)
- (iii) When the spectrum of white light is formed using a prism which colour is deviated least?(6)
- Which colour is deviated most?(6)
- (iv) Name the radiation which has wavelengths just longer than visible light.....(6)
- (v) What is monochromatic light?(6)
-(6)
- (vi) Name *one* type of emission spectrum.(6)

4. Fig. 2 shows an arrangement for detecting the radiation emitted from a radioactive source, S. Answer *five* of the following.

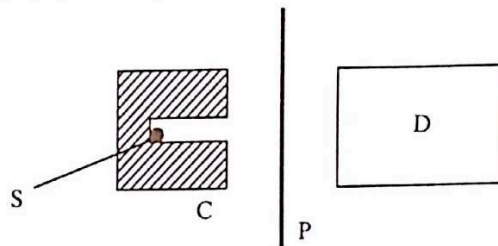


Fig. 2

- (i) Name *two* types of radiation emitted from radioactive substances.(6)
-(6)
- (ii) D is a device for detecting the radiation emitted from the source S. Name one type of detector which could have been used.(6)
-(6)
- (iii) A sheet of paper placed at P has no effect on the radiation reaching D. When the paper is replaced by a sheet of aluminium a few millimetres thick no radiation reaches D. Name the type of radiation being emitted by the radioactive source S.(6)
-(6)
- (iv) The radioactive source S is stored in a container C. Of what metal is the container usually made?(6)
-(6)
- (v) Name the scientist who discovered radioactivity near the end of the nineteenth century.(6)
-(6)
- (vi) Mention one precaution which should be taken when dealing with radioactive substances.(6)
-(6)

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Section A is on a separate sheet which provides spaces for your answers. The completed sheet should be enclosed in your answer book.

Write your answers to Sections B and C in your answer book.

SECTION B (80 marks)

Answer **two** of the questions from this section.

Each question carries the same number of marks.

5. A student performed a laboratory experiment to measure velocity. (12)
- (i) Draw a labelled diagram showing the apparatus which might have been used in this experiment. (9)
 - (ii) State clearly the measurements which the student would have made in the experiment. (9)
 - (iii) Explain how the measurements would be used to calculate the velocity. (9)
 - (iv) Indicate how the student might have made sure that the velocity was constant. (9)

6. The following is part of a student's account of an experiment to verify Snell's law.

"A glass block was placed on a sheet of paper. The angle of incidence, i , and the angle of refraction, r , were measured. The experiment was repeated for a number of different angles of incidence. The measurements obtained are shown in the table."

| | | | | | | | |
|--------------------|----|----|----|----|----|----|----|
| $i/\text{degrees}$ | 15 | 25 | 35 | 45 | 55 | 65 | 75 |
| $r/\text{degrees}$ | 10 | 16 | 22 | 28 | 33 | 37 | 40 |

- (i) Plot a graph of $\sin i$ against $\sin r$ on graph paper and explain how this graph verifies Snell's law. (24)
 - (ii) Draw a labelled diagram showing how the apparatus might have been arranged in this experiment. (9)
 - (iii) Give one precaution which should be taken in this experiment to ensure a more accurate result. (6)
7. A coil of wire, a calorimeter and other apparatus were used by a student in an experiment to verify Joule's law.
- (i) Draw a labelled circuit diagram for this experiment. (18)
 - (ii) State the measurements which the student would have made in the experiment. (9)
 - (iii) State how the measurements would be used to verify Joule's law. (12)