

# FOCUS A365

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## FORM 3 TERM 1 PHYSICS PP2 EXAMINATIONS 2018

NAME: \_\_\_\_\_ ADM NO: \_\_\_\_\_ CLASS: \_\_\_\_\_

### Instructions to candidates.

- Write your name and admission number in the spaces provided above.
- This paper contains two sections **A** and **B**.
- Answer all questions in both sections **A** and **B**.
- All your answers must be written in the spaces provided below each question.
- **KNEC** Mathematical tables may be used.
- Silent, non-programmed ,electronic calculators may be used where necessary.
- All working **MUST** be clearly shown.
- Where necessary, take  $g=10\text{N/Kg}$ , speed of light  $c= 3.0 \times 10^8 \text{ ms}^{-1}$

### For examiner's only.

Section	Question	Maximum score	Candidates score
A	Q1- 11	25	
B	12	12	
	13	11	
	14	10	
	15	10	
	16	12	
	<b>TOTAL</b>	<b>80</b>	

**SECTION A (25 MARKS) Answer All Questions in the Spaces Provided.**

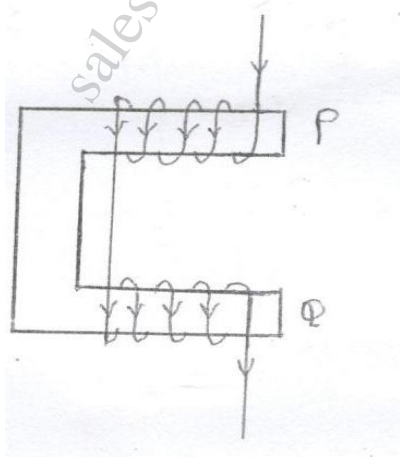
1. Determine the number of images formed when an object is placed between two plane mirrors inclined at an angle of  $72^\circ$  (2marks)

2. What is the operating resistance of an electric lamp rated by the manufacturer at 60W, 240 V?(3marks)

3. Distinguish between primary cells and secondary cells (1 mark)

4. (a) An electromagnet is made by winding insulated copper wire on a soft-iron core. State two factors which determine the magnitude of the force of the electromagnet. (2 marks)

(b) The following diagram shows a wire wound on a U-shaped soft-iron core

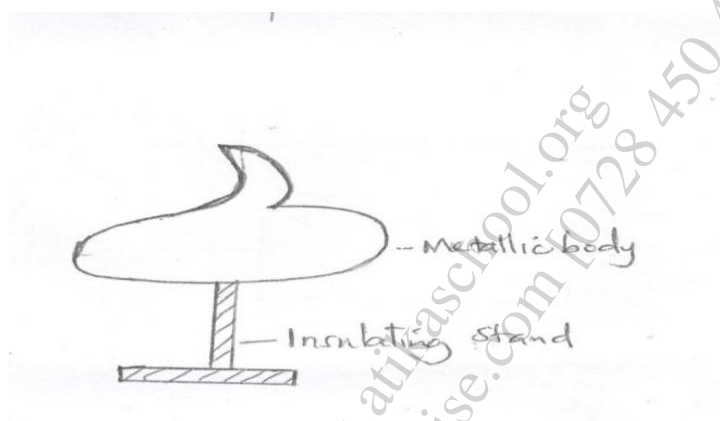


Draw the magnetic field pattern around P and Q

(2 marks)

5. A policeman standing between two high walls fires a gun. He hears the first echo after 3 seconds and the next after 5 seconds. What is the distance between the walls? (Take velocity of sound in air as 330m/s).  
(3 marks)

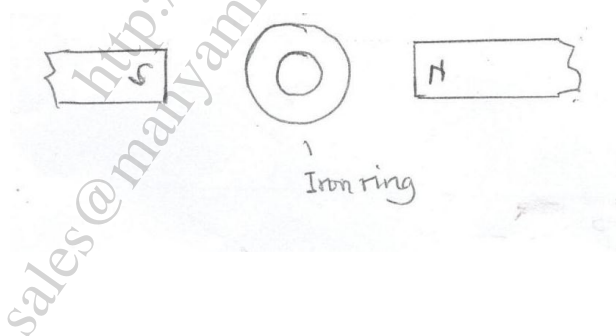
6. The following diagram shows a hollow metallic body mounted on an insulating stand. A negative charge is introduced on the body.



Using negative marks (-), show how the charge will be distributed on the body.

(1 mark)

7. (a) An iron ring is placed between two magnets as shown below



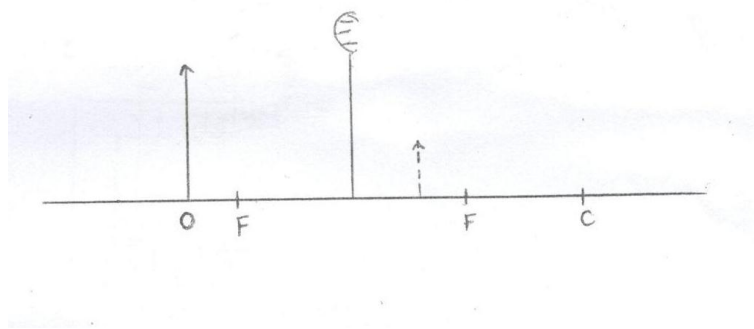
Sketch the magnetic field pattern between the poles and mark the neutral point X.

(2 marks)

- (b) State two uses of a charged gold-leaf electroscope.

(2 marks)

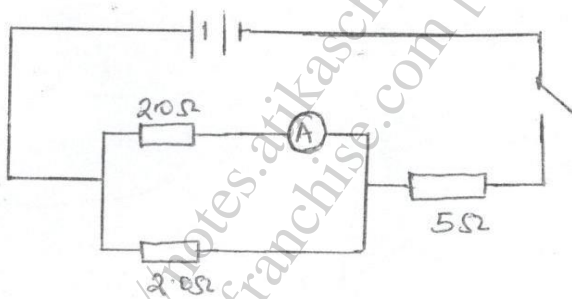
8. An object O is placed in front of a convex mirror and a virtual image I is formed as shown below.



Sketch rays on the diagram to show how the image is formed.

(2 marks)

9. Each of the cells in the circuit diagram below has an e.m.f of 1.5V and negligible internal resistance. The ammeter also has negligible resistance.



What is the reading on the ammeter when the switch is closed?

(2 marks)

10. State one condition under which Ohm's law is obeyed in a metal conductor.

(1 mark)

11. (a) Arrange the following electromagnetic waves in order of increasing wavelength; Infrared, Ultraviolet, Microwaves, Radiowaves, X-rays. (1 mark)

(b) State three properties of electromagnetic waves. (3 marks)

**SECTION B (55 MARKS) Answer All Questions in the Spaces Provided.**

12. (a) Three resistors of resistances  $2.0\Omega$ ,  $4.0\Omega$  and  $6.0\Omega$  are connected so as to obtain the least effective resistance.

i) Sketch an appropriate circuit diagram for the arrangement. (3 marks)

ii) Determine the effective resistance of the circuit. (3 marks)

(b) A voltmeter reads  $2.0\text{V}$  when connected across the terminals of a battery in an open circuit and  $1.4\text{V}$  when the battery sends a current of  $0.1\text{A}$  through a lamp. What is the:

(i) e.m.f of the battery? (1 mark)

(ii) Terminal p.d of the battery? (1 mark)

(iii) Internal resistance of the battery.

(2 marks)

(iv) Resistance of the lamp?

(2 marks)

13. (a) Define the term Principal focus as applied to thin lenses.

(1 mark)

(b) A lens forms a clear image on a screen when the distance between the screen and the object is 80cm. The image is 3 times the size of the object.

(i) State and explain the type of lens used.

(2 marks)

(ii) Determine the distance of the image from the lens.

(3 marks)

(iii) Determine the focal length of the lens.

(2 marks)

(c) State three similarities between the eye and the camera. (3 marks)

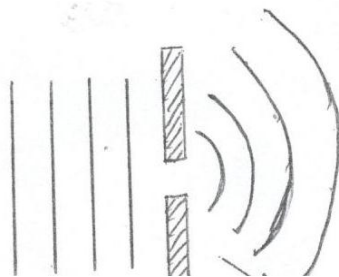
14. (a) Define the term refractive index of a material. (1 mark)

(b) State two conditions for total internal reflection to occur. (2 marks)

(c) When water is poured into a beaker to a depth of 12cm, the bottom of the beaker appears to be raised by 3cm. Determine the refractive index of water. (3 marks)

15. (a) Define the term diffraction as applied in the study of waves. (1 mark)

(b) The diagram below shows wave fronts before and after passing the opening.



State what would be observed on the pattern after passing the opening if:

(i) The gap was made smaller. (1 mark)

(ii) The wavelength was made larger. (1 mark)

(c) When a metre-rule was placed in a ripple tank where straight waves were being produced by a straight vibrator, it was noted that the distance between 12 successive crests was 30cm. The frequency of the vibrator was 20Hz. Determine:

(i) The wavelength of the waves in the ripple tank. (2 marks)

(ii) The periodic time of the waves. (2 marks)

(iii) The velocity of the waves over the water surface. (3 marks)

16. (a) Define the term capacitance. (1 mark)

(b) State two factors that affect the capacitance of a parallel-plate capacitor. (2 marks)



c) Three capacitors  $1.5\mu\text{F}$ ,  $2.0\mu\text{F}$  and  $3.0\mu\text{F}$  are connected in series to a P.d of 12V. find.

i. The combined capacitance (3 marks)

ii. The total charge stored by the arrangement (3 marks)

iii. Voltage across the  $2.0\mu\text{F}$  capacitor. (3 marks)

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