Aga Khan University Examination Board
Notes from E-Marking Centre on SSC II Physics Examination May 2012

Introduction

This document has been produced for the teachers and candidates of the SSC Part II (Class X) course in Physics. It contains comments on candidate responses to the 2012 Secondary School Certificate (SSC) examination, indicating the quality of the responses and highlighting their relative strengths and weaknesses.

This document should be read along with the AKU-EB physics syllabus based on the National Curriculum (2006).

General Comments

Teachers and candidates should be aware that examiners may ask questions that address the students learning outcomes (SLO) in a manner that requires candidates to respond by integrating knowledge, understanding and application they developed through studying the course.

Candidates need to be aware that the marks allocated to the question are related to the answer space (where this is provided on the examination paper), as a guide to the length of the required response. A longer response will not in itself lead to higher marks. Writing far beyond the indicated space may reduce the time available for answering other questions.

Candidates need to be familiar with the command words in the student learning outcomes which contain terms commonly used in examination questions. However, candidates should also be aware that not all questions will start with or contain one of the command words. Questions such as 'how?', 'why?' or 'to what extent?' may be used.

Question 1

In better responses, candidates identified the correct type of motion given in the question and provided three characteristics of simple harmonic motion.

In average responses, they correctly identified the type of motion but provided only two characteristics of SHM.

Question 2

In better responses, candidates completed the ray diagram and calculated the position and nature of image by using the formula, $\frac{1}{f} = \frac{1}{p} + \frac{1}{q}$.

In average responses, they found out the numerical value of image distance correctly but were unable to complete the diagram. Either they seemed to be confused to match their numerical value of image distance with their diagram or were unable to understand where the image should appear in the diagram.

In weaker responses, they failed either in completing the ray diagram or calculating the correct position or nature of image.

Question 3

Better responses of candidates clearly wrote the correct formulae for Coulomb's law and made correct relationship between distance and amount of charges with the electrostatic force.

In average responses, they wrote the correct formulae for part (i) *between these two charges* and for part (v) *when magnitude of both charges and distance are doubled.* But they were unable to write the correct formula for part (ii) *when distance between the charges is halved*, part (iii) *when magnitude of each charge is doubled* and for part (iv) *when both charges are doubled and their distance becomes half.*
For example in part (iii) *when magnitude of each charge is doubled*, responses were $F = 2 \times k \times \frac{q_1 q_2}{r^2}$, whereas the correct formula should be $F = k \times \frac{4q_1 q_2}{r^2}$.

In poor responses, they wrote an incorrect formula for each step of the given law. They were unable to find the relationship between force and charges which showed an inability to understand the requirement of the question.

Question 4

Better responses of candidates clearly mentioned the direction of the motion of wire and also stated the answer of the given question.
For example, the direction of motion of wire is anticlockwise or outward, the direction of force is perpendicular to the direction of current and when current flows in the opposite direction, the direction of the motion in the wire will also become opposite.

In average responses, they failed to write the direction of motion in the wire when current flows in the opposite direction.

Question 5

Better responses of candidates clearly provided the three advantages of light signal through optical fiber.

In average responses, they provided only two advantages of light signals but sometimes they were confused with the uses of optical fiber. For example, optical fiber is used in medical science.

In weaker responses, they were unable to describe the advantages of transmitting light signals through optical fiber.

Question 6

Better responses of candidates correctly identified alpha, beta particles and gamma rays and wrote one property of each.

In average responses, they correctly identified alpha, beta particles and gamma rays along with one property of any one of the three radiations.

In weaker responses, they failed to correctly identify alpha, beta particles and gamma rays and were unable to write their properties.

Question 7

a. In better responses, candidates correctly determined the amplitude, wavelength, time period and velocity of the wave with the help of the formula, $V = \lambda f$.

In average responses, they made mistakes in the conversion of units and some responses were unable to pick the given value of wavelength from the given diagram.

In weaker responses, they correctly determined either the amplitude or wavelength but failed to determine the time period and velocity of the wave.

b. Better responses of candidates correctly described the five uses of ultrasound.

In average responses, they provided only three or four uses.

Question 8

a. Better responses of candidates clearly drew the ray diagrams of long and short sightedness of a human eye and also described the defect and its correction.

In average responses they gave the correct description of the defect of a human eye but failed to draw the ray diagrams of long and short sightedness.

In poor responses, they were unable to draw the correct ray diagram with correct description of defects of a human eye.

b. In better responses, candidates derived the magnifying power of a simple microscope with a ray diagram.

In average responses, they made mistakes in some of the important steps of derivation. For example, they missed out the following steps:

$M = \frac{\beta}{\alpha}$, $M = M_2 \times M_1$, $M = \frac{q_o}{p_o}$

Question 9

a. Better responses of candidates correctly identified the combination of capacitors and also correctly derived the expression for the effective capacitance.

In average responses they failed to write all the steps of derivation of expression for effective capacitance.

b. In better responses, candidates calculated the correct value of combined resistance in the circuit and showed the correct working in finding the value of current and voltage.

In average responses, they failed to calculate the correct values of voltage across each resistor.

In poor responses, they were unable to show any correct step of the procedure. They made mistakes in the identification of combination of the resistor and applied the wrong formula.