Practice Question Set For A-Level
**Subject : Physics**
**Paper-1 Topic: Particle And Radiation**



**Name of the Student**:_____
**Max. Marks : 17 Marks** **Time : 17 Minutes**

## Q1.

(a) Name the constituent of an atom which

(i) has zero charge,

_____

**(1)**

(ii) has the largest specific charge,

_____

**(1)**

(iii) when removed leaves a different isotope of the element.

_____

**(1)**

(b) The equation

$$^{99}_{43}\text{Tc} \rightarrow {}^{A}_{Z}\text{Ru} + {}^{0}_{-1}\beta + \text{X}$$

represents the decay of technetium−99 by the emission of a $\beta^-$ particle.

(i) Identify the particle X.

_____

**(1)**

(ii) Determine the values of A and Z.

A = _____

Z = _____

**(2)**

(iii) Calculate the specific charge of the technetium−99 $\left(\frac{99}{43}\text{Tc}\right)$ nucleus. State an appropriate unit for your answer.

specific charge = _____ unit _____

**(4)**

**(Total 10 marks)**

## Q2.

Under certain circumstances it is possible for a photon to be converted into an electron and a positron.

(a) State what this process is called.

_____

**(1)**

(b) A photon must have a minimum energy in order to create an electron and a positron.

Calculate the minimum energy of the photon in joules. Give your answer to an appropriate number of significant figures.

minimum energy = _____ J

**(3)**

(c) A photon of slightly higher energy than that calculated in part (b) is converted into an electron and a positron.

State what happens to the excess energy.

_____

_____

**(1)**

(d) Describe what is likely to happen to the positron shortly after its creation.

_____

_____

_____

_____

**(2)**

**(Total 7 marks)**