

http://physicspmb.ukzn.ac.za/index.php/PHYS133

The screenshot shows a web browser window with the URL <http://physicspmb.ukzn.ac.za/index.php/PHYS133>. The browser's address bar also shows the page title "PHYS133 - Physics" and the site name "University of KwaZulu-Natal". The browser's menu bar includes "File", "Edit", "View", "Favorites", "Tools", and "Help".

The page content is organized into several sections:

- Navigation:** A sidebar on the left contains the University of KwaZulu-Natal logo and a list of navigation links: Physics at PMB, Research, Studying Physics, Courses, Bursary Register, Staff, Online exercises, Durban center, UKZN website, and Past exam papers.
- Search:** A search box with "Go" and "Search" buttons is located below the navigation menu.
- Toolbox:** A sidebar on the left contains a list of toolbox links: What links here, Related changes, Upload file, Special pages, Printable version, and Permanent link.
- Main Content:** The main content area features a series of sections, each with an "[edit]" link to its right:
 - PHYSICS 133** [edit]
 - Modern Physics for Life Sciences and Agriculture** [edit]
 - Lecture Information** [edit]
 - The course information sheet is [here](#).
 - Supplemental Instruction** [edit]
 - MCQ Information** [edit]
 - An example of how to fill out an MCQ answer sheet can be found [here](#).
 - Practicals** [edit]
 - The practical schedule is [here](#).
 - Practical Day and Group Allocations
 - We have some [online exercises with vernier calipers](#).
 - Specific course information** [edit]
 - Electricity and Magnetism** [edit]
 - Resources for the Electricity and Magnetism component of the course can be obtained by clicking on the link below.
 - [PHYS133 - Electricity and Magnetism](#)
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At the bottom of the page, a footer indicates: "This page was last modified on 22 July 2015, at 07:43. This page has been accessed 20,595 times." A "Powered By MediaWiki" logo is also present in the bottom right corner.

Example 1.2: Neutral point in the field due to two point charges

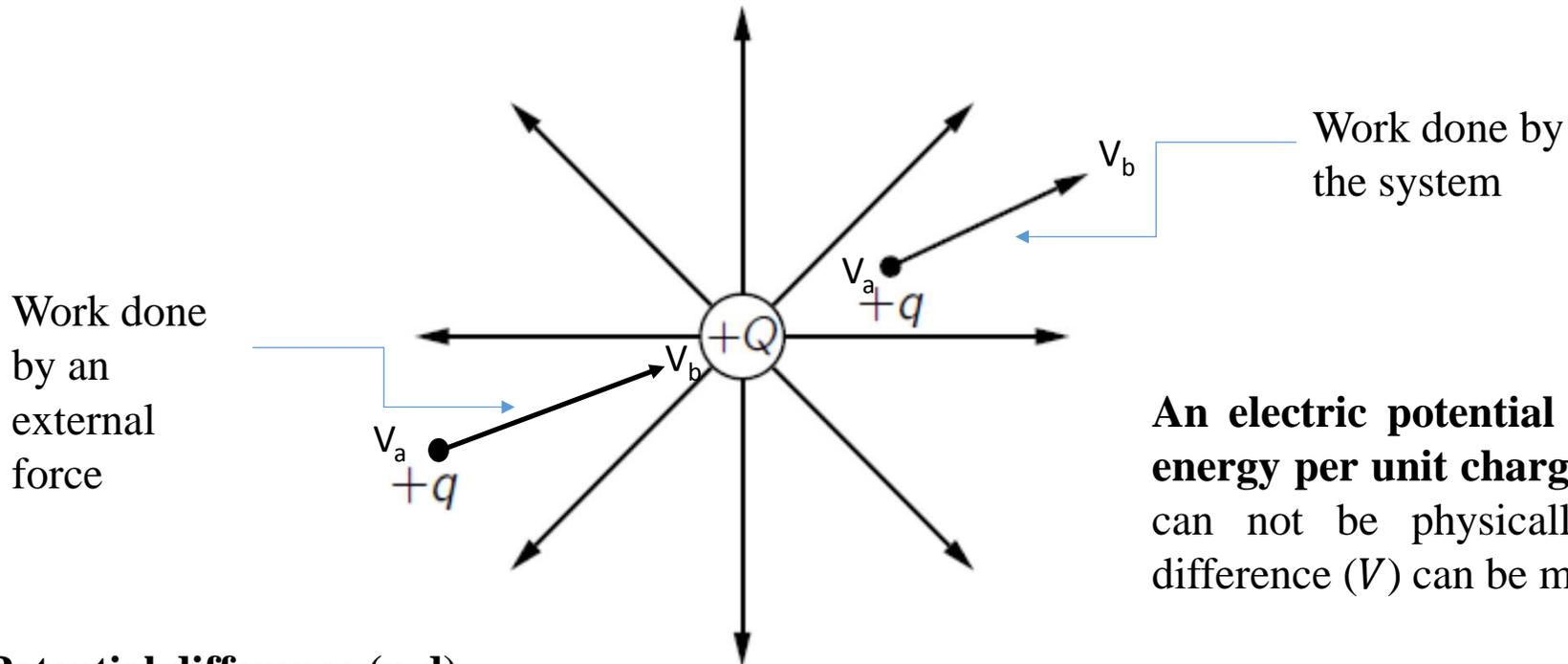
Charges of +5 nC and +20 nC are located 30 cm apart in air. Calculate

1. the force between them, and
2. the position of the neutral point in the resulting electric field.

Example 1.3: Force on a charge in a uniform electric field

Calculate the force on an electron ($e = 1.60 \times 10^{-19}$ C) in a uniform electric field E of magnitude $E = 1.5 \times 10^6$ NC⁻¹.

Electric potential and potential difference



An **electric potential** is defined as the **potential energy per unit charge** (PE/q). Electric potential can not be physically measured but potential difference (V) can be measured.

Potential difference (p.d)

The potential difference between two points in an electric field is the **work done per unit charge** in slowly transferring a small positive test charge from one point to the other.

$V = V_b - V_a = \frac{\Delta PE}{q}$ but $\Delta PE = W$ (Work-energy theorem)

$$V = \frac{W}{q}$$

The SI unit of potential difference is the volt ($1V = 1 J C^{-1}$).

One volt is the p.d. between two points in an electric field if **1 joule** of work moves a charge of **1 coulomb** between these points. Note that V is a **scalar quantity**.

The electron volt – a unit of energy

The joule is a very large unit for dealing with energies of electrons, atoms or molecules. For this purpose, the electron volt is used (abbreviated eV).

Electron volt

One electron volt is defined as the energy acquired by an electron when moving through a potential difference of 1 V.
From Equation

$$W = qV$$
$$eV = 1.6 \times 10^{-19} \text{ C} \times (1V),$$

hence we have

$$\mathbf{1 \text{ eV} = 1.6 \times 10^{-19} \text{ J.}}$$

Example: An electron moves freely from one point to another in an electric field and gains 200 eV of energy. Express this energy into J.