

# SOLUTIONS OF DRILL PROBLEMS ENGINEERING ELECTROMAGNETICS

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### Solutions of Drill Problems: Engineering Electromagnetics

Electromagnetism is a fundamental branch of engineering that deals with the interaction of electric and magnetic fields. To enhance the understanding of electromagnetism, drilling problems serve as a valuable tool for students and engineers alike. This article provides a concise overview of solutions to select drill problems commonly encountered in engineering electromagnetics.

**Problem 1:** Find the electric field intensity in the region between two parallel plates separated by a distance of 5 cm and maintained at a potential difference of 100 V.

**Solution:** Using the formula  $E = V/d$ , where  $E$  is the electric field intensity,  $V$  is the potential difference, and  $d$  is the distance between the plates, we have:  $E = 100 \text{ V} / 0.05 \text{ m} = 2000 \text{ V/m}$

**Problem 2:** A current-carrying wire is bent into a circular loop of radius 10 cm. If the current flowing through the loop is 5 A, determine the magnetic field intensity at the center of the loop.

**Solution:** Using the formula for the magnetic field intensity at the center of a circular loop,  $B = (\mu_0 I) / (2r)$ , where  $\mu_0$  is the permeability of free space,  $I$  is the current, and  $r$  is the radius of the loop, we have:  $B = (4\pi \times 10^{-7} \text{ T-m/A}) 5 \text{ A} / (2 * 0.1 \text{ m}) = 100 \pi \text{ T}$

**Problem 3:** A plane wave with a frequency of 1 GHz is propagating in free space. Find the wavelength of the wave.

**Solution:** Using the formula  $\lambda = c/f$ , where  $\lambda$  is the wavelength,  $c$  is the speed of light, and  $f$  is the frequency, we have:  $\lambda = (3 \times 10^8 \text{ m/s}) / (1 \times 10^9 \text{ Hz}) = 0.3 \text{ m}$

**Problem 4:** A transmission line has a characteristic impedance of  $50 \Omega$  and a propagation constant of  $2 + j3 \text{ rad/m}$ . Determine the phase velocity and the wavelength of the wave propagating on the line.

**Solution:** Using the formula  $\lambda = 2\pi/\beta$ , where  $\beta$  is the propagation constant, we have:  $\lambda = 2\pi / (2 + j3 \text{ rad/m}) = 0.79 \text{ m}$

Using the formula  $v = \omega/\beta$ , where  $v$  is the phase velocity and  $\omega$  is the angular frequency, we have:  $v = (2\pi \times 1 \text{ GHz}) / (2 + j3 \text{ rad/m}) = 200 \times 10^6 \text{ m/s}$  (approximately)

**Problem 5:** A waveguide with a rectangular cross-section of  $2 \text{ cm} \times 1 \text{ cm}$  operates at a frequency of  $10 \text{ GHz}$ . Determine the dominant mode that will propagate in the waveguide.

**Solution:** Using the formula  $f = (c/2a) * \sqrt{m^2 + n^2}$ , where  $f$  is the frequency,  $c$  is the speed of light,  $a$  is the width of the waveguide, and  $m$  and  $n$  are the mode numbers, we can solve for different mode combinations. The lowest mode that satisfies the given frequency is TE<sub>10</sub>.

### Wigan LEA Numeracy Centre Year 6 Mental Arithmetic Tests

The Wigan LEA Numeracy Centre conducted a series of mental arithmetic tests for Year 6 students. The tests aimed to assess students' computational skills and mathematical reasoning abilities. Here are some of the questions posed in these tests:

#### Paragraph 1:

- Question: What is  $75 + 52 - 17$ ?
- Answer: 110

- Question: Solve for x:  $5x - 10 = 20$

- Answer: 6

#### **Paragraph 2:**

- Question: What is the value of  $0.25 \times 1.5$ ?

- Answer: 0.375

- Question: Find the perimeter of a square with a side length of 5 cm.

- Answer: 20 cm

#### **Paragraph 3:**

- Question: If 3 apples cost £0.50, how much do 7 apples cost?

- Answer: £1.17

- Question: What is 25% of 60?

- Answer: 15

#### **Paragraph 4:**

- Question: A train travels 120 miles in 2 hours. What is its average speed in miles per hour?

- Answer: 60 mph

- Question: Find the area of a triangle with a base of 10 cm and a height of 8 cm.
- Answer: 40 cm<sup>2</sup>

#### **Paragraph 5:**

- Question: Simplify the fraction 12/24
- Answer: 1/2
- Question: What is the next number in the pattern: 2, 4, 6, ...?
- Answer: 8

These tests provide valuable insights into the mathematical abilities of Year 6 students. By analyzing the results, educators can identify areas where students may need additional support and develop targeted interventions to improve their numeracy skills.

**Qui est l'épouse de Gordon Ramsay ?** Ramsay a épousé, en 1996, Cayetana Elizabeth Hutcheson, une enseignante qui travaillait dans la pédagogie Montessori, surnommée « Tana ».

**Où regarder Gordon Ramsay ?** Gordon Ramsay : bataille de chefs sur M6+ : voir les épisodes en streaming.

**Quel chaîne Gordon Ramsay ?** Gordon Ramsay : recettes en famille sur M6+ : voir les épisodes en streaming.

**Combien d'enfants biologiques Gordon Ramsay a-t-il ?** Gordon et Tana Ramsay se sont mariés le 21 décembre 1996. En plus de leur fils nouveau-né, le couple est également parent de cinq enfants plus âgés : Megan, 25 ans, les jumeaux Holly et Jack, 23 ans, Tilly, 22 ans, et Oscar, 4 ans. "tout savoir sur les six enfants de

Gordon Ramsay".

**Combien d'enfants Tana Ramsay a-t-elle ?** Vie personnelle. Ramsay a épousé Gordon Ramsay à Londres le 21 décembre 1996. Ils partagent leur temps entre Los Angeles et le quartier Wandsworth Common de Londres. Ils ont six enfants , parmi lesquels Matilda (Tilly) (née en 2001).

**Où puis-je regarder Gordon Ramsay ?** Gordon Ramsay recherche le prochain plus grand entrepreneur culinaire. Obtenez Hulu, Disney+ et ESPN+ , tous avec des publicités, pour 14,99 \$/mois. Obtenez Hulu, Disney+ et ESPN+, tous avec des publicités, pour 14,99 \$/mois.

**Pourquoi Gordon Ramsay est si célèbre ?** Chef étoilé d'origine écossaise, Gordon Ramsay est également connu comme le justicier des cuisines en détresse à la télévision anglo-saxonne grâce à la célèbre émission Cauchemar en cuisine.

**Comment vaut Gordon Ramsay ?** Aujourd'hui âgé de 50 ans, il possède plus d'une trentaine d'établissements. Une réussite exemplaire qui lui a permis d'amasser une fortune estimée à 111 millions d'euros en 2015, et pour la seule année 2016, il aurait gagné près de 51 millions de dollars selon Forbes.

**Qu'est-il arrivé aux Food Stars de Gordon Ramsay ?** Le 16 mai 2022, il a été annoncé que Fox avait commandé la série. Elle a été créée le 24 mai 2023. Le 1er mars 2024, la série a été renouvelée pour une deuxième saison . Le 4 mars 2024, il a été annoncé que la deuxième saison serait diffusée le 22 mai 2024 et que Lisa Vanderpump rejoindrait la série pour affronter Gordon Ramsay.

**Qui a gagné les Food Stars de Gordon Ramsay ?** Après des semaines de compétition intense, un seul concurrent pouvait remporter la couronne de « Food Stars » », a déclaré Ramsay. «Je suis ravie de nommer la fondatrice de Whiny Baby, Jess Druey, comme notre gagnante.

**Est-ce que Gordon Ramsay a des étoiles Michelin ?** Gordon Ramsay, célèbre chef cuisinier et vedette de télévision, s'est imposé comme une figure emblématique de la gastronomie mondiale. Sa carrière éblouissante est ponctuée de 16 étoiles Michelin et d'un florilège de distinctions prestigieuses.

**Qu'est-il arrivé au fils de Gordon Ramsay ?** Lisez notre avis de confidentialité. Gordon Ramsay a réfléchi à la perte tragique de son fils Rocky en 2016 après que sa femme Tana, 49 ans, ait fait une fausse couche à 20 semaines . Dans une nouvelle interview, l'homme de 56 ans a déclaré que perdre son fils était « vraiment difficile », mais a déclaré que cette perte avait « rapproché » sa famille.

**Qu'est-il arrivé à Gordon Ramsay ?** Gordon Ramsay a déclaré qu'il avait de la chance d'être en vie après la collision dans le Connecticut, attribuant à son casque le mérite de lui avoir sauvé la vie . Dans une vidéo Instagram, Ramsey, 57 ans, a révélé une énorme ecchymose violette couvrant une partie importante de son torse et a partagé des photos d'un casque écrasé et de vêtements déchirés.

**Quel âge avait Gordon Ramsay lorsqu'il a eu son dernier enfant ?** Gordon Ramsay est devenu père pour la sixième fois à 57 ans . Le célèbre chef a annoncé samedi que lui et sa femme avaient récemment accueilli un fils nommé Jesse. Le couple a cinq autres enfants : Megan, Holly, Jack, Tilly et Oscar.

**Comment Gordon a-t-il rencontré sa femme ?** Gordon Ramsay a une réputation de longue date pour être dur en cuisine dans des émissions comme Hell's Kitchen, MasterChef et Kitchen Nightmares. Cependant, il a un faible pour sa femme, Tana Ramsay. Le couple s'est rencontré pour la première fois au début des années 90 lors d'une fête , même si Tana sortait avec quelqu'un d'autre à l'époque.

**Combien d'épouses Gordon Ramsay a-t-il eu ?** La star de "Hell's Kitchen" est mariée à l'auteur de livres de cuisine Cayetana "Tana" Ramsay , 49 ans, depuis 1996, a annoncé sur Instagram le 11 novembre que le couple avait accueilli leur sixième enfant ensemble.

**Que fait Megan Ramsay ?** Megan Ramsay est née le 16 mai 1998. Elle est décoratrice et directrice artistique , connue pour The Republic of Two (2013), Wish You Were Here (2011) et Somewhere Far (2011).

**Combien d'épouses Gordon Ramsay a-t-il eu ?** La star de "Hell's Kitchen" est mariée à l'auteur de livres de cuisine Cayetana "Tana" Ramsay , 49 ans, depuis 1996, a annoncé sur Instagram le 11 novembre que le couple avait accueilli leur sixième enfant ensemble.

**Qui est Fred avec Gordon Ramsay ?** Cuisine, culture et voyage : les chefs Gordon Ramsay et Gino D'Acampo rejoignent le maître d'hôtel Fred Sirieix pour un voyage international. Gordon, Gino et Fred partagent leur amour de la cuisine et découvrent d'autres cultures et régions. Ces trois grandes personnalités ont beaucoup à dire et s'amuse beaucoup.

**Qui est la compagne de Pierre Gagnaire ?**

**Est-ce que Gordon Ramsay a des étoiles Michelin ?** Gordon Ramsay, célèbre chef cuisinier et vedette de télévision, s'est imposé comme une figure emblématique de la gastronomie mondiale. Sa carrière éblouissante est ponctuée de 16 étoiles Michelin et d'un florilège de distinctions prestigieuses.

**What is the difference between a report and a research paper?** A research paper is an in-depth analysis of a specific topic, involving extensive research, critical thinking, and original ideas, while a report is a structured document presenting information on a subject, often based on data or findings from research.

**What is a research report in reading and writing?** Research reports are recorded data prepared by researchers or statisticians after analyzing the information gathered by conducting organized research, typically in the form of surveys or qualitative methods. A research report is a reliable source to recount details about a conducted research.

**How do you find the key findings in a research paper?** To highlight the key findings, you can use headings and subheadings to organize the results by themes, categories, or variables. Visual aids such as charts, graphs, tables, or diagrams can also be used to illustrate the data and make it easier to comprehend and compare.

**What is a research report writing pdf?** Simply, a research paper/report is a systematic write up. on the findings of the study including methodologies, discussion, conclusions etc.

**How do you write a research paper report?**

**Is a research paper considered a report?** A research paper is not simply an informed summary of a topic by means of primary and secondary sources. It is

neither a book report nor an opinion piece nor an expository essay consisting solely of one's interpretation of a text nor an overview of a particular topic.

**What are the 5 steps in writing a research report?**

**What are the 5 major parts of research report?**

**What does a research report look like?** A complete research paper in APA style that is reporting on experimental research will typically contain a Title page, Abstract, Introduction, Methods, Results, Discussion, and References sections. Many will also contain Figures and Tables and some will have an Appendix or Appendices.

**What is the basic purpose of a research paper?** The goal of a research paper is to bring together different views, evidence, and facts about a topic from books, articles, and interviews, then interpret the information into your writing. It's about a relationship between you, other writers, and your teacher/audience.

**What is research paper writing?** A research paper is an expanded essay that presents your own interpretation or evaluation or argument. When you write an essay, you use everything that you personally know and have thought about a subject.

**How to write results in research paper example?**

**What is research and report writing?** What is a Research Report? A research report is a well-crafted document that outlines the processes, data, and findings of a systematic investigation. It is an important document that serves as a first-hand account of the research process, and it is typically considered an objective and accurate source of information.

**What is the first step in writing a research report?** The process of writing a research paper begins with choosing a topic, before then conducting thorough research into that topic. To structure your paper, you should familiarise yourself with a research paper format, which typically includes an introduction, literature review, methodology, findings, and conclusion.

**How to begin a research report?** Start by broadly introducing the topic, then provide general background information, narrowing to specific background research,



and finally a focused research question, hypothesis, or thesis statement (general to specific).

**What is the difference between a case report and a research paper?** A Case Report describes a particular case regarding anyone or anything unusual that has happened. It comes with preventive measures to undo those events in case of a patient. A research article (Longer) gives full authenticity to their authors of what they have done for their particular study of interest.

**What is the difference between a term paper and a research report?** Term papers tend to be more general in nature, while research papers are more specific. Term papers require you to synthesize information from multiple sources, but they will generally not require you to conduct original research.

**What is the difference between project report and research?** The main difference between research and project is that research is the systematic investigation and study of materials and sources to establish facts and reach new conclusions, while the project is a specific and finite activity that gives a measurable and observable result under preset requirements.

**What is the difference between a lab report and a research paper?** Your task is to write up how you actually performed the experiment and evaluate the outcome. In contrast, a research paper requires you to independently develop an original argument. It involves more in-depth research and interpretation of sources and data. A lab report is usually shorter than a research paper.

[wigan lea numeracy centre year 6 mental arithmetic tests, les 100 recettes de gordon ramsay, research paper and report writing answer key](#)

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