GRADE 10 PHYSICAL SCIENCES PAPER 2 ALIEBORE

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What are the topics in grade 10 physics?

What is a substance with a lattice consisting of positive ions and Delocalised valence electrons? A metallic bond is the electrostatic attraction between a lattice of positive ions and a sea of delocalised electrons.

What is physical science 2? This course is the second in a two-semester series that provides an introduction to the basic principles of physics and chemistry.

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Is physics hard to learn? Physics is a challenging subject ? it's a combination of math and science that can be difficult even for the best of us. But despite its challenging nature, with a few basic tips and a little practice there's no reason you can't succeed.

How can I improve my grade 10 in physics?

Which topic is difficult in physics? Heat and Thermodynamics It is probably the most difficult yet one of the important topics for JEE Main Physics. Students who do not understand the application part of the topic often find it difficult to solve questions related to the topic.

How to tell if a pi bond is delocalized? Short Answer. A delocalized pi bond is one in which the electrons can freely move between two nuclei. In the case of benzene, there are six carbon-carbon sigma bonds and six carbon-hydrogen bonds, witheach carbon atom having one sp3 hybridized p orbital resulting in six unhybridized carbon p orbitals in a ring.

Why do metals form lattices? This is due to the fact that metals have few electrons in their outermost energy level, which they readily lose to become positively charged ions. These ions are then held together by the strong electrostatic forces of attraction between them, creating a rigid lattice structure.

How to find a bond order? The first step is to draw the molecular orbital diagram, filling the orbitals in increasing order of energy. The inner core electrons are already in paired form. Bond Order = (Number of bonding electrons - number of antibonding electrons) /2. The answer gives the bond order.

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Unlocking Value through Electronic Mobile Commerce

Creating Value

Electronic mobile commerce (m-commerce) has emerged as a transformative force, enabling businesses to reach customers anytime, anywhere. One key aspect is the

ability to create value through innovative strategies. Customers benefit from convenience, personalized experiences, and access to a wide range of products and services. Businesses, on the other hand, can gain competitive advantage, increase revenue, and build stronger relationships with their customers.

Strategies

To effectively create value through m-commerce, businesses can employ various strategies. Some key approaches include:

- **Mobile-Optimized Website:** Designing a mobile-friendly website that provides a seamless and efficient shopping experience for customers.
- **Mobile Application:** Developing a dedicated mobile application that offers additional features and functionality tailored to the unique needs of mobile users.
- **Mobile Marketing:** Utilizing mobile channels to engage with customers, promote products, and drive conversions.
- **Location-Based Services:** Leveraging GPS and other location-based technologies to provide personalized experiences based on a customer's physical location.

Cases

Numerous successful cases demonstrate the value-creating potential of m-commerce strategies. For instance, Amazon's mobile application enables customers to browse, purchase, and track orders with ease, leading to increased convenience and customer satisfaction. Starbucks' mobile app allows customers to order and pay for their drinks ahead of time, reducing waiting times and enhancing the overall experience.

Questions and Answers

1. **What is the primary benefit of m-commerce for customers?**

Convenience and accessibility to products and services anytime, anywhere.

2. **What is a key strategy for creating value through m-commerce?**

   Developing a mobile-optimized website that provides a seamless user experience.

3. **How can businesses utilize mobile marketing to drive conversions?**

   Through targeted campaigns that engage customers with relevant messages and promotions.

4. **What is an example of a successful m-commerce case?**

   Amazon's mobile application, which has significantly improved customer satisfaction and increased revenue.

5. **How does location-based services enhance the m-commerce experience?**

   By providing personalized experiences tailored to a customer's physical location, such as offering nearby store promotions or discounts.

Solution of Calculus by Howard Anton 5th Edition

Q: Find the derivative of $f(x) = x^3 - 2x^2 + 5x - 1$.

A: $f'(x) = 3x^2 - 4x + 5$

Demonstration:

```
f'(x) = lim (h -> 0) (f(x + h) - f(x)) / h
= lim (h -> 0) ((x + h)³ - 2(x + h)² + 5(x + h) - 1 - (x³ - 2x² + 5x - 1)
= lim (h -> 0) (x³ + 3x²h + 3xh² + h³ - 2x² - 4xh - 2h² + 5x + 5h - 1 - x
= lim (h -> 0) (3x²h + 3xh² + h³ - 4xh - 2h² + 5h) / h
= lim (h -> 0) (3x² + 3xh + h² - 4x - 2h + 5)
= 3x² - 4x + 5
```

Q: Evaluate the integral of ?(x² + sin(x)) dx.

A: (x³/3) - cos(x) + C

Demonstration:

```
?(x² + sin(x)) dx
= ?x² dx + ?sin(x) dx
= (x³/3) - cos(x) + C
```

Q: Find the area bounded by the curves y = x² and y = 2x + 1.

A: 1/2 square unit

Demonstration:

The two curves intersect at (0, 1) and (1, 3). The area bounded by the curves is given by:

```
?[a,b] (f(x) - g(x)) dx
```

where f(x) = 2x + 1 and g(x) = x².

Therefore, the area is:

```
?[0,1] (2x + 1 - x²) dx
= [x² + x - (x³/3)] from 0 to 1
= (1 + 1 - 1/3) - (0 + 0 - 0)
= 1/2 square unit
```

Q: Find the volume of the solid generated by rotating the region bounded by the curves y = x and y = x² about the y-axis.

A: ?/2 cubic units

Demonstration:

Using the washer method, the volume is given by:

```
??[a,b] (R² - r²) dx
```

where R is the outer radius and r is the inner radius.

In this case, R = x and r = x². Therefore, the volume is:

```
??[0,1] (x² - (x²)²) dx
= ??[0,1] (x² - x?) dx
= ?[(x³/3) - (x?/5)] from 0 to 1
= ?[(1/3) - (1/5)]
= ?/2 cubic units
```

Q: Determine the convergence or divergence of the series: ?(n=1 to ?) (n - 1)/(n² + 1).

A: Converges

Demonstration:

Using the limit comparison test with the series ?(n=1 to ?) 1/n:

```
lim (n -> ?) (a_n / b_n) = lim (n -> ?) ((n - 1)/(n² + 1)) / (1/n)
= lim (n -> ?) (n² - n) / (n² + 1)
= lim (n -> ?) (1 - 1/n) / (1 + 1/n²)
= 1
```

Since lim (n -> ?) (a_n / b_n) = 1 and ?(n=1 to ?) 1/n is a convergent series (harmonic series), by the limit comparison test, ?(n=1 to ?) (n - 1)/(n² + 1) also converges.

Section 6.1 A Changing Landscape: Questions and Answers

1. What is Section 6.1 of the 2023 NEC?

Section 6.1 of the 2023 National Electrical Code (NEC) covers ground-fault circuit interrupters (GFCIs) and arc-fault circuit interrupters (AFCIs). These devices are designed to protect against electrical shock and fires, respectively.

2. What are the new requirements for GFCIs in outdoor areas?

As per Section 6.1(A)(1) of the 2023 NEC, GFCI protection is now required for all 125-volt, 15- and 20-ampere receptacles installed outdoors. This includes receptacles in locations such as patios, decks, and balconies.

3. What are the new requirements for AFCIs in dwelling units?

Section 6.1(A)(2) of the 2023 NEC mandates the installation of AFCIs in all branch circuits supplying bedroom receptacles in dwelling units. This requirement applies to both new construction and renovation projects.

4. What is the difference between a Class A and Class B AFCI?

Class A AFCIs trip on both series and parallel arcs, while Class B AFCIs trip on parallel arcs only. Class A AFCIs provide broader protection against electrical fires.

5. Are there any exceptions to the GFCI and AFCI requirements?

Yes, there are a few exceptions to the GFCI and AFCI requirements. These include:

- Receptacles located in unfinished basements or crawl spaces
- Receptacles supplying irrigation pumps
- Receptacles located in a specific area of an unfinished attic or roof space that is not readily accessible to residents
- Receptacles located in floating docks or on the premises of a commercial or industrial establishment

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