SOLUTION OF SL ARORA PHYSICS CLASS 11

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Question 1: Two blocks of masses 2 kg and 4 kg are connected by a light string that passes over a frictionless pulley. The system is released from rest. Find the acceleration of the blocks and the tension in the string.

Answer: Using Newton's second law, we have:

For block 1 (2 kg):

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T - 2g = 2a
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For block 2 (4 kg):

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4g - T = 4a
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Solving these equations, we get:

- Acceleration (a) = **2.67 m/s²**
- Tension (T) = **17.33 N**

Question 2: A body is projected vertically upwards with a speed of 20 m/s. Find its maximum height and time taken to reach the maximum height.

Answer:

- Maximum height (h) = **20.4 m**
- Time taken to reach maximum height (t) = **4.5 s**

Question 3: A spring is stretched by 5 cm from its natural length. If the spring constant is 200 N/m, calculate the work done by the external agent in stretching the spring.

Answer:

- Work done (W) = **0.5 kJ**

Question 4: A particle moves in a circular path of radius 2 m with a constant speed of 10 m/s. Find the centripetal acceleration of the particle.

Answer:

- Centripetal acceleration (a) = **50 m/s²**

Question 5: A ball is thrown at an angle of 45° with the horizontal. If the ball reaches a maximum height of 20 m, calculate the initial speed of the ball.

Answer:

- Initial speed (v) = **28.28 m/s**

Técnicas de Supervivencia: Preguntas y Respuestas Esenciales

En situaciones de emergencia, contar con técnicas de supervivencia básicas puede marcar la diferencia entre la supervivencia y el peligro. Aquí presentamos algunas preguntas y respuestas cruciales sobre las técnicas de supervivencia para equiparlo con el conocimiento necesario:

1. ¿Cómo puedo encontrar agua en la naturaleza?

- Revise las hojas y la hierba por la mañana temprano en busca de rocío.
- Cave un hoyo en un lecho de río seco. El agua se filtrará al fondo.
- Busque agua en huecos de árboles, debajo de rocas o en depresiones del terreno.

2. ¿Qué puedo comer en caso de escasez de alimentos?

- Bayas, nueces y semillas (asegúrese de identificar correctamente las especies comestibles).
- Raíces y tubérculos de ciertas plantas.
- Insectos y larvas (algunos son comestibles, pero tenga cuidado con los venenosos).
- Pesque o cace si es posible.

3. ¿Cómo puedo hacer fuego en condiciones difíciles?

- Utilice un pedernal y un eslabón o una lupa para concentrar la luz solar en un punto.
- Frote dos palos juntos para generar calor y encender una mecha.
- Utilice materiales secos y fácilmente inflamables, como hojas o corteza de árbol.

4. ¿Cómo me mantengo caliente en climas fríos?

- Construya un refugio que bloquee el viento y la lluvia.
- Use ropa aislante y cubra su cabeza y extremidades.
- Cree una hoguera y siéntese cerca de ella para mantenerse caliente.
- Acuéstese junto a otras personas para compartir el calor corporal.

5. ¿Cómo puedo protegerme del peligro en la naturaleza?

- Manténgase alerta a su entorno y anticipe posibles amenazas.
- Haga ruido para ahuyentar a los animales potencialmente peligrosos.
- Construya un refugio defensivo si no puede escapar de una situación peligrosa.
- Lleve un silbato o dispositivo de señalización para pedir ayuda en situaciones de emergencia.

Recordar y aplicar estas técnicas de supervivencia puede mejorar significativamente sus posibilidades de permanecer seguro y saludable en circunstancias adversas. Al prepararse adecuadamente, puede enfrentar cualquier desafío que la naturaleza le

presente con confianza y determinación.

Tanikawa in Size 13 x24hr

Q: What is Tanikawa? A: Tanikawa is a unique Japanese art form that involves creating miniature dioramas inside matchboxes. These intricate scenes depict everyday life, traditional customs, and historical events.

Q: What are the dimensions of a Tanikawa matchbox? A: Tanikawa matchboxes are typically 13 millimeters x 24 millimeters, providing a compact canvas for the artist.

Q: How are Tanikawas created? A: Artists use a variety of techniques to create their Tanikawas. These include painting, sculpting, papercutting, and using found objects. The process can be time-consuming, with some pieces taking months or even years to complete.

Q: What subjects are depicted in Tanikawas? A: Tanikawas depict a wide range of subjects, including everyday scenes, traditional customs, historical events, and even scenes from literature. Artists often draw inspiration from their surroundings, cultural heritage, and personal experiences.

Q: Where can I see Tanikawas? A: Tanikawas are often displayed in museums, galleries, and private collections. They are also frequently used as decorative pieces in homes and offices.

Soil Mechanics: A Comprehensive Guide by Gopal Ranjan

Soil mechanics is a branch of civil engineering that deals with the behavior of soil under various loading conditions. It is essential for understanding the design and stability of structures built on or in soil. This article explores some key questions about soil mechanics based on the renowned book "Soil Mechanics" by Gopal Ranjan.

1. What is the importance of soil classification?

Soil classification is a fundamental step in soil mechanics. It helps identify the properties and behavior of soil based on its grain size, shape, and mineralogy.

Ranjan emphasizes the significance of soil classification in design and construction, as it provides insights into soil's bearing capacity, settlement potential, and drainage characteristics.

2. Explain the concept of shear strength.

Shear strength is a crucial parameter in soil mechanics, as it determines the soil's resistance to deformation and failure under different loading conditions. Ranjan thoroughly explains the factors influencing shear strength, including soil density, stress history, and pore water pressure. He also discusses common shear strength tests such as the triaxial test and the direct shear test.

3. Describe the principles of consolidation.

Consolidation refers to the time-dependent process of soil settlement due to the gradual dissipation of pore water pressure. Ranjan provides a detailed analysis of consolidation theory, including the Terzaghi and Rowe-White theories. He also explains the factors affecting consolidation, such as soil compressibility, drainage conditions, and surcharge loads.

4. What is the role of seepage in soil mechanics?

Seepage refers to the flow of water through soil pores. Ranjan highlights its importance in understanding the behavior of soil structures, such as earth dams and embankments. He discusses Darcy's law and its application in determining seepage flow patterns and pore water pressures.

5. How does soil mechanics contribute to geotechnical engineering?

Soil mechanics is a fundamental discipline in geotechnical engineering, which applies scientific principles to design and construct structures in and on soil. Ranjan emphasizes the application of soil mechanics knowledge in foundation design, slope stability analysis, retaining structures, and excavations. Understanding soil behavior helps engineers ensure the safety and longevity of geotechnical structures.

In conclusion, Gopal Ranjan's "Soil Mechanics" provides a comprehensive and insightful exploration of this essential subject. The questions and answers presented in this article highlight key concepts such as soil classification, shear strength,

consolidation, seepage, and the practical applications of soil mechanics in geotechnical engineering.

> *tecnicas de sobrevivencia*, *tanikawa in size 13 x24hr*, *soil mechanics by gopal ranjan in*

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