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CVE 307: Civil Engineering Materials Assignment

Civil Engineering Materials, Their Uses and Properties

S/N	MATERIAL	PROPERTIES	USES
1	Lime	i. Cementing capability– This is obtained by their carbonation with carbon dioxide ii. Has a higher acid resistance due to its alkaline nature iii. Gains pozzolanic activity which gives cementitious products iv. Has the ability to seal micro cracks	i. Provides building breathing property: This reduces the chances of trapped moisture and the damage of the building. ii. Provides soil stabilization for roads, building foundations, and earthen dams. iii. Lime is added to low quality soils to produce a usable base and sub base iv. Added to mortar and plaster, because of its superior plasticity and workability.
2	Glass	i. Transparency ii. Strength and durability iii. Workability iv. Transmittance v. U value vi. Recycling property	i. It is most typically used as transparent glazing material in the building envelope, including windows in the external walls. ii. Glass is also used for internal partitions and as an architectural feature. iii. It is used for aquariums, bridges, etc. iv. Tempered glass is used for fire-resistant doors. v. Glass block is used in the construction of walls, skylights
3	Bitumen	i. Most are colloidal in nature. ii. Thermoplastics. iii. They have no specific melting, boiling or freezing point. iv. Insoluble in water. v. Highly impermeable to the passage of water. vi. Generally hydrophobic. vii. Bitumen oxidizes slowly.	i. Used for paints. ii. Used in damp proofing. iii. Bitumen is used in roofing. iv. Bitumen is the usual choice for waterproofing of basements like Asphalt. v. Preservation of stones. vi. Largely used for the construction of roads, runways, taxiways, etc. vii. Used in the protection of structures.
4	Clay	i. Has the smallest particle size of any soil type. ii. Clay-heavy soil tends to be very dense. iii. Contains very little organic material therefore plants do not easily grow in it	i. Used to produce clay bricks. ii. Clay roofs and ceramic tiles iii. Clay products for interior decoration. iv. Acid-resistant lining items for example are common acid-resistant brick.

		iv. Slow permeability resulting in a very large water-holding capacity.	v. Ceramic acid-resistant pipes and companion shapes.
5	Wood	i. Color and Odor: Most trees are characterized by a typical color and odor. ii. Specific Gravity: Wood is a very light material, its specific gravity being always less than 1 (that of water). iii. Moisture Content. iv. Grain: The arrangement and direction of growth of the wood elements. v. Strength	i. Hardwood is usually utilized for construction of walls, ceilings and floors. ii. Hardwood suitable for high-quality furnishings, solid wood moldings and interior joinery. iii. Softwoods are generally used to make more of the inner structures to the frame of hardwoods, such as doors and window frames. It is also used to produce furniture.
6	Steel	i. Steel is harder and stronger overall than its parent element, iron. ii. It is extremely flexible iii. It has a high tensile strength iv. Increase in carbon content results in the increase or decrease of properties of the steel such as weldability, melting point, ductility, tensile strength. v. Addition of manganese to steel increases hardness	i. Structural sections: these provide a strong, stiff frame for the building. ii. Reinforcing bars: these add tensile strength and stiffness to concrete. iii. Sheet products: such as roofing, internal walls, ceilings, and insulating panels for exterior walls. iv. Transport networks such as bridges, tunnels and rail track.
7	Stone	i. Structure ii. Texture iii. Density iv. Appearance v. Strength vi. Hardness vii. Percentage wear viii. Porosity and absorption ix. Weathering x. Toughness xi. Resistance to fire	i. Stones are used for flooring. ii. Stone slabs are used as damp proof courses, lintels and even as roofing materials. iii. Stones with good appearance are used for the face works of buildings most commonly polished marbles and granite. iv. Stones are used for paving of roads, footpaths and open spaces round the buildings. v. Stones are also used in the constructions of piers and abutments of bridges, dams and retaining walls. vi. Crushed stones with graved are used to provide base course for roads. vii. They are also used as a basic inert material in concrete. viii. For making artificial stones and building blocks.
8	Cement	i. Workability ii. Setting iii. Segregation iv. Hydration v. Air Entrainment	i. To prepare cement mortar. ii. To prepare cement concrete. iii. To build fire proof and thermal proof structures. iv. To build hydrographic and frost resistant structures.

			v. To construct concrete roads. vi. To manufacture precast members.
9	Concrete	i. Strength of concrete ii. Concrete creep iii. Shrinkage iv. Concrete durability	i. For the construction of concrete dams. ii. For the construction of residential and commercial buildings. iii. Roads. iv. Used in marine construction. v. Culverts and sewers. vi. Foundations
10	Polymers	i. Density ii. Thermal conductivity iii. Thermal expansivity iv. Sound conductivity v. Insulability vi. Elasticity vii. Permeability	i. Used for polymer concrete which can be used to increase the durability of concrete. ii. Polymer membrane. iii. Coating: polymer can be used to protect materials like iron and steel from rust. iv. Pipes and hoses. v. Applied in products used for flooring and windows.