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Matric Number: 18/ENG03/022

Course: Civil Engineering Materials

Course Code: CVE 307

Question:

Highlight ten civil engineering materials, their uses and properties (In a tabular form).

Material	Uses	Properties
1. Concrete	a. It is an important construction material used extensively in buildings, bridges, roads and dams. b. It is a durable and cost-effective material which is a necessity for underground use. c. Concrete walls and floors make a home quite place of rest and relaxation.	• Strength; Compressive and Tensile Strength etc. • Workability • Durability • Elasticity • Impermeability • Segregation • bleeding
2. Cement	a. It is mainly used as a binder in concrete b. It is used in mortar for plastering, masonry work, pointing, etc. c. It is used in concrete for laying floors, roofs and constructing lintels, beams, stairs, pillars etc.	• Fineness of cement • Soundness • Consistency • Strength • Setting time • Heat of hydration • Fire resistant
3. Reinforced concrete	a. is used for construction on a large scale, such as bridges, dams, piers, tall buildings and stadiums b. It is used in domestic construction for the footings and foundations of everyday dwellings.	• strength in tension • strength in compression • strength in shear • durability • fire resistance
4. Steel	a. Mild steel is used for building construction. It is also a highly favored building frame material. b. Engineering steels are used for general engineering and manufacturing sectors e.g. steel bars. c. It can be welded to form frames for doors, windows and other decorations.	• Strength • Toughness • Ductility • Weldability • Durability
5. Sand	a. Sand can be used as a road base which is a protective layer underneath all roads. b. Sand is a strong strand which is used for plaster, mortar, concrete, and asphalt.	• Permeability • Fine texture

6. Bitumen	a. It is used in paving and roofing applications. b. It is used as a binder in asphalt for roads, runways, parking lots, and foot paths. c. It is used in building constructions as bricks, plastic cement joints and pipes etc.	• Adhesion • Resistance to Water • Hardness • Viscosity and Flow • Softening Point • Ductility • Specific Gravity • Durability
7. Polymers	a. It is used for flooring, windows, cladding, pipes, membranes, seals, insulation. b. Expanded polystyrene (EPS) is used for the production of concrete molds, foundation insulation, and packaging	• Density. • Thermal expansion. • Thermal Conductivity. • Permeability. • Chemicals Resistant. • Strength. • Durability. • Toxicity.
8. Lime	a. It is dominantly used for soil stabilization for roads, earthen dams, airfields, and building foundations. b. It is used in mortar and plaster in lime slurry form. c. It is used to make a special lime concrete, bricks and blocks d. Its hardened form (limestone) is used for cement manufacturing.	• Cementing capability • Higher acid resistance • Flexibility • High Workability
9. Timber(Wood)	a. It is a natural insulator and can help reduce energy needs when it is used in windows, doors and floors. b. It can be cut, carved, and shaped to form Frame works for decoration and Cement formwork	• Hardness • Strength • Toughness • Elasticity • Durability • Defects • Fibers and Structure • Appearance and Color
10. Brick(Blocks)	a. Construction of walls of any size b. Construction of floors c. Construction of arches and cornices d. Making Khoa (Broken bricks of required size) to use as an aggregate in concrete	• Hardness • Compressive strength Absorption • Frost resistance Efflorescence

	e. Manufacture of surki (powdered bricks) to be used in lime plaster and lime concrete	