1. A salesman approaches me with a new material which he says can replace steel in reinforced concrete. What should be at least 4 good questions that I should ask this salesman about the properties of this material (please exclude cost)?

1. Does the material form very strong bond with the concrete (so that it can hold the concrete firmly)?

2. Is the material good in tension (as concrete is poor in tension) and ductile in nature (steel provides lateral stability)?

3. Is the thermal expansion coefficient of the material almost similar to that of concrete?

4. Can the material prevent working or bulging of concrete (i.e., for example, FRP prevents concrete from warping)?

5. Does the material have expansion characteristics to overcome shrinkage of concrete?

2. You are building your house, and need concrete for the mat/raft footing on one day, and for the columns on another day. What would be your choice of concrete (i.e., in terms of site mix or RMC)? Why?

Site mix is convenient because the desired properties can be achieved by proportioning at the site itself. RMC may cause transportation delays especially at such fast speed of construction.

However, if speed of construction is slow, RMC is preferred as it can have very less variability & less labour costs.

3. Why is cover to steel necessary for RCC construction?

It is required to ensure that the steel reinforcement structure is held in position (i.e., doesn’t get shaken or dislocated) when the concrete is pumped. This is cover blocks, and cover → corrosion.
4. Who specifies the following properties in a concrete to be used at site:
   - Compressive strength: **Structural Engineer**
   - Workability: **Site Engineer**
   - Durability: **Supplier of concrete (in case of admixtures)**

5. List any two tools/equipment that are used for (i) concrete conveyance, (ii) concrete compaction, and (iii) concrete finishing.
   - (i) **Conveyor belt followed by elephant trunk, Concrete Bunk** (Boom placer)
   - (ii) **Needle Vibrator, External Vibrators attached to formwork** (Internal Vibrator)
   - (iii) **Bull float, Power Trowel, Hand Trowel**

6. What are the primary advantages of using steel tubes filled with concrete for compression?
   1. Concrete prevents buckling of the tubes & typical bending case.
   2. Steel lining around concrete increases the strength & load carrying capacity of the composite tube.
   3. Concrete good in compression & steel being good in tension & lateral stability, the combination has most desired properties.

7. Stressing steel before placing concrete is called **Precasting**. After the concrete hardens, the stress is transferred to the concrete by **Post-Tensioning** cutting strands.

8. Two components of any flooring system are: **Sub-floor / Floor base** and **Floor covering / Flooring**

9. What is the distinction between 1-way and 2-way RCC slab systems?
   - In 1 way slab, reinforcement of steel is along the length of the slab for preventing bending in one direction, \( L > 1.5B \)
   - In 2 way slab, **grid reinforcement** (i.e., reinforcement along both directions), \( L = B \)