

Question 1 (20 marks): Indicate with reasons whether the following statements are true or false (No marks without correct reasons. Give concise 1 line reasons and answer in the correct order.):

- a) Timber must be seasoned before use.
- b) Plywood contains several layers of veneer panels at different angles. ✓
- c) The Brinell test measures the plasticity of a metal. ✓
- d) Stainless steel is more resistant to corrosion than mild steel. ✓
- e) Lightweight concrete is susceptible to segregation.
- f) Self compacting concretes require high cohesiveness.
- g) Glass fibres are less suitable for use in concrete.
- h) Dry process of shotcreting gives better quality control.
- i) Relaxation reduces cracking risk due to shrinkage.
- j) Low strength fibres are sufficient to reduce plastic shrinkage cracking.
- k) Stainless steel cannot be used for all reinforced concrete in the world.
- l) Several cycles of freeze-thaw are needed for deterioration in concrete.
- m) Air entrainment reduces cracking due to sulphate attack.
- n) Tensile strength of concrete affects its compressive strength measured in laboratory.
- o) Curing membranes lead to more uniform concrete than wet curing.
- p) Concretes with very low water to cement ratios can have very low strengths.
- q) Fresh concrete undergoes shear thinning.
- r) Bleed water must be reworked into the concrete.
- s) Mean strength is a better indicator of concrete properties than characteristic strength.
- t) A mixture of pure limestone, quartz, hematite and bauxite would be sufficient to produce Portland clinker.

Question 2 (10 marks): List 5 measures that IS456:2000 recommends to improve durability of concrete. Give one line justification for each measure. Also suggest a practically viable improvement for each of the measures.

Question 3 (5 marks): List 5 forms of iron or steel that can be used in construction. For each form, list one property that can be useful in construction.

Question 4 (5 marks): ~~List 5 special types of concrete. For each type, mention their special property and utility in construction.~~ ✓

Question 5 (10 marks): Volumetric changes can happen due to various reasons in young and mature concrete. Use only labelled pencil sketches to explain 4 such processes that can cause damage to concrete.

Q5 → List the steps involved in designing asphalt concrete mixture using Marshall ✓  
1. selection of the individual steps with respect to field