

Department of Civil Engineering, IIT Delhi
CVL141 – Civil Engineering Materials, Major – Semester I – 2017-18

Please give concise and to-the-point answers to all questions. The limit of number of words is listed. Words beyond the limit will not be considered. No extra sheets.

Question 1 (15 marks, 225 words): 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) Bleeding reduces plastic shrinkage cracks.
- b) Autoclaved cellular lightweight concrete is highly permeable.
- c) Sharp corners should be avoided in concrete under marine conditions.
- d) Silica fume can increase autogenous shrinkage.
- e) The phenolphthalein test is useful to study risk of corrosion in marine conditions.
- f) Continued curing of high water to cement ratio concretes leads to an increase in strength.
- g) The fineness of sand affects mix designs.
- h) Lightweight concrete is useful for nuclear applications.
- i) Fibre reinforcement is more efficient than reinforcing bars.
- j) Pure metals have high plasticity.
- k) Fine grained steel is stronger.
- l) Aluminium does not corrode under normal atmosphere.
- m) It is important to measure the ductility of bitumen.
- n) Timber is an anisotropic material.
- o) Thermoplastics are useful for high temperature applications.

Question 2 (15 marks, 200 words): Give 1 possible reason and 1 possible solution or action for each of the problems observed on site below. (Answer in the correct order)

- a) High bleeding in concrete produced on site.
- b) Low slump in concrete delivered from a ready mix plant.
- c) Low 28 day strength of cores cut from concrete.
- d) Cracks on the surface of concrete floor cast 1 hour ago.
- e) Cracks on the surface of a column cast 1 week ago.
- f) Spalling of concrete with red stains.
- g) Light red colour of burnt clay bricks.
- h) High depth of carbonation in concrete.
- i) Reduction in strength upon the addition of silica fume.
- j) Sagging of beams upon removal of formwork.

Question 2 (10 marks, 200 words): Compare 5 important engineering properties of four construction materials: concrete, asphalt, timber and bricks in a table.