CONSTRUCTION MATERIALS AND TECHNOLOGY
(CIVL 2103)

Time Allotted : 3 hrs **Full Marks : 70**

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.

Candidates are required to give answer in their own words as far as practicable.

Group – A
(Multiple Choice Type Questions)

1. Choose the correct alternative for the following: **10 × 1 = 10**

(i) Water absorption of 1st class bricks should not be more than
(a) 12% (b) 15% (c) 20% (d) 25%.

(ii) Which of the following ingredients of brick earth maintain to retain its shape?
(a) Silica (b) Alumina (c) Lime (d) Magnesia.

(iii) The compacting factor of cement concrete determines it's
(a) strength (b) porosity
(c) workability (d) degree of compaction.

(iv) The maximum bulking of sand is likely to occur at a moisture content of
(a) 5% (b) 8% (c) 11% (d) 14%.

(v) The ultimate tensile strength of high tensile steel in N/mm^2 is
(a) 600 (b) 1000 (c) 1500 (d) 2000.

(vi) Critical w/c ratio for complete hydration of cement is
(a) 0.23 (b) 0.38 (c) 0.4 (d) 0.5.

(vii) Separation of coarse aggregates form mortar during transportation is
(a) bleeding (b) creeping
(c) shrinkage (d) segregation.

(viii) Air permeability method is used to determine
(a) specific surface of cement (b) soundness of cement
(c) workability of concrete (d) flexural strength of concrete.

(ix) A mat or raft foundation is an example of
(a) deep foundation (b) shallow foundation
(c) machine foundation (d) none of these.

(x) The bond in which all bricks are laid with their length in the longitudinal direction of the wall is
(a) stretcher bond (b) header bond
(c) english bond (d) frog.

Group – B

2. (a) Explain the reasons behind the following defects on bricks.
(i) Formation of Efflorescence
(ii) Formation of chuffs
(iii) Formation of checks or cracks
(iv) Formation of bloating.

(b) Write a short note on "Hydraulic Lime".

(c) Mention composition of "Steel". Compare the characteristics and applications of "Mild Steel" with "High Tensile Steel".

4 + 2 + (2 + 4) = 12

3. (a) Write short notes on:
(i) Rapid Hardening Cement
(ii) Sulphate Resisting Cement
(iii) Portland Pozzolana Cement.

(b) (i) How Aggregates are classified according to their "shape" and "particle size"?
(ii) Explain in brief "Alkali-Aggregate Reaction" (AAR).

(c) Describe the composition of oil paint.

3 + 6 + 3 = 12

Group – C

4. (a) Explain the slump test conducted for concrete with neat diagrams. Also explain the different patterns of slump formations.

(b) List down the factors which influence the workability of concrete. Also mention any four factors which affect the strength of concrete.

7 + (3 + 2) = 12

5. (a) Define admixtures used for cement concrete. Mention any two admixtures and their respective specialities.

(b) What are the design stipulations for design of concrete mix? Describe in steps the concrete mix design by I.S. 10262 (2009) code method.

4 + 8 = 12

Group – D

6. (a) What are the main objectives of foundation?

(b) Briefly write down the classification of foundation with sketch.

2 + 10 = 12

7. (a) Write short notes on well foundation along with a neat diagram.

(b) Mention the requirements of good plastering.

10 + 2 = 12

Group – E

8. (a) Plan a dog-legged stair for a building in which the vertical distance between the floors is 3.75 m. The stair hall measures 3.5 m × 5.9 m.

(b) What are the types of flooring?

10 + 2 = 12

9. (a) What are the requirements of good plaster?

(b) Give sketches of king-post truss and queen-post truss. Compare the two.

2 + 10 = 12