BUILDING MATERIALS & CONSTRUCTION
(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) In the composition of a good earth brick, the proportion of alumina or clay should vary from 20 % to ____
(a) 25% (b) 30% (c) 35% (d) 60%.

(ii) Efflorescence of bricks is due to
(a) soluble salts present in clay for making bricks
(b) high porosity of bricks
(c) high silt content in brick earth
(d) excessive burning of bricks.

(iii) Tricalcium aluminate helps in attaining _____ of cement.
(a) early strength (b) initial setting
(c) final setting (d) none of the above.

(iv) Which of the following aggregates gives maximum strength in concrete?
(a) Rounded aggregates (b) Elongated aggregates
(c) Flaky aggregates (d) Angular aggregates.

(v) The white powdery product obtained by slaking of quick lime is called
(a) Hydrated lime (b) Hydraulic lime
(c) Slaked lime (d) Calcium Chloride.

(vi) The % composition of carbon in in wrought iron ranges from
(a) 5% - 6% (b) 0.1% - 0.25%
(c) 8% - 10% (d) 12% - 15%.

(vii) Painting is done to prevent decay of wooden components by _____ rot.
(a) dry rot (b) wet rot
(c) insect effects (d) shrinkage of wood

(viii) A corner footing constructed for two or more columns is called a/an
(a) Isolated footing (b) Combined footing
(c) Pile foundation (d) Pier foundation.

(ix) 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.

(x) Usually, the thumb rule for a step of staircase is
(a) (2 X Rise in cm.) + (Going in cm.) = 60
(b) (2 X Rise in cm.) + (Going in cm.) = 20
(c) (2 X Rise in cm.) + (Going in cm.) = 100
(d) (2 X Rise in cm.) + (Going in cm.) = 80

Group – B

2. (a) Write down the functions and properties of various ingredients of a brick earth.

(B) Explain the following terms as far as lime is concerned:
(i) Calcination and Hydraulicity
(ii) Quick lime
(iii) Slaked lime
(iv) Slaking.

8 + 4 = 12

3. (a) What do you mean by "Hydration of cement"? Mention all the Bogue's compound.

(b) Mention any three deleterious substances present in aggregates.

(c) Explain in details about "Alkali-Aggregate" reaction in aggregates.

(2 + 2) + 3 + 5 = 12

Group – C

4. (a) List down various types of paints.

(b) Explain the following terminologies:
(i) Base
(ii) Enamel paint
(iii) High Tension steel.

6 + (3 × 2) = 12

5. (a) Write down any 5 properties of Wrought iron.

(b) Classify mortars based on the binding agents and explain any two of them.

5 + (3 + 4) = 12

Group – D

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

   (b) Explain in details about pile foundation and its types. (Also provide diagrams)

2 + 10 = 12

7. (a) State the rules of a good bonding.

   (b) Define the following terms in relation to brick masonry: (Also provide diagrams)
   (i) Stretcher
   (ii) Header
   (iii) Lap.

3 + (3 + 3 + 3) = 12

Group – E

8. (a) Plan a dog-legged stair for a building in which the vertical distance between the floors is 3.3 m. The stair hall measures 2.75 m × 5 m. Draw the typical plan and cross-section of stairs.

   (b) Mention the components of floor. Also explain the components.

7 + 5 = 12

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

   (b) Draw neatly labelled sketches of king-post truss and queen-post truss.

2 + 10 = 12