



Subject: Building Construction
Division: Structure
Examiner: Dr. Kais Jawad

Year: Second
Time: 3hrs.
Date: 12 / 06 / 2013

Note: Answer only four questions

Q1: Draw with suitable scale longitudinal section for rectangular symmetric combined foundation with tie beams according to the following data:

- Dimensions of foundation are 6000*3000*500 mm with one layer of reinforcement (ϕ 25 @ 250 mm in both directions)
- Dimensions of each column are 400*250 mm with 4 bars ϕ 19mm and stirrups ϕ 10 mm @250mm
- Tie beams over foundation with cross section 300*500 mm with 4 bars ϕ 19mm and stirrups ϕ 10 mm @250mm
- Depth of foundation is 500 mm from N.G.L.

Enhance your drawing with full details and dimensions.

(25%)

Q2: Draw with suitable scale longitudinal section for interior bearing wall from blinding concrete layer till five courses above DPC according to the following data:

- Wall constructed with clay bricks
- Depth of excavation is 100 cm
- Depth of water ground level is 50 cm
- Width of foundation is 75 cm
- Thickness of foundation is 30 cm
- Interior finish floor level is +40 from natural ground level

Enhance your drawing with full details and dimensions

(25%)

Q3/ What are the main objective of using:

- Raft foundation.
- Pier foundation
- Gypsum paste for construct Jack arch floor of brick
- Cement concrete block for masonry construction.
- Hand excavation.

(25%)

Q4/ Write a brief comment on some of the types of membrane damp proofing agents.

(25%)

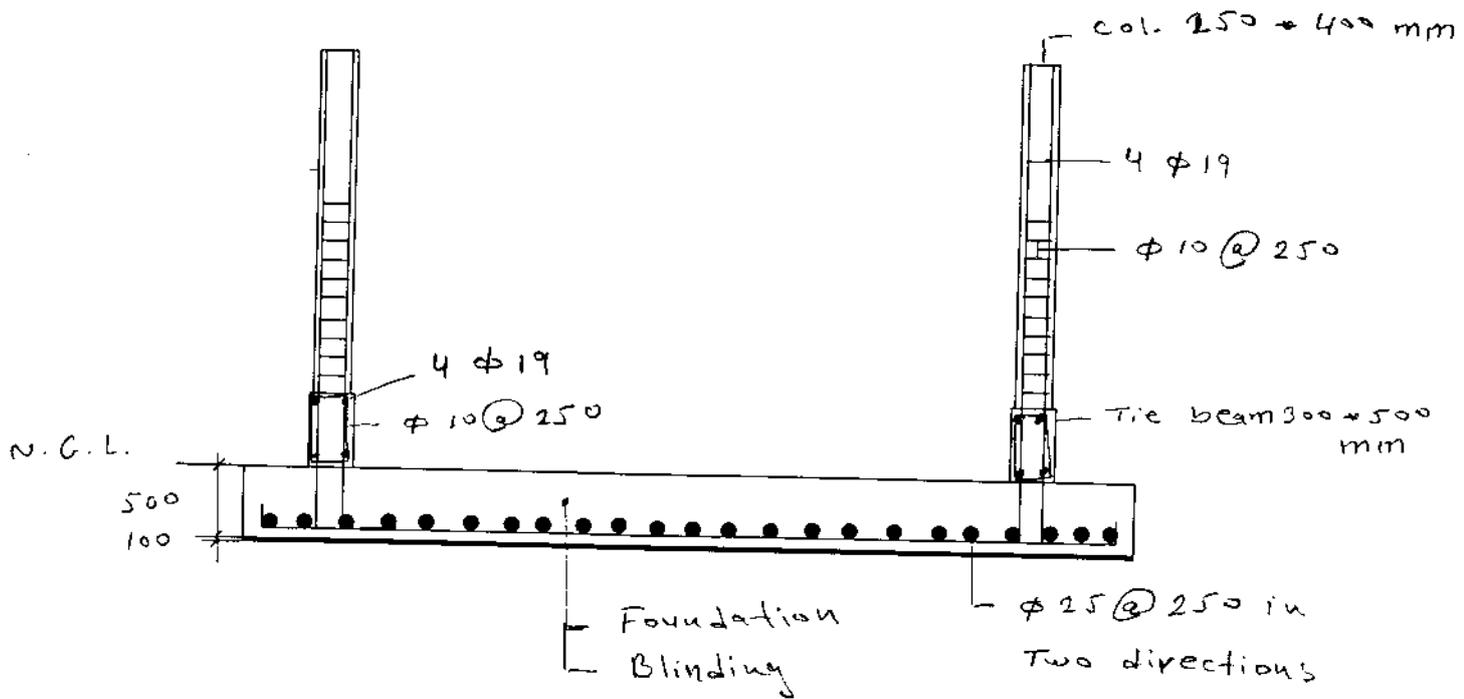
Q5/ Discuss the followings:

- Advantage of flat slab
- Two of the natural stones

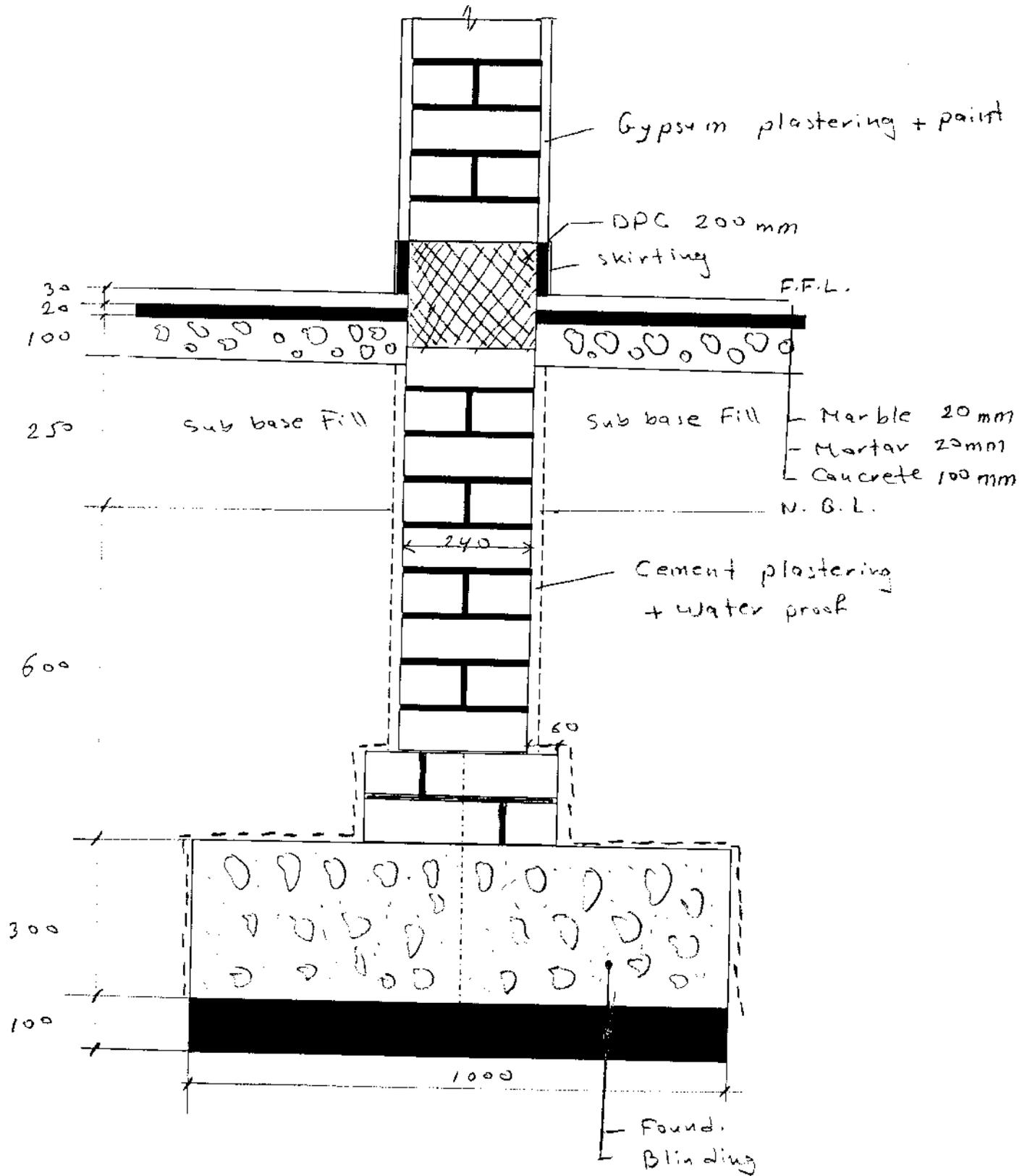
(25%)

Answers

Q1/



Q2/



Q3/

- a. The objective of used Raft foundations are for buildings on compressible ground such as very soft clays, alluvial deposits and compressible fill material where strip foundations would not provide a stable foundation.
- b. Pier foundation can be use when it is impossible to use raft or pile foundation and when the area of the base of the pier is enough to distribute the loads on the subsoil.
- c. Gypsum paste for construct Jack arch floor of brick used due to its faster setting.
- d. The use of cement concrete block for masonry construction due to the various advantages which they possess over traditional building materials like bricks and stones.
- e. Hand excavation can be used for small job such as continuous wall foundation, isolated foundation, short trenches, and shallow combined foundation and also to complete the excavation done mechanically to reach the proper level.

Q4/

A brief description of some of the types of membrane damp proofing agents is given below:

- a. Concrete layers: Cement concrete layer of 1:2:4 mix with water proofing agents is used as D.P.C.
- b. Mortar: This can be used as a bedding layer for other types of D.P.C. and is made up of cement sand mix in the ratio of 1:3 with a slight addition of lime to increase the workability.
- c. Bricks: Dense bricks which absorb less than 4½% are suitable for D.P.C.
- d. Stones: Dense stones, e.g., granite, trap; slates, etc. are used as D.P.C.
- e. Hot laid bitumen: This material is used on a bedding of concrete or mortar and should be applied so as to have a thickness of at least 3 mm.
- f. Mastic asphalt: This provides a semi-rigid impervious D.P.C. Special care is needed in its laying.

Q5/

- a. The advantages of flat slab construction are:
 - i. No projection of beam is visible and hence no additional ceiling is needed.
 - ii. More clear head room is available.
 - iii. Better lighting facilities are available
 - iv. For heavier loads, thinner section of the slab is needed.
 - v. The construction is easy.

- b. The natural stones used in building can be classified to their origin as:
- i. Igneous: The igneous stone principally used in building is granite, which was formed from the fusion of minerals under great heat below the earth's surface many thousands of years ago.
 - ii. Sedimentary: It was formed gradually over thousands of years from particle of calcium carbonate or sand deposited by settlement in bodies of water. Gradually layer upon layer of particles of lime or sand settled into depression in the earth's surface and in course of time these layers of lime or sand particles became compacted by the water or earth above them.
 - iii. Metamorphic: Those that have been changed from igneous or sedimentary stone or from earth into metamorphic stone by pressure, or heat, or both in the earth's crust. Example are marble which was formed from limestone and slate and shale formed from clay.