

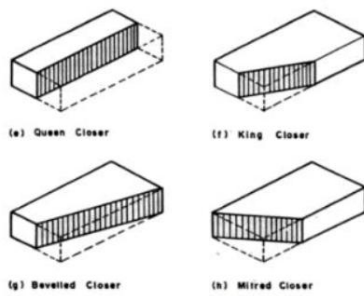
Sub:	BUILDING CONSTRUCTION MATERIALS SOLUTIONS				Sub Code:	15CV36	Branch:	
Date:	21/09/17	Duration:	90 min's	Max Marks:	50	Sem / Sec:	3(A) & 3(B)	

Answer all Questions. Draw sketches wherever necessary.

MARKS

- 1 (a) Explain  
 1) Header- Brick when laid parallel to its breadth. In modular bricks, it shows the face of 90mmX90mm.  
 2) Different types of closers –

[06]



- Queen closer – portion of the brick cut length wise
- King closer – portion of the brick obtained by cutting triangular piece half along its length and half along its breadth.
- Bevelled closer – Portion of the brick obtained by cutting half width at one end and full length at the other end.
- Mitred closer – Brick whose one end is splayed. The angle of the splay is 45 to 60.

3) Quion- Exterior angle or corner of the wall.

- (b) Differentiate and Compare English and Flemish bond with sketches.

[05]

- English bond is stronger than Flemish bond for walls thicker than 1 ½ brick .
- Flemish bond is more pleasing than English bond.
- Broken Bricks can be used in the form of bats in Flemish bond.
- Construction with Flemish bond requires greater skill in comparison with English bond.

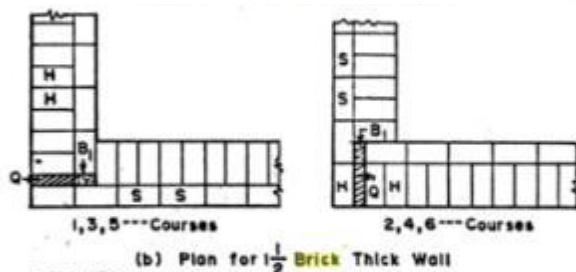
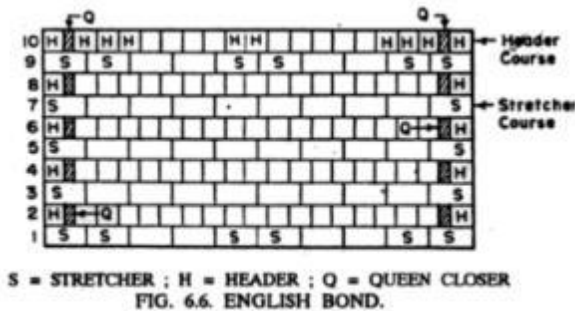
- (c) Mention rules for a good bond in Brick masonry.

[04]

- The bricks should be of uniform size. The length of the brick = width of brick + one joint , so that uniform lap is obtained.
- The amount of lap should be ¼ brick length and ½ brick thickness.
- Use of brick bat should be discouraged.
- Vertical joints in alternate courses should be along the same perpend.

- 2 (a) Draw the plan and elevation of alternate courses of 1 ½ thick English bond.

[06]



- (b) Mention the various tests carried out on bricks in laboratory. Briefly explain the procedure to determine water absorption of bricks.

[03+05]

Compressive strength  
 Water absorption Test  
 Efflorescence  
 Water absorption Test

Five bricks is taken at random and allowed to dry in an oven at 110 to 115 OC for 48 hours. It is allowed to cool at room temperature around 4 to 6 hours and weight W1 is taken. Then they are kept in water for 24 hours at 27OC and then wiped dry with a damp cloth and weight is measured as W2

$$\text{Percentage absorption} = \frac{W_2 - W_1}{W_1} \times 100$$

Efflorescence  $W_1$

- (c) What are the requirements of good stone? [04]
1. Appearance- face work it should have fine, compact texture; light-coloured stone is preferred as dark colours are likely to fade out in due course of time.
  2. Structure - It should have a uniform texture, free from cavities, cracks and patches.
  3. Strength – It should be strong enough to withstand the disintegrating action of weather.
  4. Seasoning – stones should be well seasoned.
  5. Weathering – Resistance of the stones against wear and tear due to atmospheric agencies should be high.
  6. Specific gravity – It should be between 2.3 to 2.5.
  7. Toughness - Tough stones are used where vibratory loads are expected.
  8. Hardness - It is an important for floors, pavements and aprons of bridges.
  9. Porosity and water absorption – porosity of the stone depends on mineral constituents, cooling time and structural formation. A porous stone disintegrates as it absorbs rain water, freezes, expands and causes cracking.
  10. Workability – Stones should be such that cutting, dressing and bringing it to shape and size should not be uneconomical.

- 3 (a) What do you mean by dressing of stones? Mention the three purposes of dressing? [02+03]
- Dressing of stones - It is a process in which the surfaces of the stones are prepared to form, and made to fit for any constructional purpose.
- Purposes of Dressing
- To get desired appearance from the stone work.
  - To make the transport from quarry easy and economical
  - To suit the requirements of stone masonry
  - To take advantage of local men near quarry who are trained for such type of work.

- (b) Define Aggregate Crushing value. Also, explain the experiment conducted to determine the Crushing value. [02+04]
- Aggregate crushing value gives a relative measure of an aggregate to crushing under a gradually applied compressive load.
- Test Procedure
- The material for the test should consist of aggregate passing 12.5 mm sieve and retained on 10 mm sieve.
  - Weight of material is determined (weight A).
  - The cylinder of the test apparatus is positioned on the base-plate and the test sample is added in three layers, each being subjected to 25 strokes from the tamping rod.
  - The surface of the aggregate is carefully levelled and the plunger is inserted so that it rests horizontally on this surface.
  - The apparatus, with the test sample and plunger in position is then placed between the platens of the testing machine and loaded at an uniform rate as possible, so that the total load is reached in 10 minutes. The total load should be 40t.
  - The load is released and material is removed from the cylinder and sieved on a 2.36 mm sieve.
  - The fraction passing the sieve is weighed. (weight B)

$$\text{Aggregate crushing value} = \frac{B}{A} \times 100$$

This value should not be more than 30% for concrete used in runways, roads etc and 45% for aggregate used in concrete.

- (c) Define bulking of sand and its significance. [03+03]
- The increase in the volume of a given mass of fine aggregate caused by the presence of water is known as bulking. The water forms a film over the fine aggregate particles, exerts force of surface tension and pushes them apart increasing the volume. The extent of bulking depends upon the percentage of moisture present in the sand and its fineness. With ordinary sand bulking varies from 15-30 percent. It increases with moisture content up to a certain point (4-6%), reaches maximum, the film of water on the sand surface breaks, and then it starts decreasing.

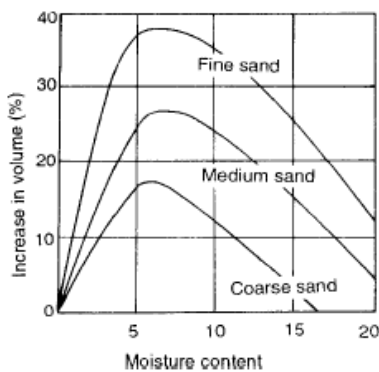


Fig. 6.2 Effect of Moisture Content on Bulking of Sand

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