PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
B.Tech. Summer 2018 – 19 Examination

Semester: 6   Date: 09/05/2019
Subject Code: 03104380   Time: 10:30am To 01:00pm
Subject Name: Design of Masonry Structures   Total Marks: 60

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 Objective Type Questions- (Each of one mark)   **(15)**

1. Assertion A : For identical strength, a composite cement-lime mortar is preferred over cement mortar.
   Reason R : Composite cement-lime mortar has higher drying shrinkage than cement mortar.
   Select your answer based on the codes given below:
   (A) Both A and R is true and R is the correct explanation of A
   (B) Both A and R is true but R is not a correct explanation of A
   (C) A is true but R is false
   (D) A is false but R is true

2. Consider the following statements regarding bands to be provided for strengthening masonry work in masonry buildings constructed in zone III, IV and V.
   (i) Lintel band is provided at lintel level on partition walls, (ii) Gable band is provided at top of gable masonry below the purlins, (iii) The bands shall be to full width of the wall and not less than 7.5 cm in depth, (iv) The bands shall be made of reinforced concrete only.
   Of these statements, the correct statements are
   (A) (i) and (ii)(B) (i) and (iii)(C) (ii) and (iv)(D) (ii) and (iii)

3. The use of relatively weak mortar 1. Will accommodate movements due to loads and, cracking if any, and will be distributed as thin hair cracks which are less noticeable or harmful. 2. Will result in reduction of stresses due to differential expansion of masonry units. Of these statements.
   (A) 1 alone is correct   (B) 2 alone is correct
   (C) Both 1 and 2 are correct   (D) Neither 1 nor 2 is correct

4. For designing masonry components of a structure, seismic forces provision in the design calculation is not necessary for buildings constructed is
   (A) Zone I only(B) Zone I and II(C) Zone I, II and III(D) Zone I, II, III and IV

5. Water retentivity for brick masonry should not be less than _____.

6. Consider the following statements:
   1. Masonry in rich cement mortar though having good strength with high shrinkage is much liable for surface cracks.
   2. Lime mortar possesses poor workability and poor water retentivity and also suffers high shrinkage.
   3. Masonry in lime mortar has better resistance against rain penetration and is less liable to crack when compared to masonry in cement mortar.
   Which of these statements are correct?
   (A) 1, 2 and 3(B) 1 and 2(C) 2 and 3(D) 1 and 3

7. In India, strength of common bricks generally varies between _____

8. Consider the following statements:
   A high lime content in a composite cement-lime mortar results in
   1. Slow hardening.2. Quick setting. 3. Weaker mortar. Of these statements
   (A) 2 and 3 are correct(B) 1 and 2 are correct (C) 1 and 3 are correct (D) 1, 2 and 3 are correct

9. The effective height of free standing non-load bearing wall and column respectively will be _____ (Where H is the height of wall or column between centers)

10. A 200 mm thick brick masonry wall made of modular bricks carries an axial load of 30 kN/m from wall above and an eccentric load of 20 kN/m from RCC floor acting at a distance of 47.5 mm from the centre line of the wall. The resultant eccentricity ratio is _____ .

11. The thickness of each leaf of a cavity wall shall not be less than _____.

12. Minimum compressive strength in N/mm² for H1 type mortar used for masonry is_____.

13. Cement mortars richer than 1 : 3 are not used in masonry because
    (i) There is no gain in strength of masonry. (ii) There is high shrinkage. (iii) They are prone to segregation
    Of these statements

(A) Only (ii) is correct(B) (i) and (ii) are correct

(C) (ii) and (iii) are correct(D) (i), (ii) and (iii) are correct

14. Direct load carrying capacity of a brick masonry wall standing freely as against when it supports RC slab will be

(A) More(B) Less(C) The same in both the cases(D) 100 %

15. Consider the following statements:

The use of relatively weak mortar

1. Will accommodate movements due to loads and, cracking if any, and will be distributed as thin hair cracks which are less noticeable or harmful.

2. Will result in reduction of stresses due to differential expansion of masonry units.

Of these statements

(A) 1 alone is correct(B) 2 alone is correct(C)Both 1 and 2 are correct(D) Neither 1 nor 2 is correct

Q.2 Answer the following questions. (Attempt any three) **(15)**

   a) What are the design loads considered while designing a masonry wall?
   b) Write a note on design thickness/ cross section in accordance to IS 1905: 1987.
   c) Advantage of using AAC Blocks over conventional brick unit?
   d) What is Confined Masonry Construction?

Q.3 A1) Estimate quantity of cement and sand for 10m3 brick masonry unit having 1:3 cement mortar proportion. **(07)**

A2) A masonry wall, 20 cm thick (see Figure) carries an axial load 27 kN/m from wall above and an eccentric load 16 kN/m from RCC floor acting at a distance 4.75 cm from the centre line of the wall. Determine the resultant eccentricity of loading and eccentricity ratio.
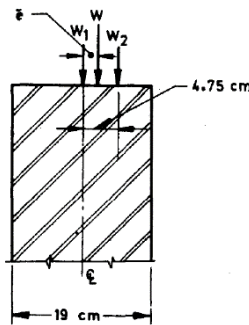
B) Calculate brickwork and steel quantity in 10cm thick partition wall in cement mortar. Dimension of wall, L=10m and h =1m. **(08)**

OR

B) Calculate effective height, effective length and effective thickness of walls and column. Please refer Figure for the same. Slab thickness 12cm. **(08)**
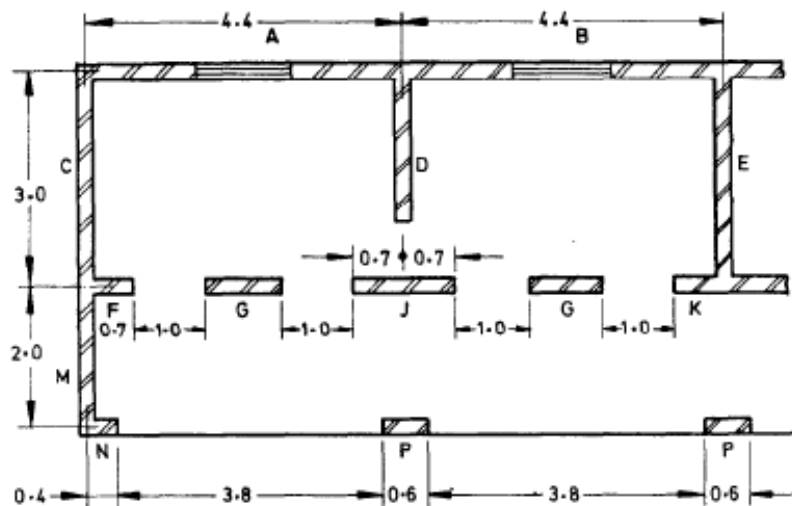
All dimensions in metres.

Q.4 A) Which are the common defects in workmanship in masonry construction? **(07)**

OR

A) How Confined Masonry Buildings ResistEarthquake Effects? **(07)**

B) Write down the comparison between the confined masonry and RCframe construction. **(08)**