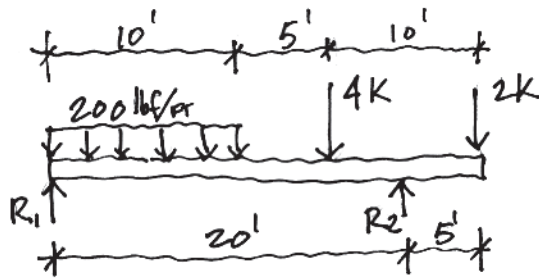


STRUCTURAL SYSTEMS MOCK EXAM QUESTIONS

1. Neglecting the weight of the beam, what are the values for the reactions at R1 and R2?



2. Check all that apply about slump tests:

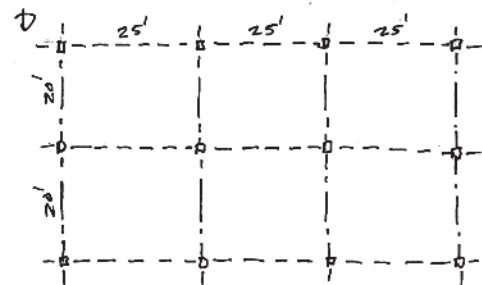
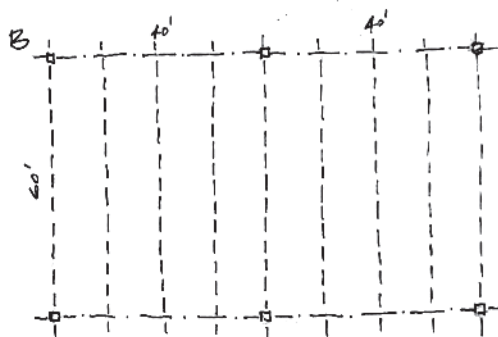
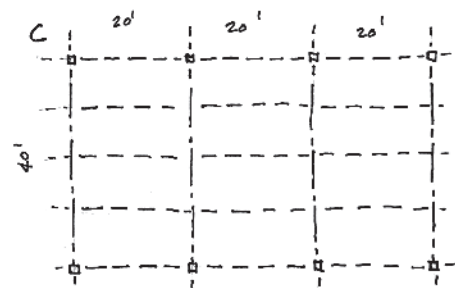
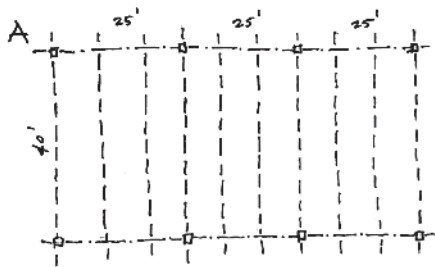
- Shows the strength of the concrete at 28 days
- Shows the admixtures in the mix
- Shows the workability of the concrete
- Shows the amount of camber in a concrete beam
- Shows the strength of the concrete
- Shows the bearing capacity below the footing
- Gives an indication of the final finish of the concrete

3. I would use a mat (or raft) foundation when I expect there to be _____.

4. Three story building with no basement (slab on grade) has a column spacing of 30' x 30' and an assumed live load of 80 psf for the floor and 30 psf for the roof. If the dead load for both the floor and roof is 20 psf and the footing below one of the internal columns is 5' x 5', what is the soil bearing capacity? (ignore lateral and other loads)

- a. 3000 psf
- b. 5000 psf
- c. 7000 psf
- d. 9000 psf

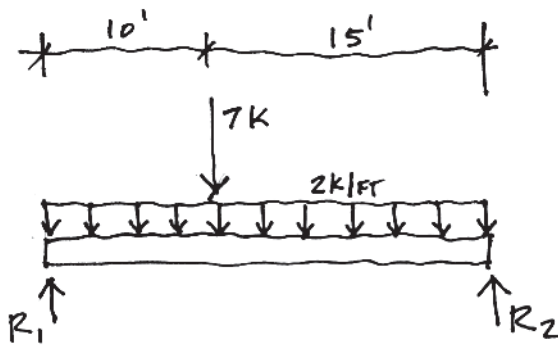
5. When choosing a framing plan for a steel structure, the engineer offers four different potential layouts. Since you are concerned about efficiency and economical use of material, which would you choose? (assume office occupancy, with typical corrugated steel decking)



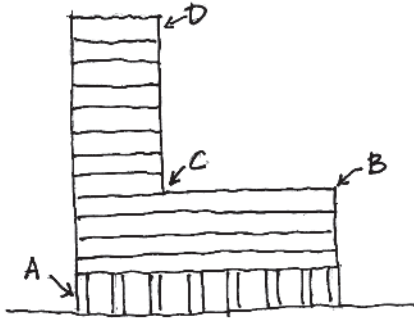
6. For design reasons, you do not want to use shear walls in the building because you need larger windows than the shear wall could easily accommodate. So, instead, you would probably employ:

- a. Massively hinged columns
- b. Braced frames
- c. Moment resisting frames
- d. Vierendeel frames

7. Draw the shear and moment diagram for the beam shown:



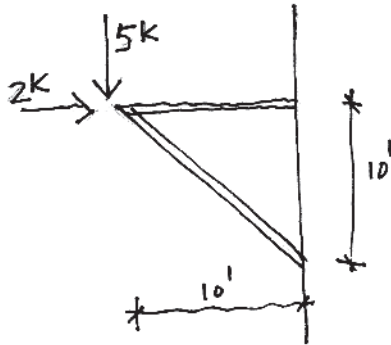
8. In the elevation of the multi-storied building subject to earthquake forces shown, which location is likely to be the biggest problem?



9. After bringing in fill from an outside source, prior to the foundation installation, what test would be appropriate?

- a. Vane Shear Test
- b. Proctor Test
- c. Cylinder Test
- d. Slump Test

10. Is the top chord of this cantilevered frame in tension or compression?



11. Bonus NCARB Question:

Buckling of a column can be reduced by which of the following: (Check all that apply)

- Increasing the size of the member
- Rotating the column
- Bracing the column
- Changing the type of end restraints
- Reducing the length of the column
- Reducing the r (radius of gyration)