Mahatma Education Society's

PILLAI'S COLLEGE OF ARCHITECTURE

Sector-16, Plot No.10,New Panvel-410 206

SECOND YEAR B.ARCH: ANNUAL EXAM APRIL 2011

THEORY OF STRUCTURES

TIME: 3 HRS DATE:11/04/2011 MAX.MARKS 100

NOTES: 1) ALL QUESTIONS CARRY 16 MARKS EACH.

2) SOLVE ANY THREE QUESTIONS FROM EACH SECTION.

3) DRAW SKETCHES WHERVEVER NECESSARY.

4) FOUR MARKS ARE RESERVED FOR NEAT SKETCHES.

SECTION A

Q.1 a) Give an account (with sketch) of a test for assessing load bearing capacity of soil.

b) Why is de-watering from soil necessary before foundation.State the methods of de-watering and explain any one method.

Q.2) A fixed beam AB has 10.0 m span.The beam carries four point loads as shown in **FIG:1**. Find the fixed end moments at A & B and draw Bending Moment & Shear Force Diagram.

Q.3) A continuous beam ABCD is loaded as shown in **FIG 2.** Find the moments at A,B,C, & D . Also find the reactions and draw Shear Force & Bending Moment Diagrams.[USE THREE MOMENT THEOREM ONLY.]

Q.4) A continuous beam ABC is loaded as shown in **FIG.3.** Find the fixed end moments & Draw Shear Force & Bending moment Diagram.[USE MOMENT DISTRIBUTION METHOD ONLY.]

Q.5) A retaining wall has overall height of 4.0 m.It is 0.75 m wide at top & 2.5 m wide at base as shown in **FIG 4**.The earth filling is up to the level of top edge.If the density of soil is 13KN/m^3. & that of wall is 20 KN/m^3, coefficient of friction between the wall & soil is 0.5 & angle of repose is 30°. Calculate maximum and minimum pressure at base & state stability of wall.

SECTION B

Q.6) a) What is the importance of soil mechanics with reference to construction work.

b) Define any **FOUR** of the following:-

I) Void ratio II) Porosity III) Degree of saturation IV) Dry Density

V) Plastic limit

Q.7) The cross section of a column is as shown in **FIG 5**. There is an eccentric load of 60 KN as shown. Find the stresses at the corners of column.What additional load is required for no tension at any of the corners. With this additional load what are the stresses at the corners.

Q.8) Find: 1) Euler's crippling load &

2) Load by Rankine's formula for:-

A hollow cylindrical steel tube having 40mm external dia. and 3.0 mm thickness.The effective length for a column is 2.5 m.Take $E = 2.05 \times 10^3$ N/mm^2 , a = 1/7500 and fc = 335 N/mm^2.

Q.9) A timber beam of rectangular cross- section is 100 mm wide & 240 mm deep. It is simply supported at its ends with a span of 4.0 m. What U.D.L the beam should carry to produce a maximum deflection of 6.0 mm.Take value of $E = 1.1 \times 10^4$ N/mm^2.

Q.10) For a portal frame loaded as shown in **FIG 6** . Find moments and reactions at A and D. Also draw B.M.D.

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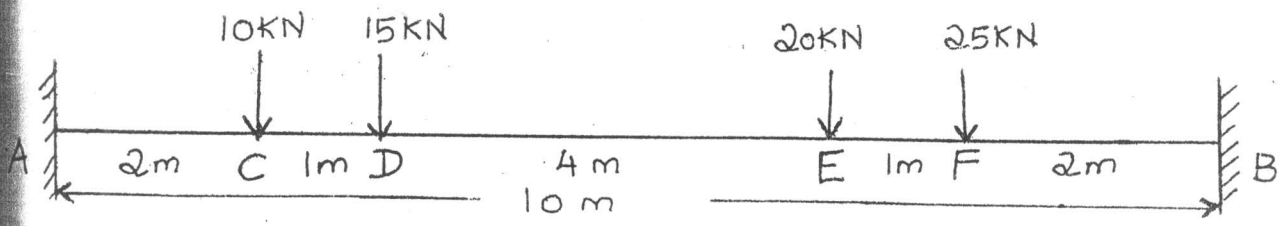
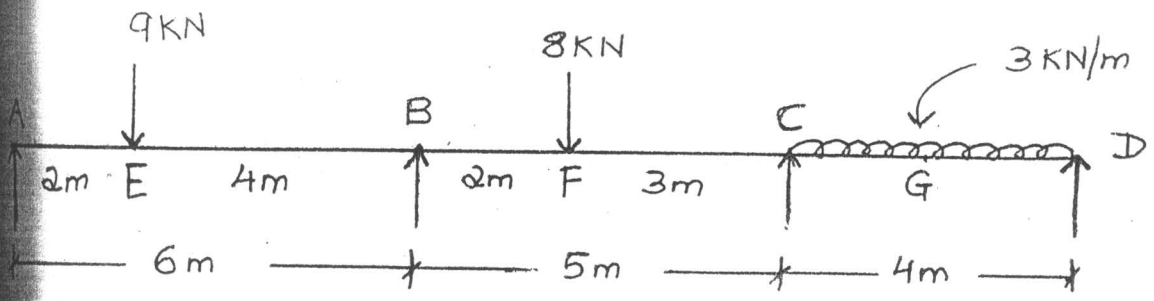
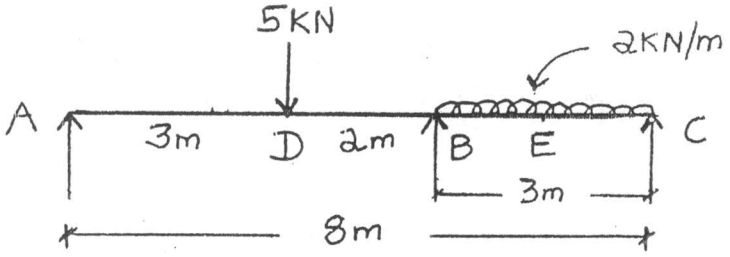


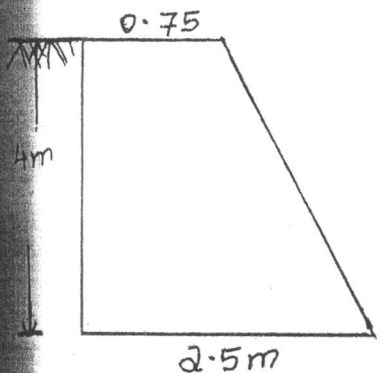
Q.2. FIG: 1



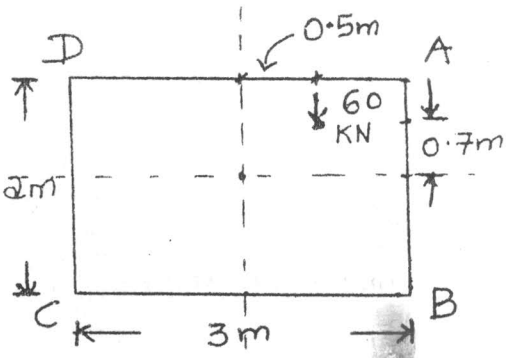
Q.3. FIG: 2



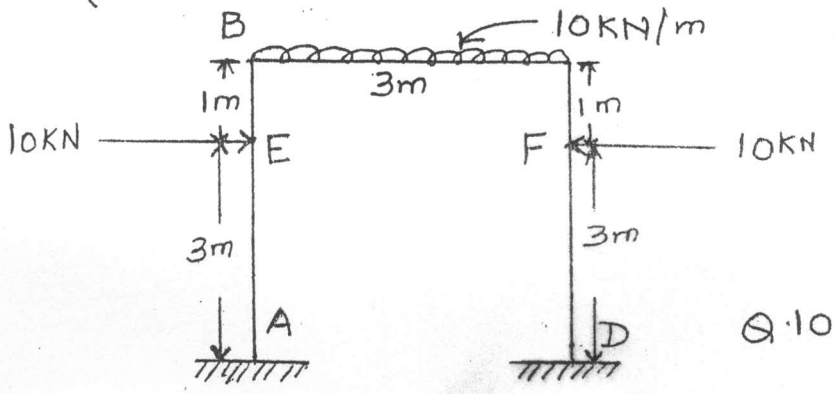
Q.4. FIG: 3



Q.5 (FIG: 4)



Q.7 (FIG: 5)



Q.10 (FIG: 6)