PILLAI"S COLLEGE OF Architecture

2nd year B.ARCH: Annual Exam April 2010

THEORY OF STRUCTURES

Time 3 hrs. Max. Marks 100

Notes: 1) All questions carry 16 marks each.
2) Solve **ANY THREE** questions from each section.
3) Sketches are essential
4) Four marks are reserved for neat sketches

SECTION I

Q.1 a) Write a note with a sketch about test in accessing the load bearing capacity of soil.

b) Write a note about different types of soils found in India.

Q.2 A fixed beam AB, 9.0 m long is loaded as shown in Fig I. Draw Bending Moment and Shear Force diagrams after calculating moments and reactions at important points.

Q.3 A continuous beam ABCD has both ends simply supported and is loaded as shown in Fig.II. Calculate Moments and Reactions and draw Bending Moment and Shear Force Diagrams. **Use method of Three Moments only.**

Q.4 A continuous beam ABCD has fixed end A and simply supported end D. The beam is loaded as shown in Fig. III. Calculate Moments and Reactions and draw Bending Moment and Shear Force Diagrams. **Use method of Moment Distribution only.**

Q.5 a) Explain the method to work out the maximum stresses in the cross section of a column carrying eccentric load. (6 Marks)

b) The cross section of a column carrying eccentric load is shown in Fig. IV. Calculate the maximum stresses at the corners. What additional load at the centre of the column is required so that there is no tension anywhere in the column? What are the new stresses at the four corners with this additional load ? (10 Marks)

---------- PLEASE TURN OVER FOR SECTION II ----------

SECTION II

Q.6 a) Write a note on different types of foundations and draw sketches.

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

Q.7 a) The cross section of a soil retaining wall is shown in Fig. V. If density of wall material is 24KN/m^3, the density of soil is 19 KN/m^3, coefficient of friction is 0.55 and angle of repose is 32°, find the maximum and minimum stresses at the base. Also draw stress diagram showing these stresses. (12 Marks)

b) Draw stress diagrams of the base of a water storage dam in following three cases:

i. No tension in the base

ii. Some tension in the base

iii. Zero minimum tension at the base (4 Marks)

Q.8 A hollow circular tube used as a column has outer dia 200 mm and has thickness 20mm. The original length of a column is 5.0 m and both ends are hinged.
If values of E=1 x 10^5 N/mm^2, f_c =550N/mm^2 and a= 1/1600, find the load, the column will carry using 1) Euler's formula and 2} Rankine's formula.

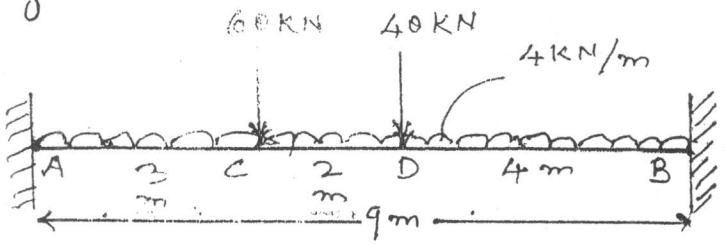
Q.9 a) For a simply supported beam AB, span is 5.0m. There is a point load of 30 kN at a Distance of 3.75 m from left end A. If EI = 26 x 10^{12} Nmm^2, find deflection below load.

b) A cantiver beam 3.0m length of uniform section is loaded with 20KN load at the free end, In addition it carries a U.D.L of 10 kN load on entire span calculate maximum deflection. E = 2.1 X 10^5 N/mm^2, I= 22500 x 10^4 mm^4

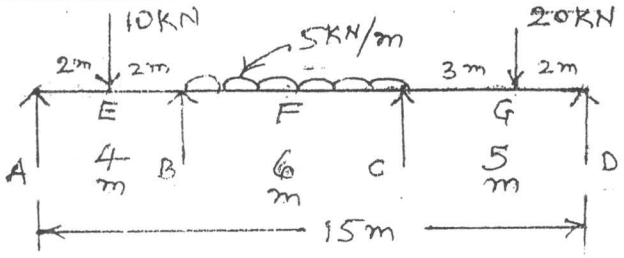
Q.10 Draw Shear Force Diagram and Bending Moment Diagram for a fixed beam shown in Fig. VI

---------- END OF PAPER ----------

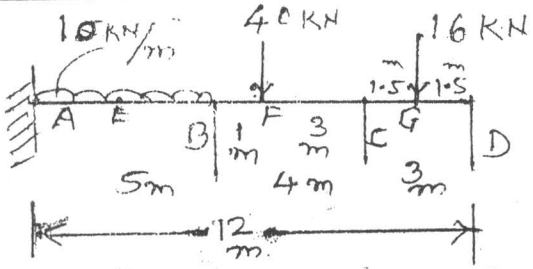
IInd year – TOS – April 2010



Q 2.
fig I



Q 3.
fig II
Three moment Theorem.



Q 4
fig III.
moment Distribution method

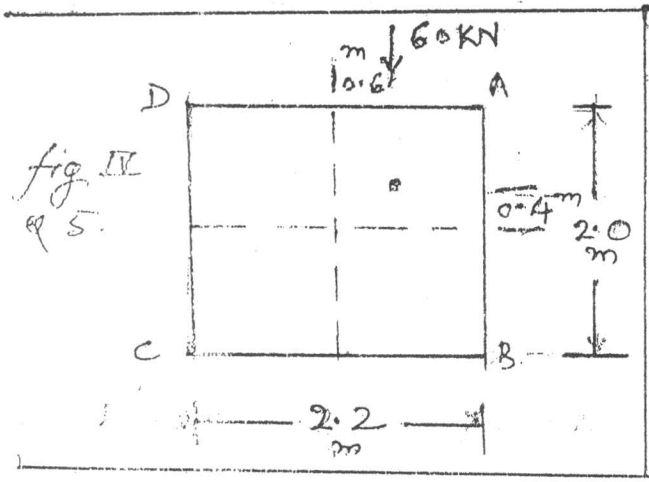


fig IV
Q 5.

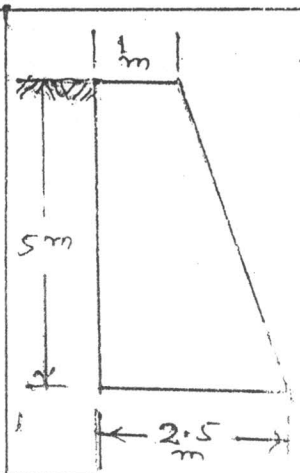


fig V
Q. 7

fig VI. Q 1C
End A sinks by 15 mm
End B sinks by 7 mm
$EI = 6000$ KNm^2