Royal school of Architecture
Mid-Semester Examination (R.G.U.) 2017
1th Semester B. Arch.
**Theory of Structures 1 and mathematical tools**
(AR 0106)

Full Marks: 20

Time: 1 hours

The figures in the brackets indicate full marks for each question

**Answer the following:**                                    (1 X 4 = 4 marks)

1. Differentiate between statics and dynamics.
2. What are the basic components of a building? Define any one of them.
3. Define force. Classify the force systems.
4. State the Varigon's Theorem and the parallelogram law of forces.

**Answer the following:**                                    (3 X 2 = 6 marks)

5. What are roof structures? Explain its function in detail.
6. Determine the axial forces induced in the bars AC and BC as shown in fig1 due to the action of the horizontal force P applied at point C when the bars are hinged together at C and to the foundation at points A and B.
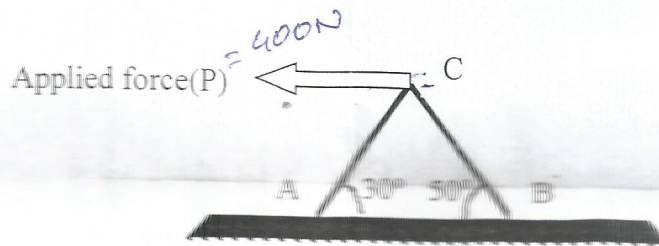


Figure 1

**Answer the following:**                                    (5 X 2 = 10 marks)

7. (a) A circle of diameter 12.60 cm is inscribed within a square touching its sides. Find the area of a fillet.

Or

(b) A rectangular lawn 30m x 20m has two roads each 2m wide running in the middle of it, one parallel to the length and the other parallel to the width. Find the cost of pairing the roads at Rs 12.50 per $m^2$.

8. (a) Write notes on the various masonry units of a building.

Or

(b) Five forces $F_1$, $F_2$, $F_3$, $F_4$ and $F_5$ are acting at a point on a body as shown in figure 2. If the magnitude of $F_1 = 15$ kN, $F_2 = 23$kN, $F_3 = 40$kN and $F_4 = 35$kN then, find the magnitude and direction of the force $F_5$ when the body is in equilibrium.