## First Semester B. Arch. Degree Examination, June/July 2016
## Building Structures – I

Time: 3 hrs.　　　　　　　　　　　　　　　　　　　　　　　　　　Max. Marks:100

**Note: *1. Answer any FIVE full questions,***
***choosing ONE question form each Part.***
***2. Missing data, if any, may be suitably assumed.***

### PART – A

1　a.　Define structure, and explain load transfer mechanism in normal framed structure with sketch.　**(10 Marks)**
　b.　Explain horizontal one-way and two-way systems with respect to slabs.　**(10 Marks)**

2　a.　Explain the importance of vertical and horizontal structural system with suitable examples.　**(10 Marks)**
　b.　Explain cable stayed and suspended structures with sketches.　**(10 Marks)**

### PART – B

3　a.　Explain the physical properties of brick and timber.　**(10 Marks)**
　b.　Write a note on concrete.　**(10 Marks)**

4　a.　Briefly explain dead load and live load. Also give unit weight of different materials used in the building.　**(10 Marks)**
　b.　Determine reaction due to dead load of beam of size 250 mm × 500 mm and span 4 m. Take unit weight or density of material as 25 kN/m$^3$.　**(10 Marks)**

### PART – C

5　a.　Explain principle of transmissibility of forces.　**(05 Marks)**
　b.　Explain types of loads and types of supports with sketches.　**(06 Marks)**
　c.　Determine the reactions of the beam shown in Fig. Q5(c).　**(09 Marks)**


Fig. Q5(c)
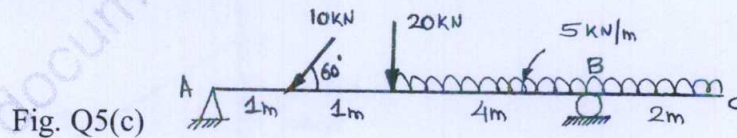
6　a.　Explain shear and bending in beams subjected to vertical loads.　**(04 Marks)**
　b.　Determine reactions at the points of contacts for the shown Fig. Q6(b).　**(08 Marks)**
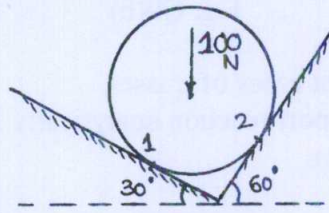

Fig. Q6(b)

　c.　Determine magnitude and inclination of resultant for the force system shown in Fig. Q6(c).　**(08 Marks)**


Fig. Q6(c)

1 of 2
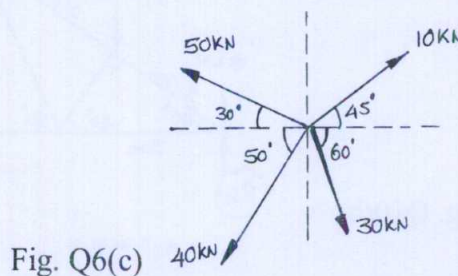
## PART – D

7  a. Define stress, strain and Poisson's ratio. **(06 Marks)**

   b. A 20 mm diameter specimen is found to reduce by 0.004 mm when it is subjected to a tensile force of 20 kN. Take $E = 2 \times 10^5$ N/mm² determine Poisson's ratio. **(06 Marks)**

   c. When a 12 mm diameter specimen is subjected to a tensile force of 20 kN, a elongation of 0.3 mm was observed over a length of 130 mm. Reduction in diameter is 0.02 mm. Determine :
     i) Young's modulus
     ii) Percentage increase in length
     iii) Percentage decrease in diameter. **(08 Marks)**

8  a. Explain thermal stress and strain. **(08 Marks)**

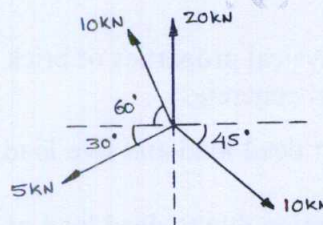   b. Determine magnitude and inclination of resultant for the shown Fig. Q8(b) by graphical method. **(12 Marks)**



Fig. Q8(b)

## PART – E

9  a. Explain perfect, deficient and redundant trusses with sketches. **(08 Marks)**

   b. Determine self weight of the truss shown in Fig. Q9(b). The truss is fabricated with double angle ISA 60 × 60 × 6 mm with weight per meter for each angle is 5.4 kg/m. **(12 Marks)**
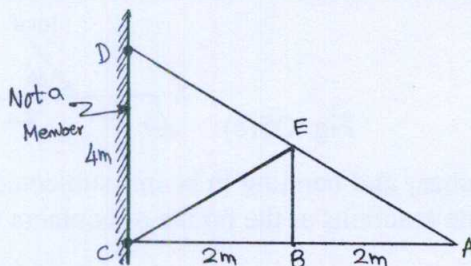


Fig. Q9(b)

10  a. Sketch different types of trusses. **(05 Marks)**

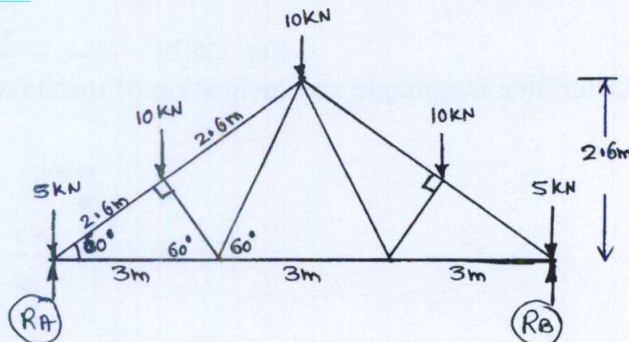   b. Determine support reaction analytically for the shown truss. Fig. Q10(b). **(15 Marks)**



Fig. Q10(b)

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