

CBCS SCHEME

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15ENG1.5

First Semester B.Arch. Degree Examination, June/July 2019 Building Structures – I

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Assume any missing data suitably.*

Module-1

- 1 Explain vertical/lateral structural systems. (20 Marks)

OR

- 2 Explain dome, shell, cable stayed, suspended, membrane structures. (20 Marks)

Module-2

- 3 Explain wood, masonry, steel, concrete, fabric as a structural material. (20 Marks)

OR

- 4 Explain dead load, live load, static load, dynamic load and impact load. (20 Marks)

Module-3

- 5 a. Describe different types of supports. (08 Marks)

- b. A $3\text{m} \times 2.5\text{m} \times 0.15\text{m}$ RCC slab is centrally supported by 30cm square column of 4m clear height resting centrally on $2\text{m} \times 2\text{m} \times 0.3\text{m}$ R.C.C. footing. Indicate and calculate tributary load and load path. (12 Marks)

OR

- 6 Enumerate tension, compression, shear, bending and torsion. (20 Marks)

Module-4

- 7 a. A bar of 20mm diameter is tested in tension. It is observed that when a load of 37.7 kN is applied, the extension measured over a gauge length of 200mm is 0.12mm and the contraction in diameter is 0.0036 mm. Find Poisson's ratio and Young's modulus. (10 Marks)

- b. A steel rail is 12.6m long and is laid at a temperature of 24°C . The maximum temperature expected is 44°C .

i) Estimate the minimum gap between two rails to be left so that temperature stresses do not develop.

ii) Calculate thermal stresses in the rails if no expansion gap is provided.

Take $E = 2 \times 10^5 \text{ MN/m}^2$ and $L_e = 12 \times 10^{-6}/^\circ\text{C}$.

(10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. $42+8=50$, will be treated as malpractice.

OR

- 8 a. Define resultant and equilibrant of concurrent coplanar force system. (05 Marks)
 b. Five forces $F_1 = 18\text{N}$, $F_2 = 22.5\text{N}$, $F_3 = 15\text{N}$, $F_4 = 20\text{kN}$ and F_5 are acting on a body as in figure Q.8(b) and the body is in equilibrium. Find F_5 in magnitude and direction analytically or graphically. (15 Marks)

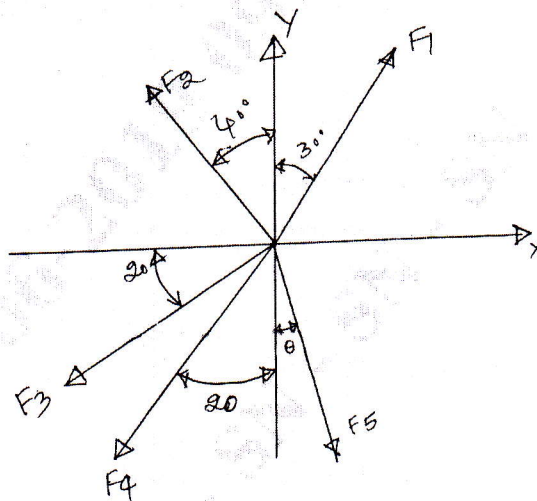


Fig.Q.8(b)

Module-5

- 9 Explain truss concept of triangulation. Draw common truss configurations. (20 Marks)

OR

- 10 5 steel trusses are spaced 6m c/c to support roof covering. Each truss is as shown in Fig.Q.10. Each truss member weighs 500N/m and each truss carries external load as shown. Roof covering (weighing 0.9 kN/m^2) rests on 4 purlins each weighing 600N/m. Calculate:
 a. Self weight of each truss.
 b. Total weight of roof cover and purling.
 c. Support reactions of central loaded truss. (20 Marks)

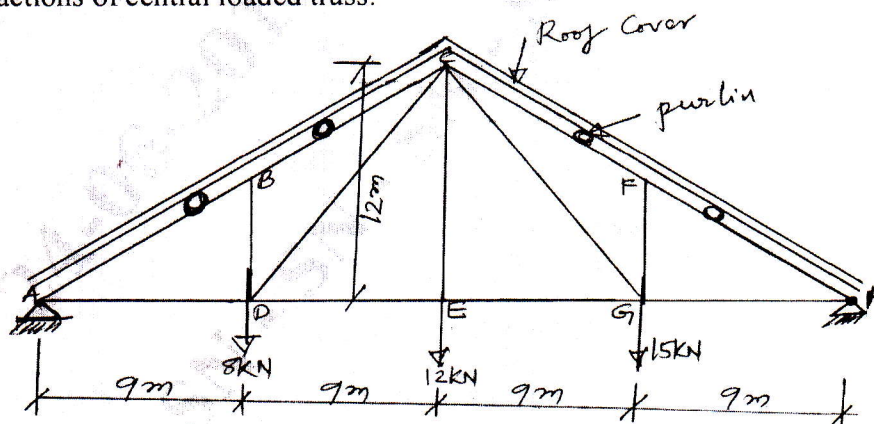


Fig.Q.10
