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15ENG1.5

First Semester B.Arch. Degree (CBCS) Examination, Dec.2016/Jan.2017
Building Structures

Time: 3 hrs.

Max. Marks:100

- Note:** 1. Answer FIVE full questions, selecting ONE full question from each module.
 2. Missing data if any can be assumed suitably.
 3. Follow written dimension. Do not scale.

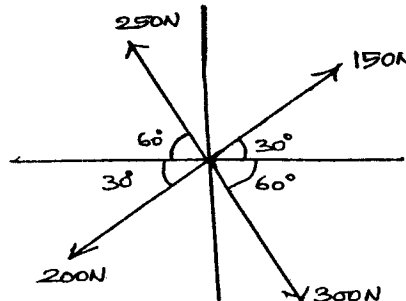
Module – 1

- 1 Explain how structures got evolved right from stone Age to present industrial modern Age with neat sketches. (20 Marks)
- OR**
- 2 a. Draw and describe an natural and manmade cantilever structure. Indicate load path and load transfer. (10 Marks)
 b. For a typical building of your choice indicate load path and load transfer. (10 Marks)

Module – 2

- 3 a. What are the ingredients used in plain concrete? Indicate the properties of the ingredients. (10 Marks)
 b. What are advantages and disadvantages of i) wood ii) steel iii) concrete. (10 Marks)
- OR**
- 4 a. Explain Dead load, live load, impact load and earthquake load. (10 Marks)
 b. Determine the magnitude and direction of resultant force from Fig Q4(b). (10 Marks)

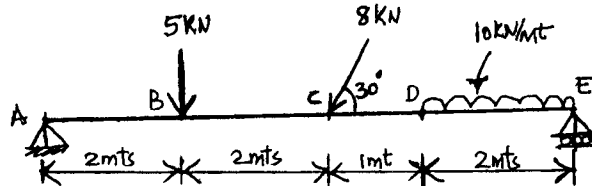
Fig Q4(b)



Module – 3

- 5 a. Differentiate between :
 i) Coplanar force system and concurrent force system.
 ii) Composition of force and Resolution of force.
 iii) Resultant of a force and equilibrant. (09 Marks)
 b. Determine the support reactions for the beam shown in Fig Q5(b) (11 Marks)

Fig Q5(b)



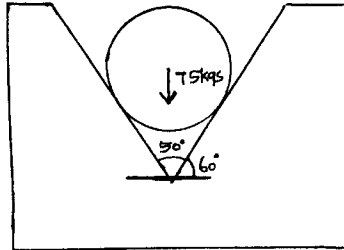
OR

- 6 a. What are statically determinate beams? Give examples. (03 Marks)
 b. With neat sketches explain different types of supports. (08 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.

- c. A sphere of mass 75kgs is placed in V groove of a wooden block as shown in Fig Q6(c). Determine the Reactions on the block. (09 Marks)

Fig Q6(c)



Module – 4

- 7 a. With help of neat sketch plot Stress – strain graph of mild steel specimen, indicate all the important points. (08 Marks)
- b. A Tension test was conducted on mild steel specimen and following data was obtained from the test.
- | | | |
|----------------------------|---|--------|
| Diameter of steel bar | = | 30mm |
| Gauge length of bar | = | 200mm |
| Load at elastic limit | = | 250kN |
| Extension at a load 150kN | = | 0.21mm |
| Maximum load | = | 380kN |
| Total extension | = | 60mm |
| Diameter of rod at failure | = | 22.5mm |

Determine the following :

- | | | |
|--------------------------------|-----------------------------|------------|
| i) Young's modulus of material | ii) Stress at elastic limit | |
| iii) % elongation in the bar | iii) % Decrease in area. | (12 Marks) |

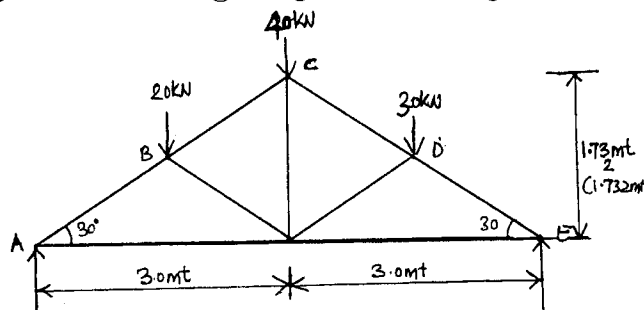
OR

- 8 a. Explain the different types of stresses and strains, encountered in structures. (16 Marks)
- b. Determine the compressive strength of a column having a cross section 230mm × 450mm. when it is subjected to a compressive force of 120kN. (04 Marks)

Module – 5

- 9 a. Explain the following with sketches.
 i) Perfect Frame ii) Deficient frame iii) Redundant frame. (06 Marks)
- b. For the Truss. Shown in Fig 9(b). Determine the reactions at the support. (07 Marks)
- c. Determine the weight of Truss (Dead load) for the detail shown in Fig Q9(b). Size of Angle used is Double Angle ISA 50×50×6 @ 4.5kg/mt for each angle. (07 Marks)

Fig Q9(b)



OR

- 10 Explain the procedure adopted to analyse the Truss by
 a. Method of joints
 b. Method of section. (20 Marks)
