

Questions 2017

Introduction, forces and loads

1. What professionals are members of a building design team?
2. What data are necessary to define a force vector in the plane? Sketch an example, and give also the related units!
3. Give examples for variable and permanent loads (at least two-two)!

K building visit, requirements of buildings, building constructions and building materials

4. What kind of load-bearing structural materials were used for the construction of the K-building? Give also the name of the corresponding loadbearing structure!
5. Give three important dimensions (height, width or length in m) of the K building of BME, that can be related to any functional unit, part or whole of the building or to a building construction!
6. How many internal courts does the K-building of the BME have? What was the main aim by designing them?
7. What fundamental and common requirements are to be taken into consideration by design of buildings, building constructions and loadbearing constructions?
8. What kind of different safety requirements are to be considered when designing buildings?
9. Give a list of functionality requirements of spaces in buildings (requirements of human comfort and use)!
10. Give non-structural requirements of loadbearing structural materials!

Laboratory visit

11. Describe the way of rupture of the brickwork specimen tested in the laboratory for compression!
12. We tested in the laboratory among other:
 reinforcing steel bar in tension,
 brickwork in compression and
 timber in compression parallel to grains
Give the approximate value of the ultimate strength (the strength measured at rupture) of these tested materials in KN/cm^2 (or N/mm^2)

Mechanical behaviour of structural materials strength evaluation

13. What is stress? Give also the unit of it!
14. What is strain? Give also the unit of it!
15. What is strength? Give also the unit of it!
16. What is a stress-strain diagram! Sketch an example
17. Sketch a linear elastic-completely plastic stress-strain diagram, and indicate on it: the linear-elastic part, the yield point, the completely plastic part and the point corresponding to rupture!
18. Give structural requirements of loadbearing structural materials!
19. What different values of the strength are determined by statistical evaluation of the test results? Which is the mostly safe value?
20. Sketch a rigid-completely plastic stress-strain diagram!
21. Sketch two strength distribution curves: one with greater and one another with smaller scatter!
22. What is the Student factor t in the equation $f_k = f_{nom} = f_m - tS$ depending from? Here s is the scatter, f means strength, the indices indicate different values of the strength

Film projection: Film 1: Loads, film 2: Deformations

23. What is the relation between temperature and rigid behaviour of structural materials?
24. What was the reason of the collapse of the Tacoma Narrows Bridge in the USA in 1940?
25. The speed of load application (slow, rapid, dynamic load application) can influence the mechanical behaviour of structures. Give an example for that!
26. What is self-frequency (or natural period) of structures?
27. What happens if the natural period of the structure is equal to the load revival period?
28. Why is it dangerous to apply rigid materials to loadbearing structures?
29. You apply the same load slowly and then dynamically to the structure: Will the response (for example the deformation) of the structure be the same or different? If different, how much is approximately the difference?
30. What kind of deformation is caused by shear? Sketch an example!

Construction site visit

31. Formulate three statements concerning your observations made during the construction site visit you consider important!

Modelling and analysing structures

32. What are main components of the static model?
33. What is an external joint of a structure? (Why is it called external joint?)
34. Why do we need the static model of loadbearing structures? For what purpose do we use it?

35. How do we simplify structural members, when constructing the static model of the structure?
36. What kind of joints do you know?
37. Sketch the static model of a simple supported arch!
38. What is the name of the given static model?
39. What are the main steps (phases) of the design of loadbearing structures?
40. What are the fundamental laws of structural analysis?
41. Sketch the static model of a cantilever loaded by uniformly distributed load!
42. Sketch the static model of a simple supported beam loaded by concentrated force at mid-span!
43. What is span? Give also the unit of it!

Responses of loadbearing structures

44. What are responses of loadbearing structures when being loaded?
45. What is normal stress? Give also the unit of it!
46. What is shear stress? Give also its unit!
47. What is normal force? Give also its unit!
48. What is shear force? Give also its unit!
49. What is distortion? Give also its unit!
50. Is cracking a response of structures when loaded? What kind of stress may produce cracking?
51. What is an internal force! What different internal forces do you know?

Project bureau visit

Process of creation

52. What are different means of protection of the natural and built environment?
53. Who are participating in the elaboration of the general development project (GDP)?
54. What is the role of the client in the process of building investments?
55. What is the role of the general management company in the process of building investments?
56. Different members participating in preparation of the building permission project!
57. What different authorities are intervening in authorization of the building permission project?
58. Who is the building manager (or project manager)?
59. What is responsible the general contractor company for, during the realization of the building?
60. Give the name of some subcontractors which may be contracted by the general contractor company for different execution activities! (Name at least four!)

Documentations of buildings

61. What kind of different projects are to be made for the authorization and erection of buildings?
62. What is treated by the general development project (GDP)?
63. What is the aim of the tender project?
64. Why is demolition project also necessary (what aspects should be taken into consideration by making it)?