

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)**

**CLASS: BARCH
BRANCH: ARCHITECTURE**

**SEMESTER : VII
SESSION : MO/18**

SUBJECT: AR7301-STRUCTURAL CONCEPTS IN ARCHITECTURE
TIME: 03:00 HRS.

FULL MARKS: 60

INSTRUCTIONS:

1. The question paper contains 7 questions each of 12 marks and total 84 marks.
 2. Candidates may attempt any 5 questions maximum of 60 marks.
 3. The missing data, if any, may be assumed suitably.
 4. Before attempting the question paper, be sure that you have got the correct question paper.
 5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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- Q.1(a) Define structure. Mention one structure system and give an example. [2]
(b) Give one example for each structural system: [4]
(i) Cable suspended structure (iii) Folded plate structure
(ii) Bundle tube system (iv) Diagrid structure system
(c) Explain the structural development in architectural development. Support your answer with sketches. [6]
- Q.2(a) What are two centered and three centered arch? Give sketches. [2]
(b) What are the advantages and disadvantage of geodesic dome? [4]
(c) Explain and sketch the following: [6]
(i) Z shell
(ii) Edge supported shell
(iii) North light shell
- Q.3(a) Write the difference between cable suspended roof and cable supported roof. [2]
(b) What is synclastic and anticlastic curve in tensile structure? Support with examples. [4]
(c) Discuss the various advantages and disadvantages of tensile structure. [6]
- Q.4(a) What is mansard roof truss? [2]
(b) What is space frame? Differentiate between planer frame and space frames. [4]
(c) Write short notes and support with sketches: [6]
(i) Truncated truss
(ii) Warren truss
(iii) Queen truss
- Q.5(a) What is waffle slab and where is this system used? [2]
(b) Explain the various materials used for folded plate structure. [4]
(c) What are the different applications of folded structures in architectural buildings? Give examples for each. [6]
- Q.6(a) Discuss the general characteristics of a pneumatic structure. [2]
(b) Explain and give an example of kinetic structure. [4]
(c) Define and state the application of the following: [6]
(i) Pneumatic structure
(ii) Mobile structure
- Q.7(a) What is a Diagrid system? Mention the various components. [2]
(b) What is a braced frame system? Explain the various types of bracing used in buildings with sketches. [4]
(c) Explain the structural systems used in the following buildings: [6]
(i) Sears Tower Chicago, Illinois
(ii) John Hancock tower, Chicago
(iii) Hearst tower