

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

**CLASS: BARCH
BRANCH: ARCH**

**SEMESTER : VII/ADD
SESSION : MO/19**

SUBJECT: AR7301 STRUCTURAL CONDEPTS IN ARCHITECTURE

TIME: 3:00 HOURS

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) What is arch action? [2]
Q.1(b) With a neat sketch explain the application of fan vault. [4]
Q.1(c) Justify the structural concept associated with geodesic dome with neat sketch and example of any relevant building. [6]
- Q.2(a) What is hyper surface? [2]
Q.2(b) Describe cable net structure with neat sketch. [4]
Q.2(c) Explain the general principles of structural behavior related to shallow, anticlastic tensile membranes. [6]
- Q.3(a) What is waffle slab? [2]
Q.3(b) What is flat plate system? Differentiate between two-way and one-way slab system. [4]
Q.3(c) Examine with schematic sketch the stiffness and load-carrying variations under the structural principle of folded plate. [6]
- Q.4(a) Write advantage of space truss over plane truss. [2]
Q.4(b) Define space frame structure? Explain its structural principle. [4]
Q.4(c) "There will need to be a difference between member size that are in tension and compression". [6]
What can be deduced about the design and necessary shape of individual truss member?
- Q.5(a) What is mobile structure? [2]
Q.5(b) "Analyzing the operation of air in balloon" describe the air pressure role in pneumatic structure. [4]
Q.5(c) Define and state the application of following: [6]
a) Kinetic structure
b) Pneumatic structure
- Q.6(a) What is high rise building? [2]
Q.6(b) Give reasons - "wind load deflection is the most important one in the high rise building design" with sketch. [4]
Q.6(c) Differentiate between the structural concept of braced frame structure and braced-tube structure. [6]
- Q.7(a) What is super-structure and sub-structure? [2]
Q.7(b) Structural members are under deformation due to load. Explain with four deformation associated with forces when applied to members. [4]
Q.7(c) Natural elements are under which load category? Elaborate the three encountered load types in detail: wind, snow and earth with illustrative sketch. [6]

:29/11/2019::E