**Review: Describing Structures, 3 Types of Structures, Forces**

**Name:**

1) Classify these real-life examples as frame, shell or mass structures by writing

**M** for mass structure, **F**  for frame structure, or **S** for shell structure on the blank in front of the structure description. (7-3-2)(5 marks)

\_\_\_\_\_\_\_a) a sandbag \_\_\_\_\_\_\_b) a canoe

\_\_\_\_\_\_\_c) Eiffel Tower \_\_\_\_\_\_\_d) an ice sculpture

\_\_\_\_\_\_\_e) an empty can of beans \_\_\_\_\_\_\_f) a ladder

\_\_\_\_\_\_\_g) made by piling up materials

\_\_\_\_\_\_\_ h) made with a skeleton of strong materials that support some forces

\_\_\_\_\_\_ i) can be hollow or have materials covering it

\_\_\_\_\_\_ j) made of entirely one continuous piece and is hollow inside

\_\_\_\_\_\_ k) a hydro dam

\_\_\_\_\_\_ l) a piece of pottery made by a potter

\_\_\_\_\_\_ m) a Ferris wheel

2) Mass, frame and shell structures get their strength in different ways. Match each type of structure to its description of why it is strong it`s response to stress. Write MASS for mass structure, FRAME for frame structure and SHELL for shell structure.

a) These structures are strong because of their large mass being piled up. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b) These structures are strong because they are made of one continuous piece.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

c) These structures are strong because they have a strong supporting structure that may be bolted down to ensure that they are firmly planted in the ground. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

d) These structures become weak if they have a small fracture (crack) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

e) These structures are so massive that they are not affected by a small fracture (crack) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

f) The earth can be compressed below these structures because they are so massive. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

g) These structures are strong because forces on them are spread out over the entire surface. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3) a) Draw to show the difference between a **column** and a **beam.** (7-3- )(2 marks)

b) Label which of the above is horizontal and which is vertical.

c) The difference between a column and a beam is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

FUNCTIONS of STRUCTURES

4) Below is a list of functions for a structure. Give a purpose for each structure. (7-3- )(2 marks)

contain, transport, separate, shelter, transport, communicate, break,

hold, support, lift, communicate, fasten

\_\_\_\_\_\_\_\_\_\_\_\_a) a shoe \_\_\_\_\_\_\_\_\_\_\_\_\_\_b) a motorboat

\_\_\_\_\_\_\_\_\_\_\_\_c) a pinata \_\_\_\_\_\_\_\_\_\_\_\_\_\_d) a cup

\_\_\_\_\_\_\_\_\_\_\_\_e) an empty can of beans \_\_\_\_\_\_\_\_\_\_\_\_\_\_f) a ladder

\_\_\_\_\_\_\_\_\_\_\_ f) a vase made out of pottery by a potter

\_\_\_\_\_\_\_\_\_\_\_\_ g) a Ferris wheel

JOINTS

5) Below is a list of joints. Write M if the joint is mobile. Write R if the joint is rigid.

(7-3- )(2 marks)

\_\_\_\_\_\_\_\_\_\_\_ a) elbow \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_b) hands of a clock

\_\_\_\_\_\_\_\_\_\_\_ c) the leg of a chair \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ c) the corner of a ladder

JOINING MATERIALS

6) Here is a list of joining materials. Write the appropriate word beside its description.

welding, interlocking shapes, fasteners, ties, adhesives,

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Carefully shaped parts hold themselves together
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Thread, string and rope hold shapes together
3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Metal pieces are melted and fused together

d) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Sticky substances are used to hold materials together

e) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Nails, screws and dowels

7) Give an example of

Composite material

Layered material

Woven or knit material

FORCES

8) What is a force? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What unit measures force? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What tool is used to measure force? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

9) Draw the force diagrams (arrows) for the following situations. Be sure to show the MAGNITUDE of the forces by drawing the arrows differently.

10) Choose the best word: deform, crack, collapse (fall)

Sideways forces on mass structures would make them \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Sideways forces on frame structures would make them \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Sideways force on shell structures would make them \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Which of the following is a **composite** material?

a) wool b) corrugated cardboard c) rebar re-enforced concrete

46)\_\_\_ A car’s windshield is made by sandwiching a piece of plastic film between two

layers of glass. What might be the advantage of this?

a) safety b) cost c) aesthetics