

## DESIGN AND MEASUREMENT

1. You decide to build a stand for your television, game console, and Blu-ray player based on the diagram below.

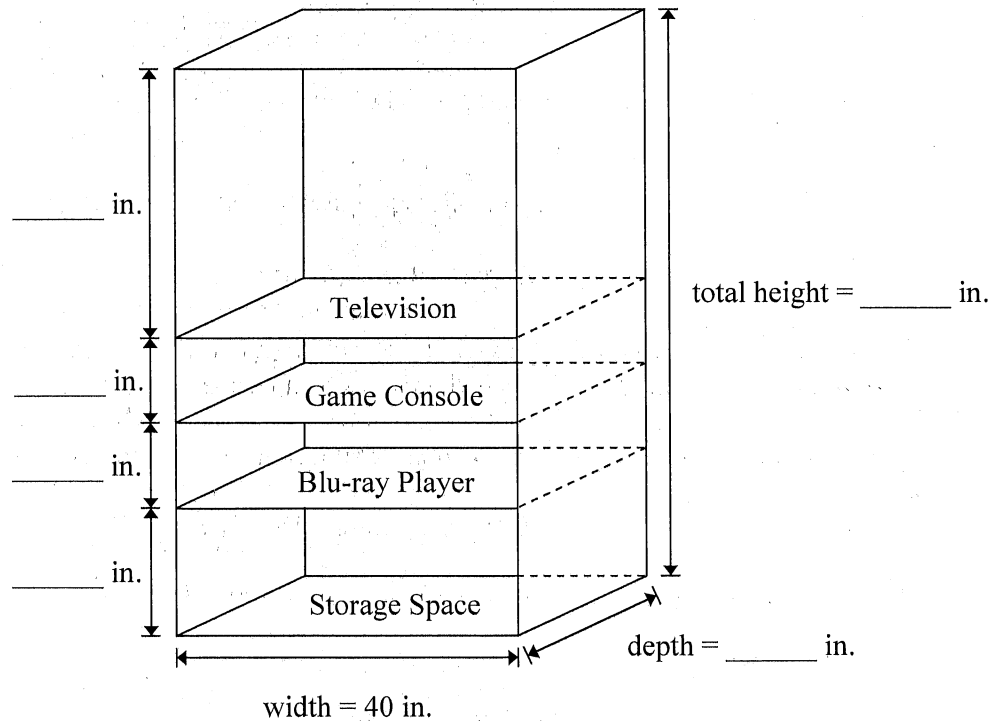
Total:  
10 marks

The stand must meet the following specifications:

- The total height of the stand must be at most 84 in.
- The width of the stand must be 40 in.
- For stability, the depth of the stand must be at least one-third of the total height.
- The top shelf must accommodate a television with a diagonal length of at least 50 in.
- The shelves for the game console and Blu-ray player must each be at least 8 in. high.
- The storage space at the bottom of the stand must be at least 12 in. high.

- a) Label the following diagram with your dimensions for the height of each shelf, the total height, and the depth.

(2 marks)



b) Based on the diagram in (a) and the following specifications, determine the minimum number of sheets of plywood needed to build your stand.

- The sides, top, bottom, and shelves of the stand must be built with  $\frac{3}{4}$  in. plywood.
- The back of the stand must be built with  $\frac{3}{8}$  in. plywood.
- Plywood is purchased in 48 in.  $\times$  96 in. sheets.
- Smaller pieces of plywood cannot be fastened together to make a larger piece.

Support your answer by including sketches with dimensions showing how you would cut the sheets of plywood.

*(3 marks)*

- c) You must apply two coats of paint to all the surfaces, not including the edges, before the stand is assembled. All the edges will be laminated. How many cans of paint will you need if each one-litre can covers 9000 square inches?

*(2 marks)*

d) Calculate the total cost to build the stand, including taxes.  
(GST = 5%, PST = 7%)

- One  $\frac{3}{4}$  in. sheet of plywood costs \$49.95.
- One  $\frac{3}{8}$  in. sheet of plywood costs \$29.95.
- A one-litre can of paint costs \$14.95.
- The laminated edging costs \$19.95.

All materials must be purchased in whole units.

*(2 marks)*

e) A Blu-ray case has a volume of 20 cubic inches. Determine the maximum number of cases that could be kept in the storage space of your stand.

*(1 mark)*