

AMALTHEA'18 - IIT GANDHINAGAR

TECHARTS

DATE - 20/10/2018

TOTAL DURATION - 1HR 30 MIN

TEAM NAME - _____

MEMBER 1 NAME - _____ CONTACT NO. - _____

MEMBER 2 NAME - _____ CONTACT NO. - _____

RULES AND REGULATIONS –

1. THE PAPER IS A TOTAL OF 200 POINTS.
2. SECTION A CONTAINS EASY AND MEDIUM PROBLEMS.
3. SECTION B CONTAINS SPECIAL QUESTION. IN CASE OF SAME SCORES, TEAM WHICH SOLVES MAXIMUM QUESTION OF SECTION B WILL BE GIVEN HIGHER RANK.
4. NO MOBILE PHONES, CALCULATORS OR OTHER ELECTRONIC GOODS ARE ALLOWED.
5. ANY SUCH UNETHICAL PRACTICES WILL LEAD TO DISQUALIFICATION OF THE TEAM.
6. NO QUERIES REGARDING CORRECTNESS OF THE QUESTIONS WILL BE ENTERTAINED.

SELECTION CRITERIA AND RESULTS

1. TOP 6 TEAMS WILL QUALIFY FOR ROUND 2.
2. IF TWO TEAMS SCORES SAME POINTS TEAM WHICH SOLVES QUESTIONS OF SECTION B WILL BE GIVEN HIGHER RANK.
3. QUALIFYING STUDENTS WILL BE INFORMED THROUGH PHONES.

TOTAL SCORE - _____

SECTION A

1. **Count the votes**

(Easy – 5 points)

Here is a simple but pretty interesting problem.

In recent elections a total of 5219 votes were cast for four candidates. The winner exceeds his opponent by 22, 30, and 73 votes, yet it is not known how to figure the exact number of votes received by each.

Tell the number of votes received by each candidate.

Answer:

a) _____

b) _____

c) _____

d) _____

2. **Heclai's Path**

(Easy – 10 points)

This Puzzle is designed to show the erratic path of the comet Heclai, which starts from the Dark black star, destroys the entire constellation of sixty-two other stars, and ends by exploding the large hexagonal star. Start at the dark black star, and then draw the **fewest** number of connected straight lines that will pass through each star and end on the big white star.

(Draw the pattern on the paper itself)



(If you complete the path in less than or equal to 15 steps you receive 15 points else you get 5 points if you complete it in more than 15 steps. And in all other cases you receive 0 points.)

3. Strobogrammatic number

(Easy – 15 points)

A Strobogrammatic number is a number whose numeral has rotational symmetry, that is, it appears the same when rotated 180 degrees.

Examples include 1, 8, 69, 101, etc.

Numbers are **(1, 2, 3, 4, 5, 6, 7, 8, 9, and 0)**

What is the sum of first 6 prime Strobogrammatic numbers?

ANSWER: _____

4. Word Bowling

(Easy – 10 points)

Mr. Stark is trying to figure out how he can knock over one bowling pin at a time and always leave pins standing that will spell a word. He has just knocked down the second T and the remaining letters spell STARLING, which is the name of a bird. How can he bowl over a pin at a time leaves a familiar word, until only one pin that makes a word all by itself is left.

(Every word formed must have some meaning starting from left to right while reading.)



Answers -

- a) STARTLING
- b) STARLING

- c) _____
- d) _____
- e) _____
- f) _____
- g) _____
- h) _____

- i) I

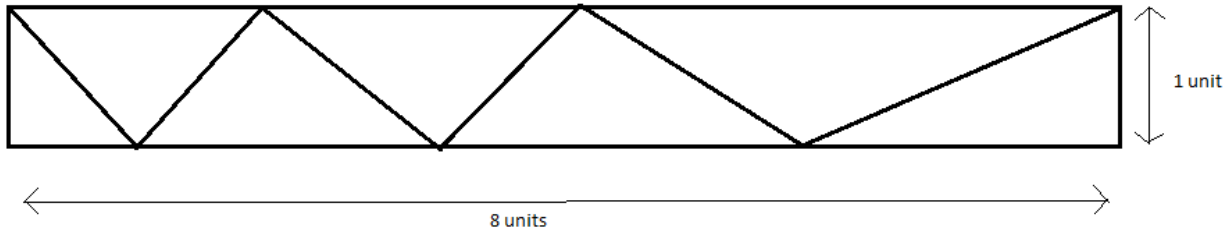
Note - Any incorrect answer will lead to 0 points.

5. **Zig-Zak**

(Medium – 15 points)

Six straight, zigzagging lines are drawn inside an 8x1 unit's rectangle. The drawing starts at the top left vertex and ends at the top right vertex.

What is the maximum possible sum of lengths of these 6 segments?



ANSWER: _____

Rough Work –

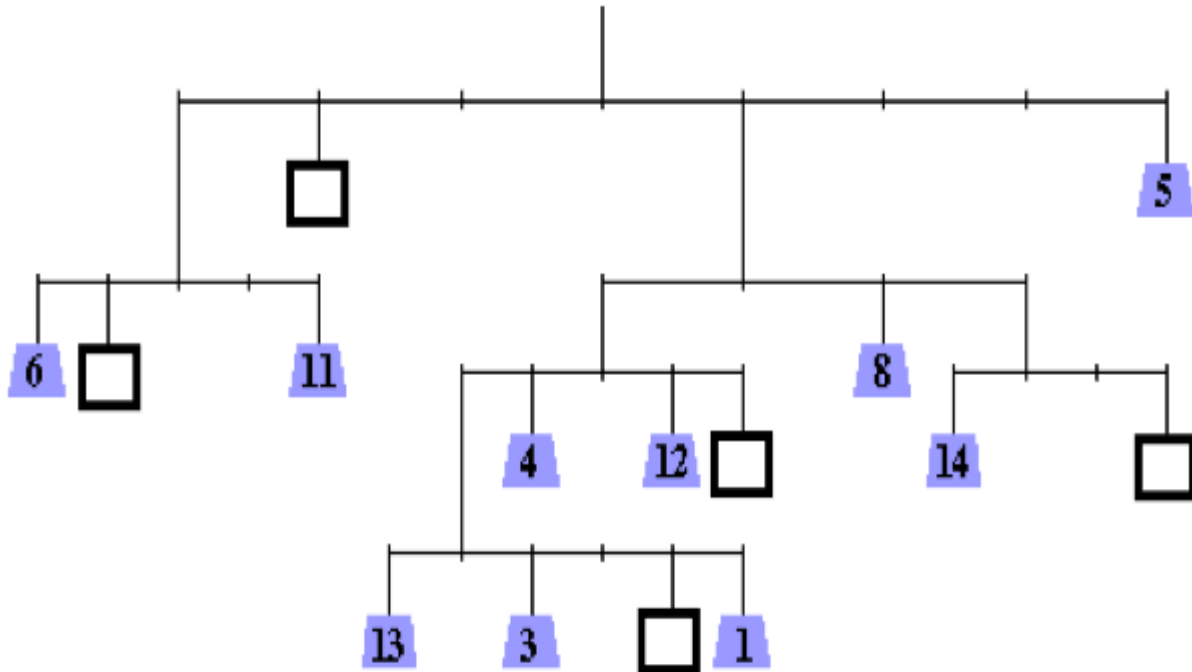
6. Way Back Machine

(Medium – 15 points)

The given machine should be in equilibrium (Rotational, Translational) by putting some mass in the empty weighing plates.

Fill in the empty block with masses such that it is in equilibrium.

Note – Any wrong answer will to 0 points.

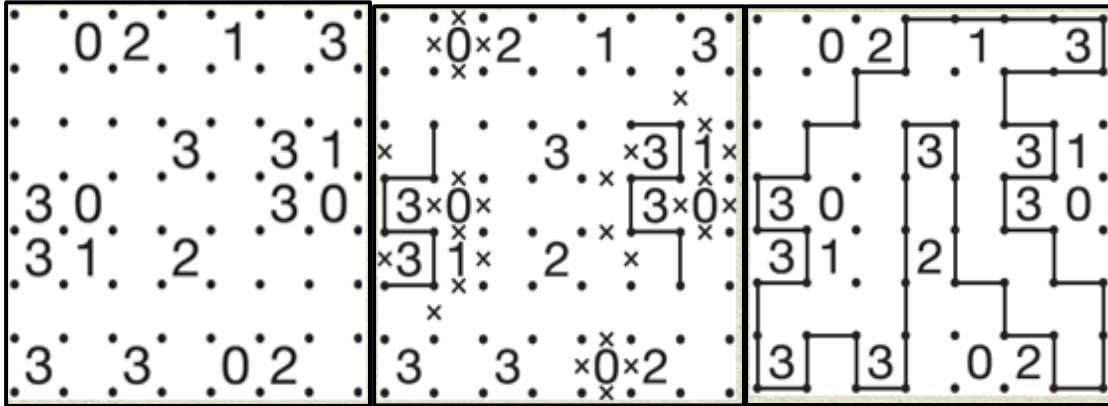


Rough Work -

SECTION B

1. Slithelink

(Medium- 30 points)



Sample

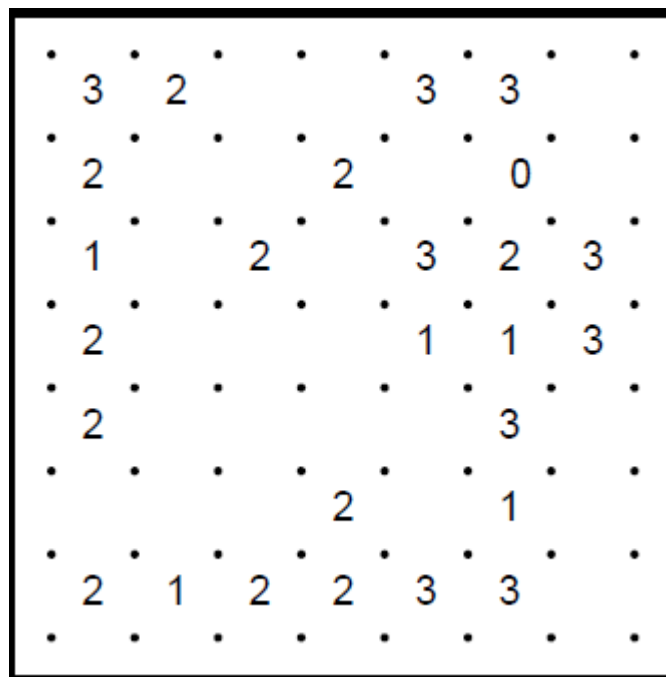
Progressing

Solution

Rules –

- Connect adjacent dots with vertical or horizontal lines to make a single loop.
- The number indicate how many lines surrounds it, while empty cells may be surrounded by any number of lines.
- The loop never crosses itself and never branches off.

Using above rules and example solve this question and form a loop.

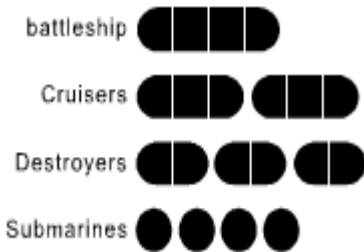
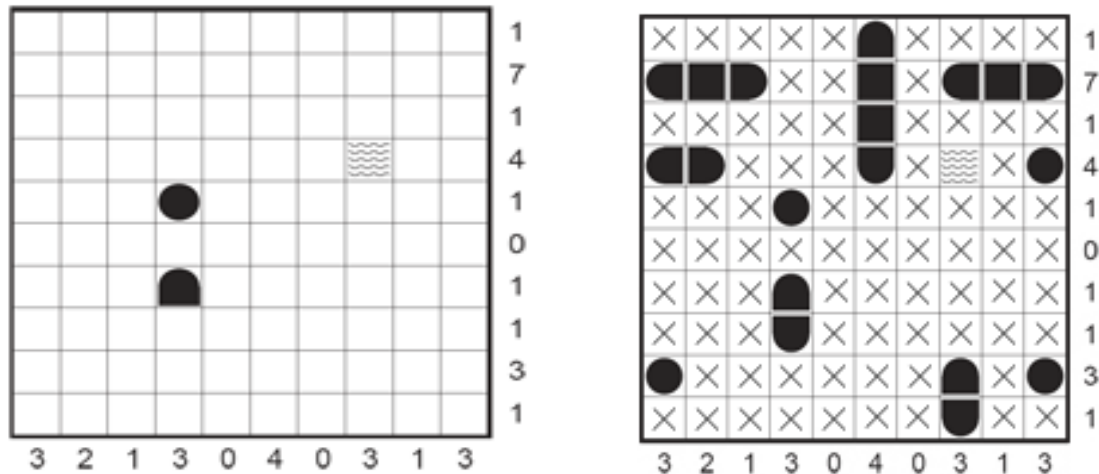


2. BATTLESHIP

(Hard- 40 points)

Rules or instructions to solve -

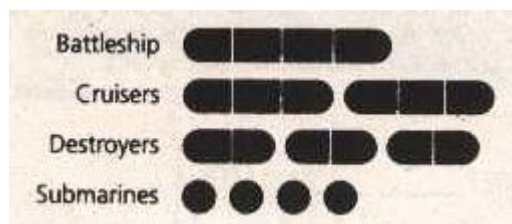
Each Battleship puzzle represents an ocean with a hidden fleet of ships, which may be oriented horizontally or vertically within the grid such that no ship touches another, not even diagonally. The numbers on the right and on the bottom of the grid show how many squares in the corresponding row and columns are occupied by ship segments. Occasionally some squares may contain given ship or water segments to start the puzzle. The object is to discover where all ships are located.

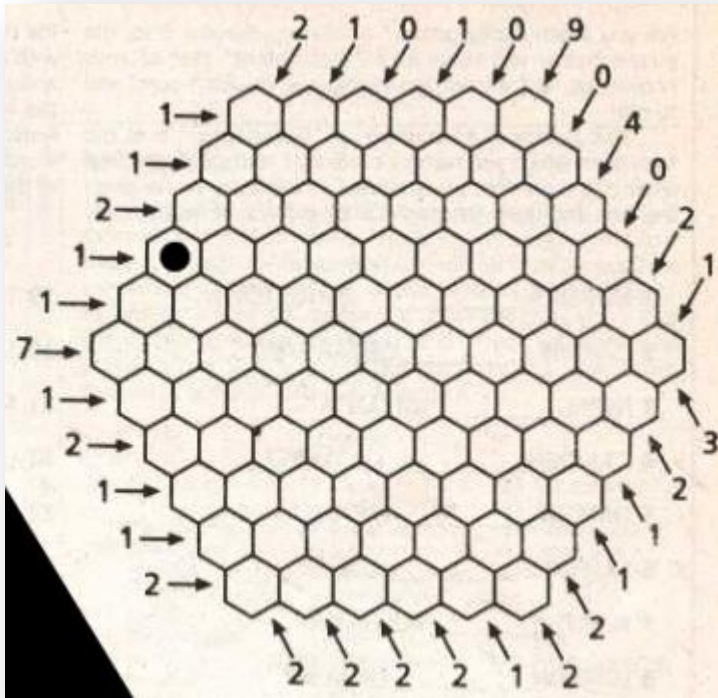


Submarines consists of a single round segment, destroyers have two end segments , cruisers have two end segments and a middle segment, and the battleship is constructed of two end segments and two middle segments. Any remaining square in the grid contains water, which is shown as a symbol of water or as an 'X'.

Solve the given Hexagonal Battleship puzzle on next page.

Fill them –





Rough Work -

