

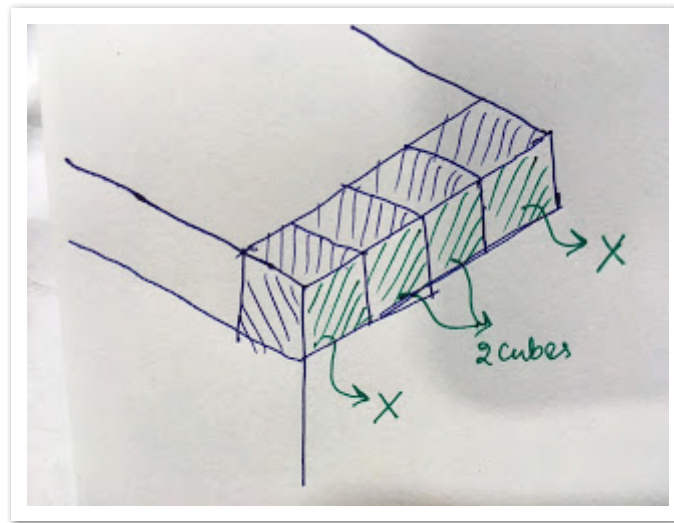
Answers for UCEED 2017 PART-A

1) 12

Out of the all 6 surfaces of the given cube, it is given that three surfaces are green while the rest three are orange.

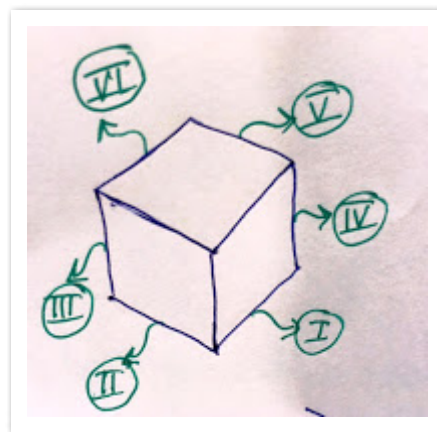
We are interested in finding the edges which have contact with one orange and one green surfaces,

The following image shows for one corner (top). As shown, although it has four small cubes at the top, the two edge cubes on either side will have two surfaces having a single color and another surface having another color, so they shouldn't be counted. So, for one edge, we have 2 cubes.



Now, the trick is to count the no. of such corners possible. Below figure shows all possible corners that lead to the required. All the invisible surfaces in the below image are green color.

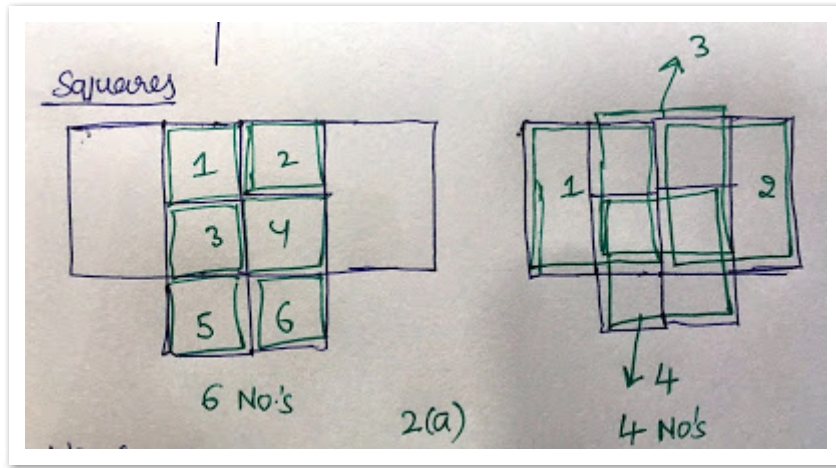
As can be seen, we have 6 edges, thus counting to $6 \times 2 = 12$ cubes



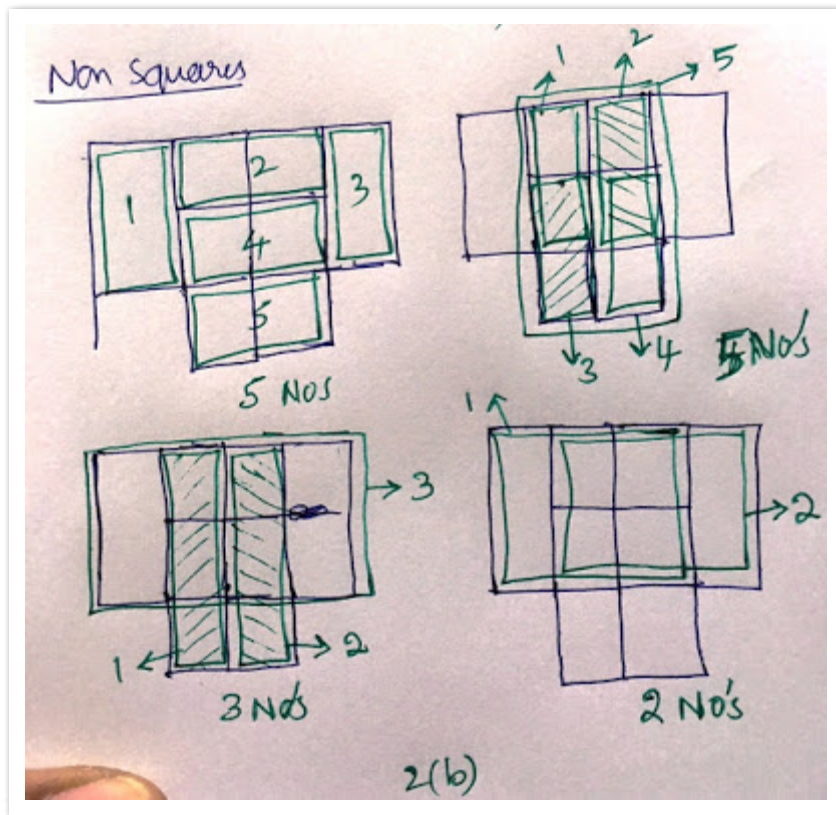
2) 25

Below figure shows the reflected image. The problem can be split to counting of no. of squares and the no. of non-squares (but rectangles).

Below two images gives the situation of no. of squares, which will count to $6 + 4 = 10$



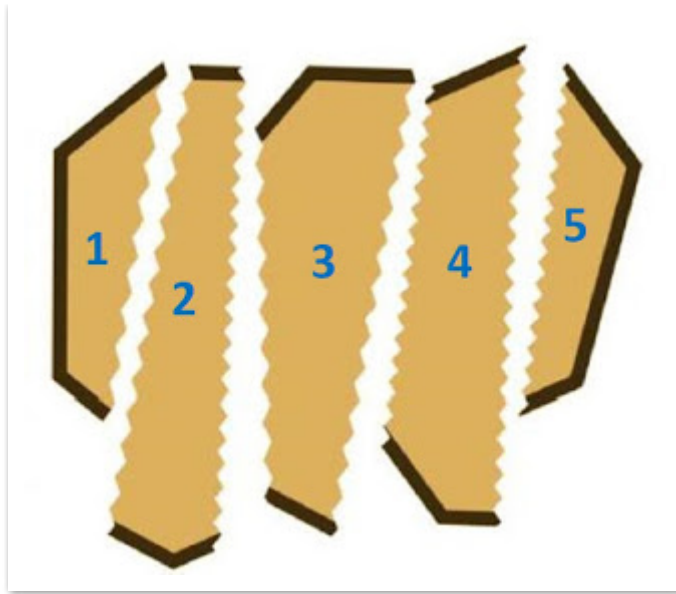
Below four images shows no. of non rectangles which will count to $5 + 5 + 3 + 2 = 15$



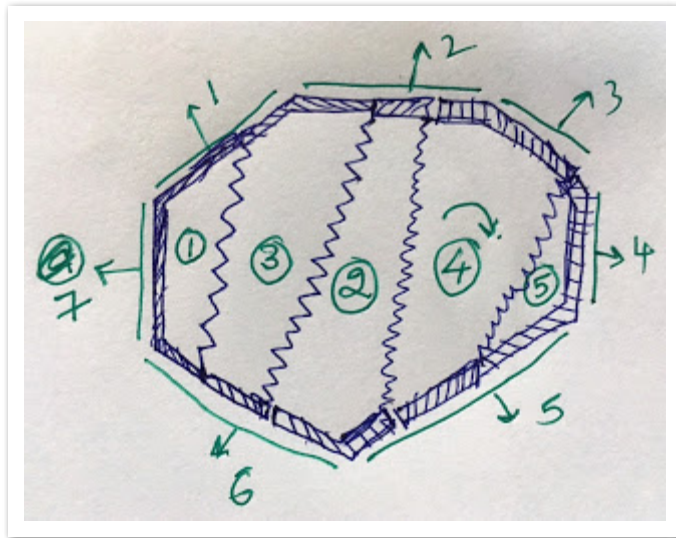
Total = $10 + 15 = 25$

3) 7

In the below figure, I've numbered each parts from 1 to 5.

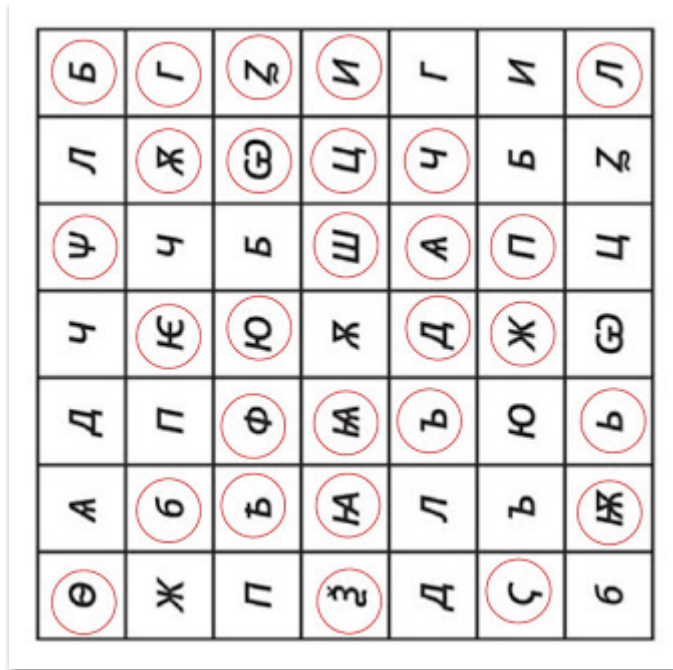


In the below image, I've arranged them (based on by matching the zig zag tooth of each part, starting from part 1). If you observe zig zag teeth for part 1, has 9 depressions and a close observation of part 3, reveals that that too has 9 projections on its left side. Like wise matching each part, I ended up in the below image, now count the no. of outer surfaces.



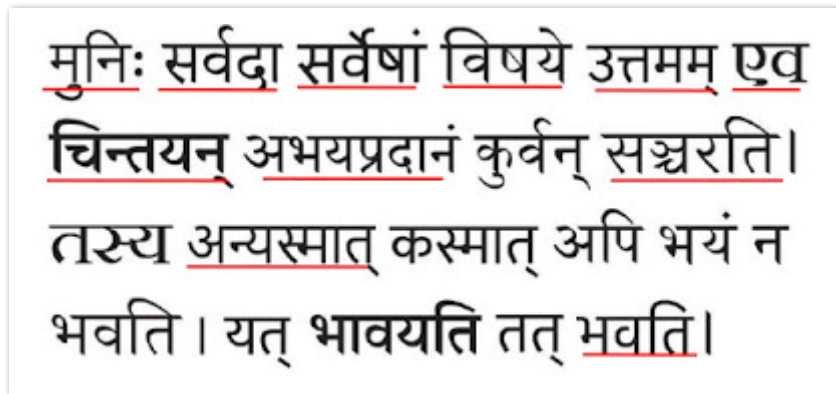
4) 28

Below image highlights the possible different symbols



5) 11

In the below image, I've underlined the different identified fonts



6) 7669

if we see the difference of the purchase, it will look something like below

(301-151)=150
(601-301)=300
(1201-601)=600
(2401-1201)=1200
(4801-2401) = 2400

so, the increase in purchase range in each step is
150, 300 (150*2), 600 (300*2), 1200 (600*2), 2400 (1200*2),

They are in GP.

150, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400,

So, our required purchase amount false in 9th step, because at every step, max is double the difference, for example for the first step, max ~300 which is 150*2

checking the discount,

$19 = 30 - 11$
 $49 = 60 - 11,$
 $109 = 120 - 11,$
 $229 = 240 - 11,$
 $469 = 480 - 11,$
 the next five terms will be
 $480 * 2 - 11$
 $960 * 2 - 11$
 $1920 * 2 - 11$
 $3840 * 2 - 11 = 7669$

7) 1.5

considering,
 one parrot as x
 one fish as y
 one elephant as z

then as per the given equation

$$x + 2y = 4z \quad (1)$$

$$2x + z = y + x \quad (2)$$

we need

$$z = k * x$$

where k is the number of parrots, so we need to eliminate y as far as possible

from (2)

$$2x - x + z = y$$

$$x + z = y \quad (3)$$

putting (3) in (1) instead of y

$$x + 2 * (x + z) = 4z$$

$$3x = 4z - 2z$$

$$3x = 2z$$

$$z = \frac{3}{2} * x = 1.5 * x$$

EEK :D,

that's one and half parrot!

one parrot and half more parrot! I can't see the second parrot being halved, Hopefully, next time UCEED examiners won't be this cruel :D (just kidding)

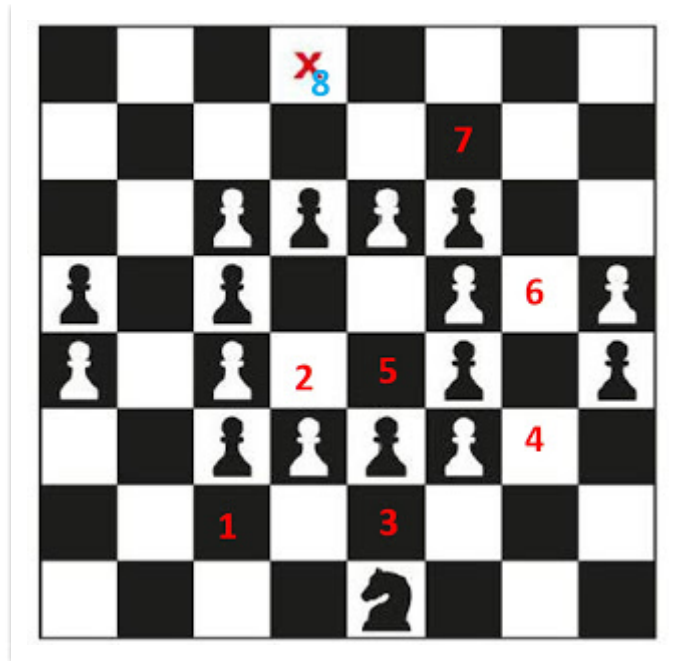
8) 11

Following are the alphabets that can be flipped on horizontal axis

B, C, D, E, H, I, K, M, O, W, X

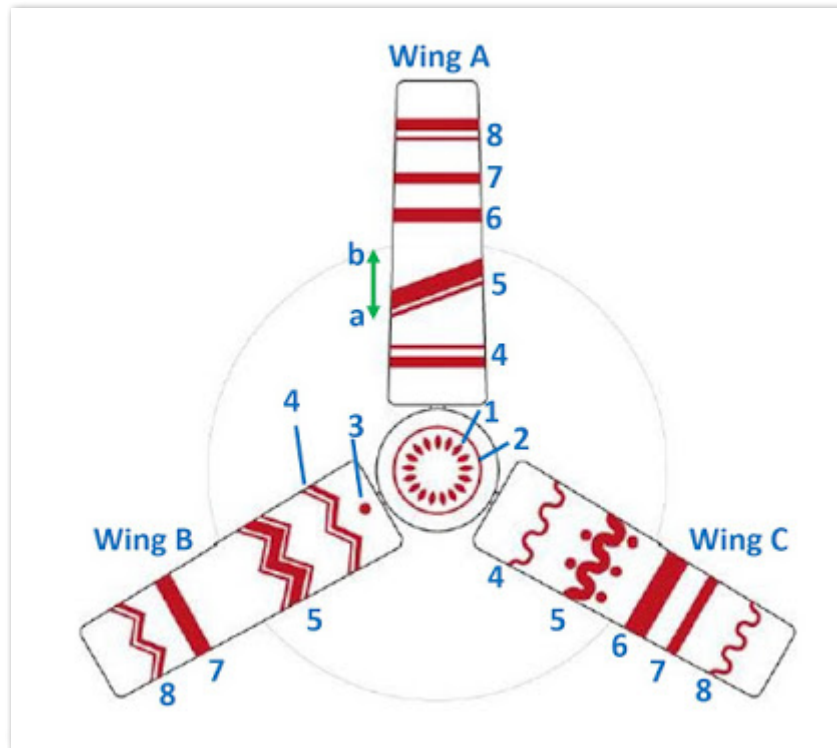
9) 8

I've numbered the steps to be taken by knight which is possible the least no.



10) 8

Below picture shows the numbering that I followed.



Note that although there are several lines on each fan wing, but when the fan rotates, all the patterns appear to be following a circular line. For example, consider the pattern 5 in wing C, as you can see, it has a wave with several dots on the top and bottom of the pattern. No doubt, if they are rotated, they will result in three circular lines. But, observe the pattern 5 in wing A. The pattern is slanted from a to b. So if the wing is rotated, then that will look like a single circle of thickness ab . This thickness (ab) covers the gaps of between the three circles formed by the rotation of pattern 5 of wing C, and so the result will be only one circle. This also covers the pattern 5 in wing B. Similarly you can find the mixing and non mixing of other patterns too.

11) 17

The letters that can be visualized from figure A are

B, C, D, E, F, G, H, L, P

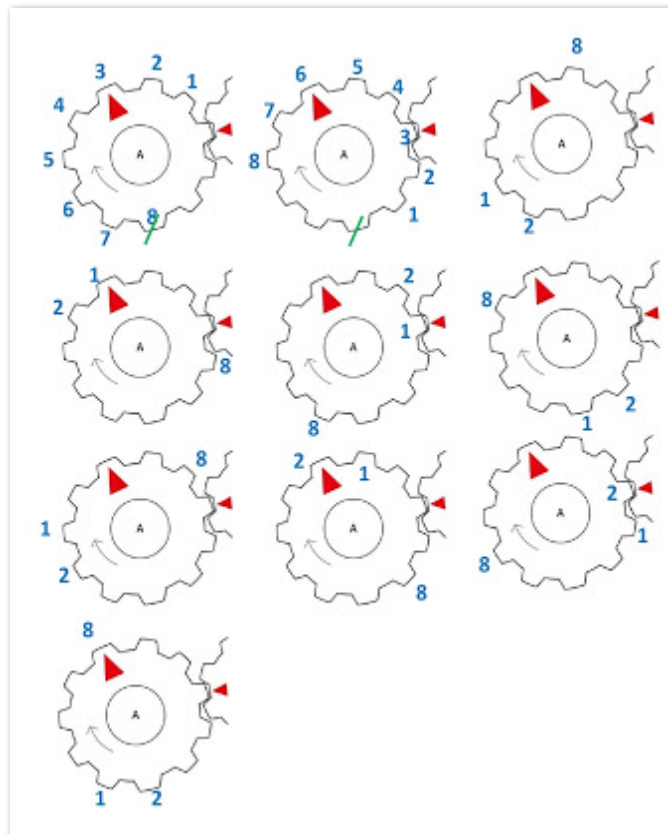
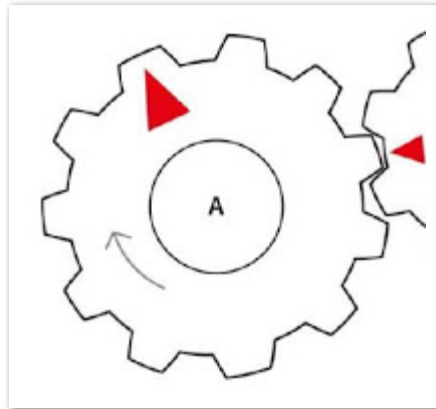
So, all together, we can visualize 9

So, no. of alphabets that cannot be overlapped to fit within figure figure1 is $26-9=17$

12) 10

No. of gears on A = 11
 No. of gears on B = 8

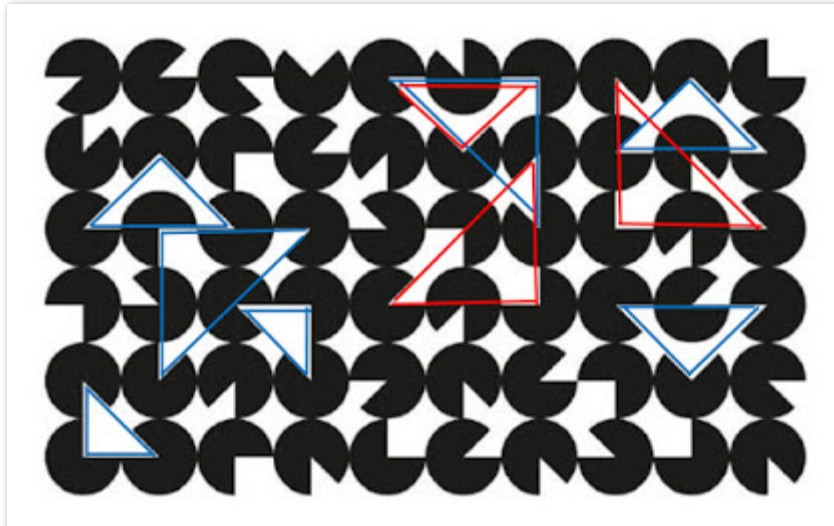
Since second gear has 8 no. of tooth and considering the complete 8 no. of gear movement as 1 turn, we mark on A whenever 8 gears are counted just like in the first image of the below image. Since gear A turns clockwise, we need to count the gears in the counter clockwise direction, which is the direction in which gear B mesh with A. Note the location of the 8th gear teeth. In the next turn start from the next teeth of the marked gear (as shown in the second image) and count again 8 gears. Repeat this until the 8th gear is on the red mark on A.



Note: I just showed images for easy understanding, not to scare you :P You can use ur pen or pencil or even your finger to count in counter clockwise and keep counting each 8 gears as 1 turn. Repeat counting mentally until the red mark is reached.

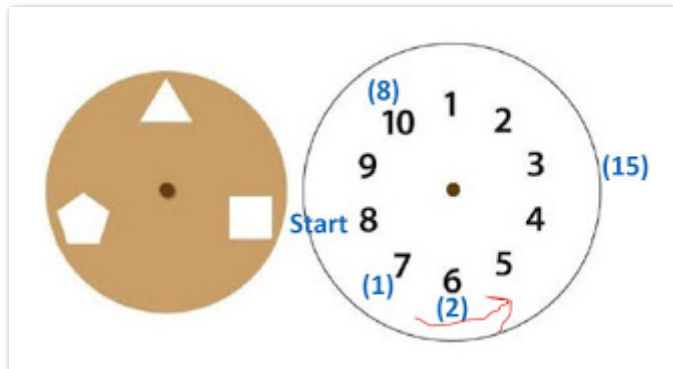
13) 10

below image shows the triangles marked in colors, just to differentiate from each other. I wish the question could have been much clear anyway :P



14) 3

Given, at each second, the numbered disc rotates two numbers in anti-clockwise direction while the cut-out disc rotates 1 no. in clockwise. So, relatively, for every sec, the numbered disc moves $2+1 = 3$ no.s, assuming that the cut-out disc is held stationary.



So, after 5 secs, the no. should have been moved $3*5 = 15$ times in anti clockwise direction. So, taking no. 8 as the start/refernce, move anticlockwise 15 times which will give the required no. which will appear in the pentagon after 5 secs.

15) 0.715

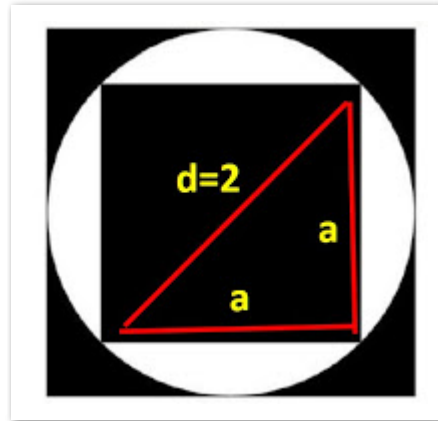
First, find the area of the black area, then find how much area it is occupying with respect to the total area, that ratio will give us the probability

Total area = $2*2 = 4$

Area of the white circle without black square in the center
 = $(\pi/4)*\text{square_root}(\text{dia})$

$$= (3.14/4)*4 = 3.14$$

to find the side of the inside square, note that one of the hypotenuses of the triangle is itself the diameter of the circle as shown in the below image. saying the side of the square as a and using the pythagorean theorem



$$\text{square}(a) + \text{square}(a) = \text{square}(d) = 4$$

$$2*\text{square}(a) = 4$$

$$\text{square}(a) = 2$$

$$a = \text{square_root}(2)$$

$$\text{So, area of the inner square} = a*a = \text{square_root}(a)*\text{square_root}(a) = 2$$

$$\text{So, finally, area of the black part} = \text{total area} - \text{area of circle} + \text{area of inner square} = 4 - 3.14 + 2 = 2.86$$

$$\text{The required probability is} = \text{area of black divided by total area} = 2.86/4 = 0.715$$

16) 0.625

Total no. of summing combinations possible are $4*4 = 16$

Total no. of combinations for the sum is

considering only 5 in the first circle and matching with all the four no's in the second circle

(5,2), (5,3), (5,4), (5,5)

doing the same for the other three no's 2,3 and 4, we get the combinations

(2,2), (2,3), (2,4), (2,5), (3,2), (3,3), (3,4), (3,5), (4,2), (4,3), (4,4), (4,5)

out of all the combinations, the combinations which add up to 7 or more are

(5,2), (5,3), (5,4), (5,5)

(4,3), (4,4), (4,5)

(3,4), (3,5)

(2,5)

$$\text{which are } 4+3+2+1 = 10$$

$$\text{So, the probability is } 10/16 = 5/8 = 0.625$$

17) 36

no. of surfaces from left = 7

no. of surfaces from front = 7

no. of surfaces from right = 5

no. of surfaces from back = 5

no. of surfaces from top = 7
no. of surfaces from bottom = 5

For a clear understanding of [how to count - check this link](#)

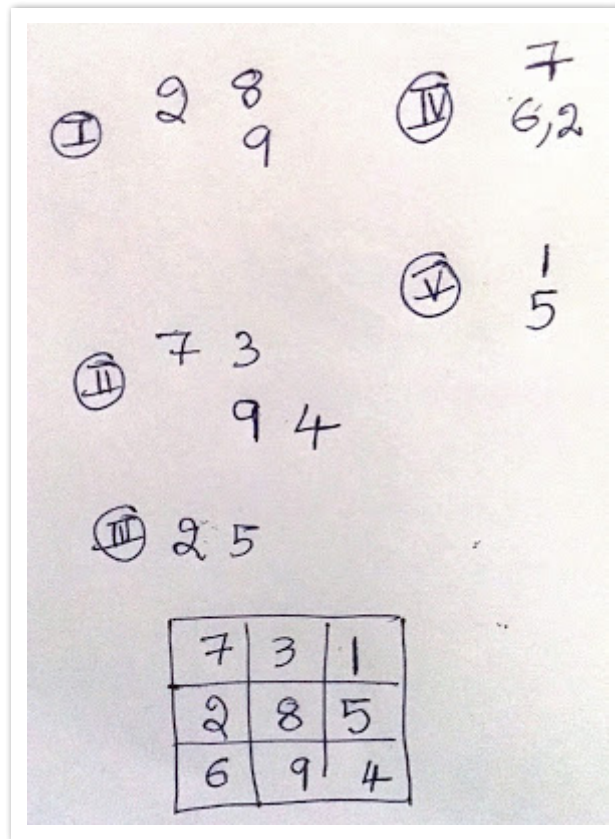
18) 55

Since, they reach their home 10 mins early, it means the time saved by her husband to travel the distance (equal to the distance walked by her) to and fro, should be 10 mins,

So, the one way travel time for her husband is 5 mins, but she started 1 hour ago to reach the spot. So, time taken by her = 60 min - 5 mins = 55 mins

19) 15

Below image shows the rules given by 1,2,3,4,5 and the below table shows the possible arrangement.



20) 10

AB is equal to the radius of the sphere which is 10m

21) A, C

22) B, C, D

The following are non effective considering rural illiterate scenario

I, II, VII

23) B, D

24) C, D

25) B, D

26) A, B

27) A, B, C, D



28) A, B, D

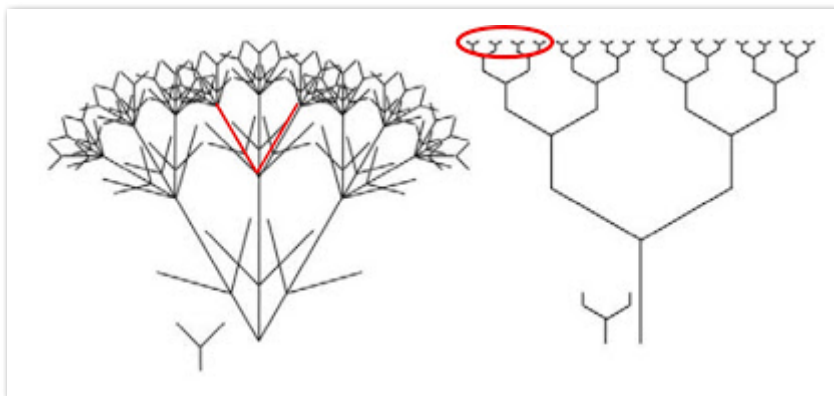
By careful observation

29) A, B, C, D

All the patterns in the option can be used.

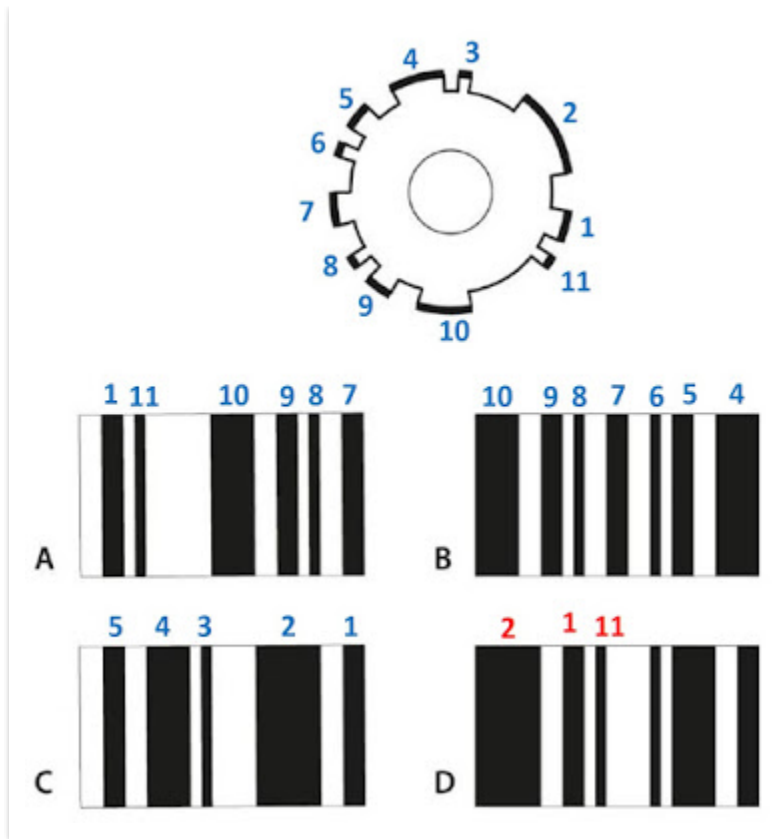
30) C, D

Below figure shows the impossible options



31) A, B, C

Below image shows the explanation with numbers marked, only D doesn't follow a pattern.



32) B, C

33) A, C, D

34) A, B

35) A, C, D

36) A,C,D

Except for B, all the remaining parts are needed.

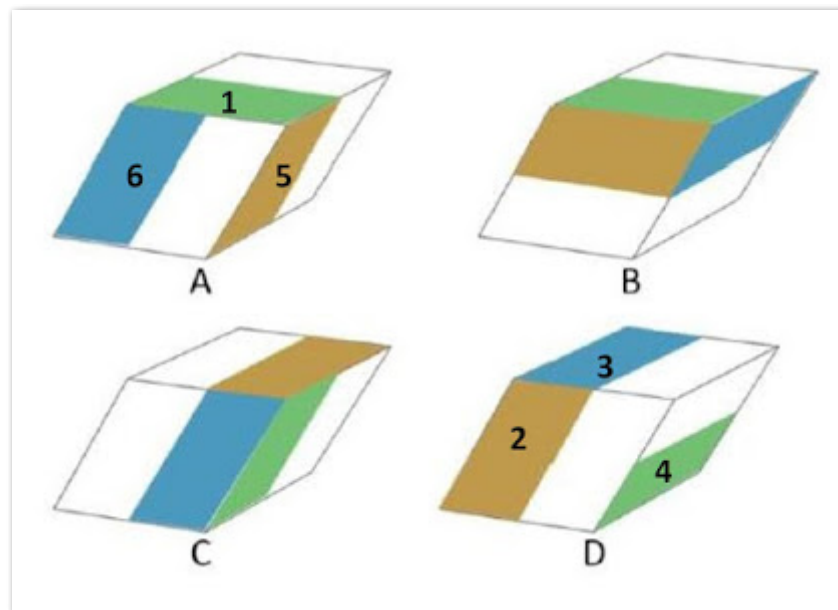
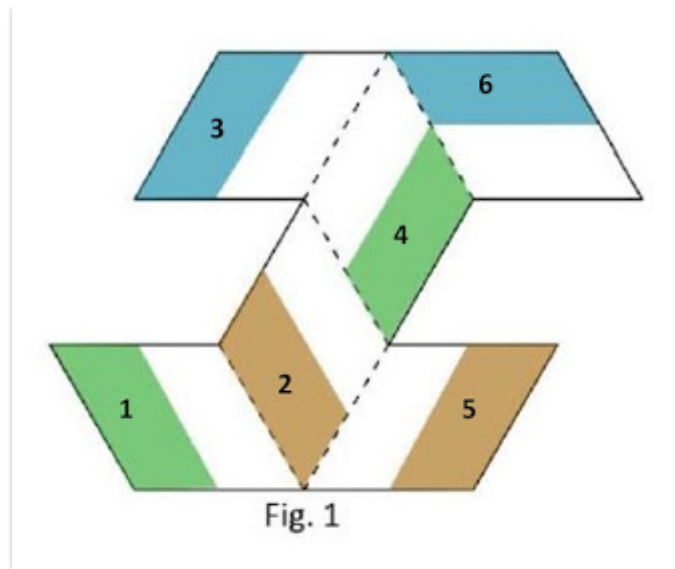
37) B, C, D

The + and - should be aligned in the same direction if there are multiple batteries and they are connected in parallel. So, clearly circuit S will not glow.

Batteries in series (one next to another) as shown in Q, will provide double the energy and so they should glow more, Unlike in parallel batteries which provide only half the energy each. So, R is same as P since parallel battery of 2 no's equivalent to one batter as in P.

38) A, D

Numbering the different colors as shown in the below image.

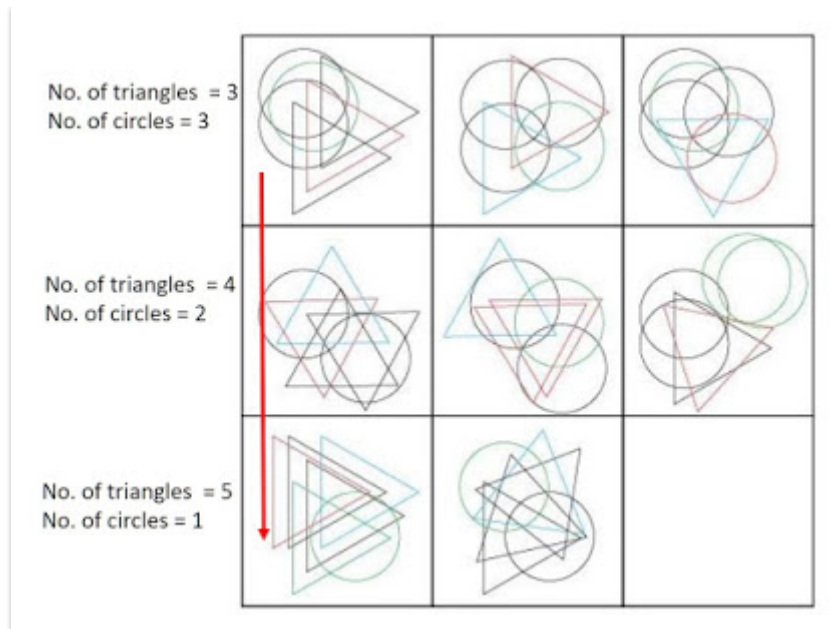


I've marked the arrangement which is possible. They are obtained by folding the given unfolded shape into the paper, rather than folding up.

39) B, D

It's obvious since they said that when the force was removed, it gets back to its usual position which will happen only when there is some springing action. A and B, doesn't provide spring support, while B is similar to safety pin design and D is obviously a springer model, both of which obviously provide the return action.

40) A, C



As you can observe in each column, the no. of circles in each box decreases by 1 from top box to the bottom box and the no. of triangles increases by 1 no. in each box. Below image shows the explanation for the first column (three boxes), likewise if we do the same thing for the last column, we note that the top box has 5 circles, and 1 triangle and the bottom box (on the same column) has $(5-1)=4$ circles and $(1+1)=2$ triangles

So, the final box should have
 $4-1=3$ circles and
 $2+1=3$ triangles

41) C, D

42) A, C

Exposure is same in all the three cases and the first thing varying is the focus. Image from moving camera should have equal effect on all the parts of the given photo, while aperture size will have effect on parts of the given image.

43) A, C, D

44) B, C
 Both suits the purpose.

45) A, C
 Not sure, I just googled it

46) D

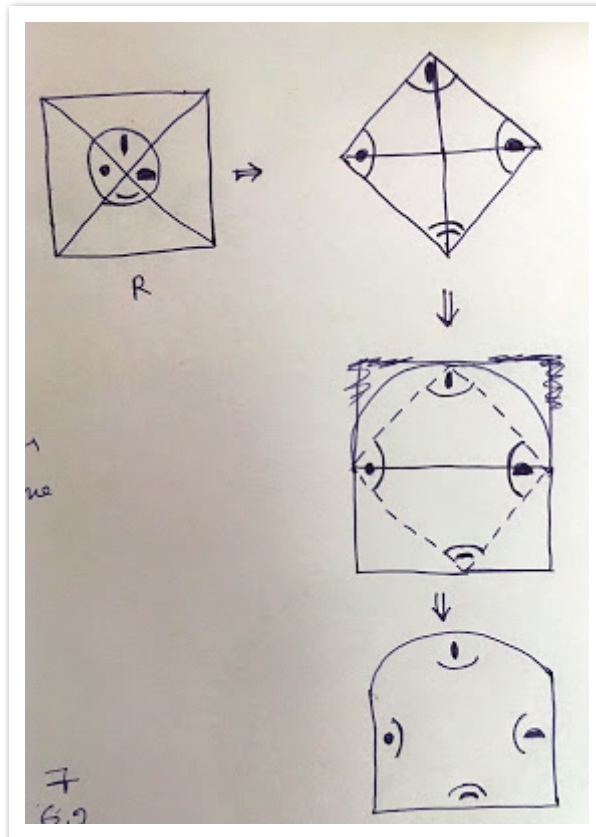
47) A

48) A

Clearly, the emoji move left to right such that its tongue is out alternatives. So, the emoji in the ques mark should have tongue out. And the two kind of emojis (with tongue out, alternates in each row.

49) B

Just unfold R, in the reverse direction, marking all the patterns as shown in the below image



50) D

Definitely, S should come next to P, because by matching the top circular white space in both. Only option B and D have that. Matching P, left side and R right surface, it gives a correct match.

51) C

Observe the bike, alternates in direction everytime - left and right. So it should be left. The pencil increase in size in every step. Sandals pair move in anti clockwise direction, slightly more than 90 degrees in each step. Clock color, changes according to elementary color pattern, orange-yellow-green-blue

52) A

Clearly, the alphabet no, is equal to the no. of sides of the given shape. Like the first triangle has 3 sides and the alphabet C, appears in 3rd number in the alphabets list. Similarly F = 6, H=8, and the fourth pattern has two shapes, one 8 sided and one four sided, so HD, Last pattern has only one shape which has 8 sides, and so It should be H again.

53) B

The logic for this is involved. But, let me put this way.

observing the clocks, we see that the second and clock has remained in the same position as firsts. So, it is either making 0 progress or 12 hrs advancing.

the third clock shows 3'O clock which mean it has advanced 6 hrs from the second clock. And the fifth clock shows 4.5 hrs

So, putting them as series, we see

12, 6, ?, 1.5

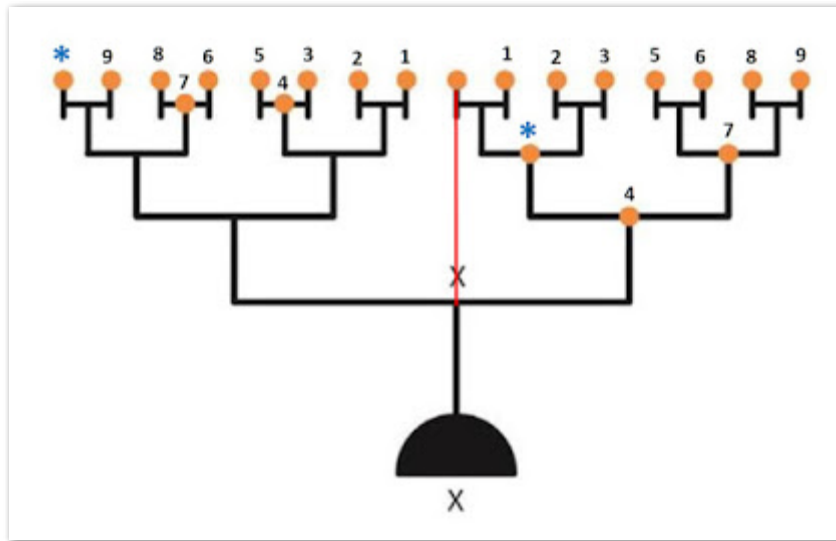
6 can be looked as $12/2$

similarly when we look ? as $6/2 (=3)$, then we see that $?/2$ which is $3/2 = 1.5$, which agrees with the last clock. SO ? should be three hours from the previous position

previous clock (third clock) is 3'O clock so, the answer should be $3+3 = 6$ 'O clock

54) B

In the below image, I've marked some numbers, a line and stars. The red line denotes the center of rotation. Each orange dots to the right of the center red line X-X when rotated 180 degrees anti clockwise in the top view, will form semi circles on the top.



Similarly, each orange dots lying on the left of the center red line X-X when rotated 180 degrees anti clockwise in the top view, will form semi circles on the bottom.

Also the numbers dots will hence form a circle, like marked in the image, number 1 on the right of X-X axis will form a semi circle on the top, while number 1 on the left of X-X axis will form a semi circle on the bottom, both together will form a circle. All the numbered dots will hence form circles, only the blue star on the right side of X-X, will make a semi circle on the top, while the blue star on the left side of X-X will make the outer semi circle on the bottom as shown in option B

55) A

A fits figure 1, when A is made upside down and matched with figure 1.

56) B

Here, I'm trying to give a detailed explanation for your easy understanding.

- Let
- mass of cuboid = x
- mass of sphere = y
- mass of cube = z
- mass of cone = p

Given,

$$x+y = z+p \quad (1)$$

$$x = y+p \quad (2)$$

$$y = 2 \quad (3)$$

using (3) in (2)

$$x = 2+p$$

$$p = x-2 \quad (4)$$

using (4) and (3) in (1)

$$x+2 = z+x-2$$

which gives

$$z = 4$$

also given that

2kg mass is equivalent to 62.5 cubic cm of volume,

so, $z=4$ kg mass is equivalent to $62.5 \times 2 = 125$ cubic cm

Now, the size of the cube can be obtained by equalling the volume of cube to 125

$$a \cdot a \cdot a = 125$$

$$a = 5,$$

also given that length of the cube doubles when exposed to air.

So, now the size of the cue is $10 \times 10 \times 10$

Let K no. of cubes are required

volume of the tank = $K \cdot$ volume of each cube

$$50 \cdot 50 \cdot 50 = K \cdot 10 \cdot 10 \cdot 10$$

so,

$$5 \cdot 5 \cdot 5 = k$$

$$k = 125$$

57) A

Right side view says that there's the white strip to the left of the top view,

Left side view says that there is no white strip on the top portion of the left side view and so in the top view also, there shouldn't be any white strip to its left.

Similarly, front side view shows that there's the white strip in The mid of the top and so in the top view, the bottom part of it should show the strip

58) B

Blue strip in all the strips are in contact with 3 other color strips except in B which has only 2 contacts.

Similarly violet color in the given pattern are in contact with three other colored pattern, except in B which shows 4 contacts.

So, B should be odd.

59) B

Based on the size of the red counter, and noting the curves of 'b' in the questions, P in option B seems more reasonable.

60) D

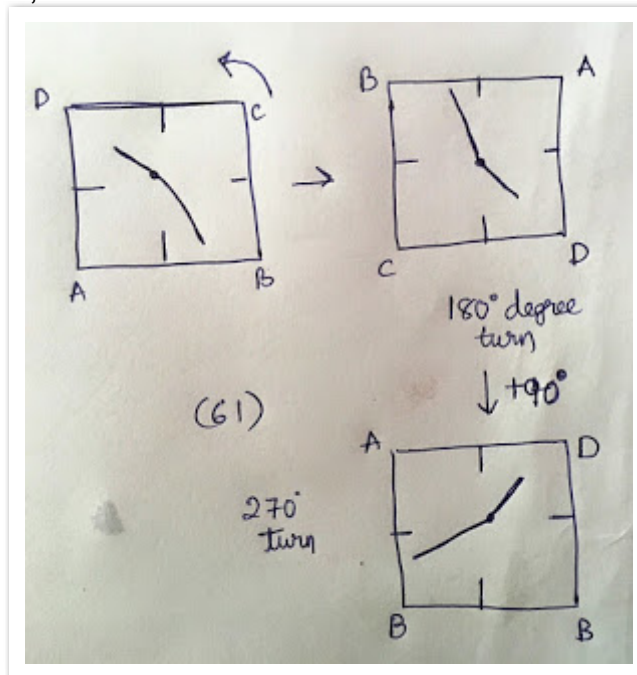
By observation

61) D

Current time in the question is 1.40

adding 8.45, we have 10.25, which will look like as shown below.

It, when rotated 270 degree, will like the one shown below



62) B

given 10% is one lakh in 2001,

so, 100% is ten lakhs in 2001

Population in 2011 is 10% increased. So, the total population is 11 lakhs.

Percentage of public vehicles = $(5 \text{ lakhs} / 11 \text{ lakhs}) * 100 = 45-46\%$

So, the percentage of private vehicles = $(2 \text{ lakhs} / 11 \text{ lakhs}) * 100 = 18\%$

63) C

64) B

65) A

i. If we rotate the pattern 18 degree, we will get the pattern as shown in option A

ii. If we flip horizontally, then the pattern will look like B

iii. If we rotate the pattern in ii by 180 degrees, we will get a pattern as shown in D

iv. If we flip the pattern in iii, we get pattern shown in A

66) C

Q rotates anti clockwise, R rotates clockwise, S rotates counter clockwise, T rotates clockwise and U rotates counter-clockwise.

67) D

68) A

69) B

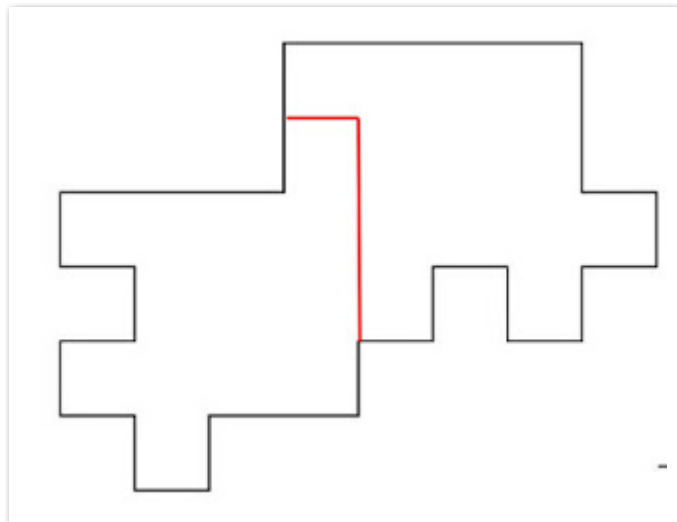
70) C

71) D

72) C

73) B

Below image shows the partition



74) C

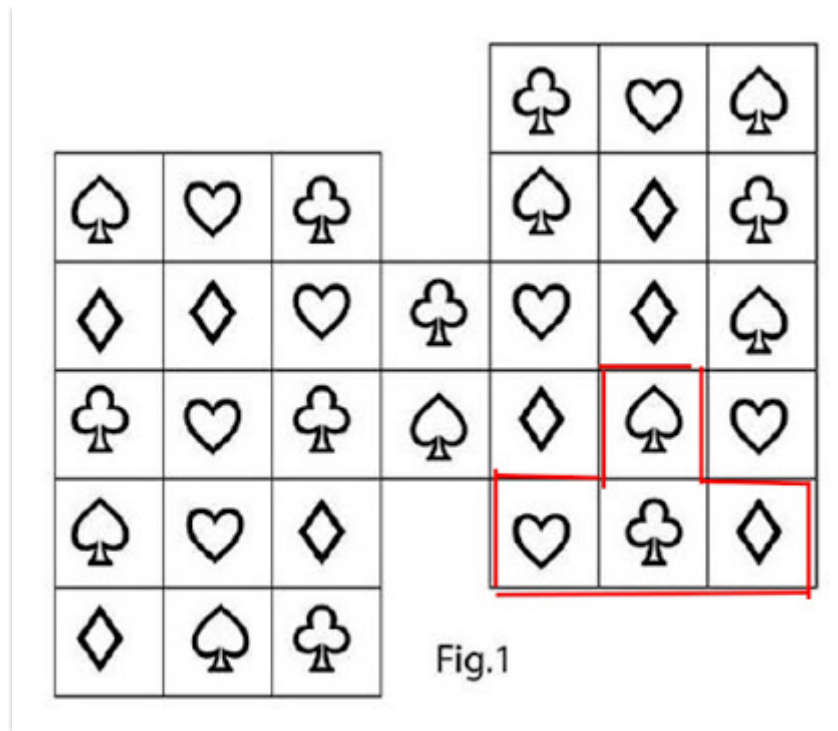
When two bolts mesh, they should rotate in opposite direction. So, since the two bolts are rotating in the same direction, they will remain the same and will not move

75) A

Cutting initi start at X, and so the strength should be more at that point

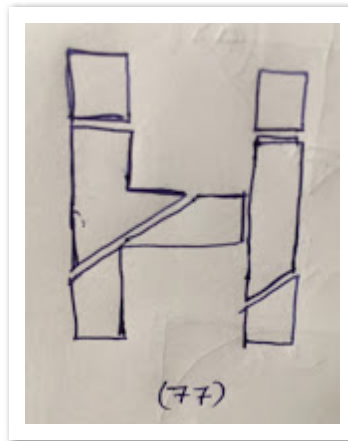
76) B

Below image, I've marked the symbol.



77) A

Below image shows the pattern.



78) C

79) B

A pin hole camera will capture the surface upside down and, right to left and vice versa.

80) D

81) C

82) C

Below image shows the possible path, starting from idi

