

Q1) Given a collection of points P in the plane, a 1-set is a point in P that can be separated from the rest by a line, i.e the point lies on one side of the line while the others lie on the other side. The number of 1-sets of P is denoted by $n_1(P)$. The minimum value of $n_1(P)$ over all configurations P of 5 points in the plane in general position (i.e no three points in P lie on a line) is

- a) 3
- b) 5
- c) 2

Q2) Paul the octopus who has been forecasting the outcome of FIFA world cup matches with tremendous accuracy has now been invited to predict ICC world cup matches in 2011. We will assume that the world cup contenders have been divided into 2 groups of 9 teams each. Each team in a group plays the other teams in the group. The top two teams from each group enter the semi finals (after which the winner is decided by knockout).

However, Paul has a soft spot for India and when India plays any team, Paul always backs India. Alas, his predictions on matches involving India are right only 2 out of 3 times. In order to qualify for the semi finals, it is sufficient for India to win 7 of its group matches. What is the probability that India will win the ICC world cup?

- a) $(2/3)^{10}$
- b) $(2/3)^9 + 8/3 * (2/3)^9$
- c) $8/3 * (2/3)^9$
- d) $(2/3)^{10} + 8/3 * (2/3)^9$

Q3) A toy train produces at least 10 different tunes when it moves around a circular toy track of radius 5 meters at 10 meters per minute. However, the toy train is defective and it now produces only two different tunes at random. What are the odds that the toy train produces 4 consecutive music tunes of the same type?

- a) 1 in 16
- b) 1 in 4
- c) 1 in 8

Q4) A number when divided by D leaves a remainder of 8 and when divided by $3D$ leaves a remainder of 21. What is the remainder left, when twice the number is divided by $3D$?

- a) 13
- b) cannot be determined
- c) 3
- d) 42

(solution:c)

Q5) Six friends decide to share a big cake. Since all of them like the cake, they begin quarreling who gets to first cut and have a piece of the cake. One friend suggests that they have a blindfold friend choose from well shuffled set of cards numbered one to six. You check and find that this method works as it should simulating a fair throw of a die. You check by performing multiple simultaneous trials of picking the cards blindfold and throwing a die. You note that the number shown by the method of picking up a card and throwing a real world die, sums to a number between 2 and 12. Which total would be likely to appear more often – 8,9 or 10?

- a) 8
- b) All are equally likely
- c) 9
- d) 10

Q6) One day Alice meets pal and byte in fairyland. She knows that pal lies on Mondays, Tuesdays and Wednesdays and tells the truth on the other days of the week byte, on the other hand, lies on Thursdays, Fridays and Saturdays, but tells the truth on the other days of the week. Now they make the following statements to Alice – pal. Yesterday was one of those days when I lie byte. Yesterday was one of those days when I lie too. What day is it ?

- a) Thursday
- b) Tuesday
- c) Monday
- d) Sunday

(solution:a)

Q7) A car manufacturer produces only red and blue models which come out of the final testing area completely at random. What are the odds that 5 consecutive cars of the same color will come through the test area at any one time?

- a) 1 in 16
- b) 1 in 125
- c) 1 in 32
- d) 1 in 25

Q8) Alok is attending a workshop “How to do more with less” and today's theme is *Working with fewer digits*. The speakers discuss how a lot of miraculous mathematics can be achieved if mankind(as well as womankind) had only worked with fewer digits.

The problem posed at the end of the workshop is

How many four digit numbers can be formed using the digits 1, 2,3,4 ,5 (but with repetition) that are divisible by 4?

Can you help Alok find the answer?

- a) 100 b) 125 c) 75 d) 85

Q9) Rearrange the following letters to make a word and choose the category in which it Ms
RAPETEK A

- a) Bird
- b) Vegetable
- c) City
- d) Fruit

Q10) On planet korba, a solar blast has melted the ice caps on its equator. 9 years after the ice melts, tiny planetoids called echina start growing on the rocks. Echina grows in the form of circle, and the relationship between the diameter of this circle and the age of echina is given by the formula
$$d = 4\sqrt{t-9} \text{ for } t \geq 9$$

where d represents the diameter in mm and t the number of years since the solar blast.

Jagan recorded the radius of some echina at a particular spot as 7mm. How many years back did the solar blast occur?

- a) 17
- b) 21.25
- c) 12.25
- d) 12.06

(solution:b)

Q11) In the reading room of a library, there are 23 reading spots. Each reading spot consists of a round table with 9 chairs placed around it. There are some readers such that in each occupied reading spot there are different numbers of readers. If in all there are 36 readers, how many reading spots do not have even a single reader?

- a) 8
- b) None
- c) 16
- d) 15

(solution:d)

Q12) Ferrari S.P.A is an Italian sports car manufacturer based in Maranello, Italy. Founded by Enzo Ferrari in 1928 as Scuderia Ferrari, the company sponsored drivers and manufactured race cars before moving into production of street-legal vehicles in 1947 as Ferrari S.P.A. Throughout its history, the company has been noted for its continued participation in racing, especially in Formula One where it has employed great success. Rohit once bought a Ferrari. It could go 4 times as fast as Mohan's old Mercedes. If the speed of Mohan's Mercedes is 46 km/hr and the distance traveled by the Ferrari is 953 km, find the total time taken for Rohit to drive that distance.

- a) 20.72
- b) 5.18
- c) 238.25
- d) 6.18

(solution:b)

Q13) A sheet of paper has statements numbered from 1 to 70. For all values of n from 1 to 70. Statement n says 'At least n of the statements on this sheet are false.' Which statements are true and which are false?

- a) The even numbered statements are true and the odd numbered are false.
- b) The odd numbered statements are true and the even numbered are false.
- c) The first 35 statements are true and the last 35 are false.
- d) The first 35 statements are false and the last 35 are false.

(solution:d)

Q14) Middle – earth is a fictional land inhabited by Hobbits, Elves, dwarves and men. The Hobbits and the Elves are peaceful creatures who prefer slow, silent lives and appreciate nature and art. The dwarves and the men engage in physical games. The game is as follows . A tournol is one where out of the two teams that play a match, the one that loses get eliminated. The matches are played in different rounds where in every round , half of the teams get eliminated from the tournament. If there are 8 rounds played in a knock-out tournol how many matches were played?

- a) 257
- b) 256
- c) 72
- d) 255

(solution:d)

Q15) A research lab in Chennai requires 100 mice and 75 sterilized cages for a certain set of laboratory experiments . To identify the mice, the lab has prepared labels with numbers 1 to 100 , by combining tags numbered 0 to 9. The SPCA requires that the tags be made of toxin-free material and that the temperature of the cages be maintained at 27 degree Celsius. Also , not more than 2 mice can be caged together and each cage must be at least 2 sq.ft in area. The 5 experiments to be conducted by lab are to be thoroughly documented and performed only after a round of approval by authorities. The approval procedure takes around 48 hours. How many times is the tag numbered '4' used by the lab in numbering these mice?

- a) 9
- b) 19
- c) 20
- d) 21

(solution:b)

Q16) There are two water tanks A and B, A is much smaller than B. While water fills at the rate of one litre every hour in A, it gets filled up like 10, 20, 40, 80, 160... in tank B. (At the end of first hour, B has 10 litres, second hour it has 20, and so on). If tank B is $\frac{1}{32}$ filled after 21 hours, what is the total duration required to fill it completely?

- a) 26 hrs
- b) 25 hrs
- c) 5 hrs
- d) 27 hrs**

(solution:a)

Q17) Consider two tumblers, the first containing one litre of coffee. Suppose you take one spoon of water out of the first tumbler and pour it into the second tumbler. After moving you take one spoon of the mixture from the second tumbler and pour it back into the first tumbler. Which one of the following statement holds now?

- a) There is less coffee in the first tumbler than water in the second tumbler.
- b) There is more coffee in the first tumbler than water in the second tumbler
- c) There is as much coffee in the first tumbler as there is water in the second tumbler
- d) None of the statements holds true.

Q18) Francois Pachet, a researcher at Sony Computer Science laboratories is also a jazz musician. He decided to build a robot able to improvise like a pro. Named Continuator, the robot can duet with a live musician in real-time. It listens to a musical phrase and then computes a complementary phrase with the same playing style. If the cost of making the robot is divided between materials, labour and overheads in the ratio of 4:6:2. If the materials cost \$108, the cost of the robot is

- a) \$270
- b) \$324
- c) \$216
- d) \$ 648**

(solution:b)

Q19) A lady has fine gloves and hats in her closet- 18 blue- 32 red and 25 yellow. The lights are out and it is totally dark in spite of the darkness. She can make out the difference between a hat and a glove. She takes out an item out of the closet only if she is sure that it is a glove. How many gloves must she take out to make sure she has a pair of each colour?

- a) 50
- b) 8
- c) 60
- d) 42

Q20) A man jogs at 6 mph over a certain journey and walks over the same route at 4 mph. What is his average speed for the journey?

- a) 2.4 mph
- b) 4 mph
- c) 4.8 mph
- d) 5 mph

(solution:d)

Q21) Spores of a fungus, called late blight, grow and spread infection rapidly. These pathogens were responsible for the Irish potato famine of the mid-19th century. These seem to have attacked the tomato crops in England this year. The tomato crops have reduced and the price of the crop has risen up. The price has already gone up to \$45 a box from \$27 a box a month ago. How much more would a vegetable vendor need to pay to buy 27 boxes this month over what he would have paid last month?

- a) \$27
- b) \$ 18
- c) \$45
- d) \$ 486

Q22) Given a collection of 36 points P in the plane and a point equidistant from all points in P, which of the following are necessarily true?

A. The points in P lie on a circle.

B. The distance between any pair of points in P is larger than the distance between X and a point in P

- a) A and B
- b) Neither A nor B
- c) B only
- d) A only

Q23) In the year 2002, Britain was reported to have had 4.3m closed – circuit television (CCTV) cameras – one for every 14 people in the country. This scrutiny is supposed to deter and detect crime. In one criminal case, the police interrogates two suspects. The ratio between the ages of the two suspects is 6:5 and the sum of their ages is 55 years. After how many years will the ratio be 8:7.?

- a) 11
- b) 6
- c) 10
- d) 5

Q24) Susan made a block with small cubes of 8 cubic cm volume to make a block 3 small cubes long, 9 small cubes wide and 5 small cubes deep. She realizes that she has used more small cubes than she really needed. She realized that she could have glued a fewer number of cubes together to look like a block with same dimensions, if it were made hollow. What is the minimum number of cubes that she needs to make the block?

- a) 114
- b) 135
- c) 21
- d) 71

Q25) Alok and Bhanu play the following coins in a circle game. 99 coins are arranged in a circle with each coin touching two other coin. Two of the coins are special and the rest are ordinary. Alok starts and the players take turns removing an ordinary coin of their choice from the circle and bringing the other coins closer until they again form a (smaller) circle. The goal is to bring the special coins adjacent to each other and the first player to do so wins the game. Initially the special coins are separated by two ordinary coins O1 and O2. Which of the following is true ?

- a) In order to win, Alok should remove O1 on his first turn.
- b) In order to win, Alok should remove one of the coins different from O1 and O2 on his first turn.
- c) In order to win, Alok should remove O2 on his first turn.
- d) Alok has no winning strategy.
