XAT 2012

Quantitative Ability

- **58.** Three Vice Presidents (VP) regularly visit the plant on different days. Due to labour unrest, VP (HR) regularly visits the plant after a gap of 2 days. VP (Operations) regularly visits the plant after a gap of 3 days. VP (Sales) regularly visits the plant after a gap of 5 days. The VPs do not deviate from their individual schedules. CEO of the company meets the VPs when all the three VPs come to the plant together. CEO is on leave from January 5 th to January 28 th , 2012. Last time CEO met the VPs on January 3, 2012. When is the next time CEO will meet all the VPs ?
 - A February 6, 2012
 - **B** February 7, 2012
 - C February 8, 2012
 - D February 9, 2012
 - E None of the above
- **59.** Ramesh analysed the monthly salary figures of five vice presidents of his company. All the salary figures are integers. The mean and the median salary figures are 5 lakh, and the only mode is 8 lakh. Which of the options below is the sum (in lakh) of the highest and the lowest salaries?
 - **A** 9
 - **B** 10
 - **C** 11
 - **D** 12
 - E None of the above.

Instructions [60 - 62]

based on the following information

The following graphs shows the revenue (in \$ million) of three companies in their initial six years of operations, in an economy which is characterized by a persistent inflation.



- **60.** In 2010, which could be a valid statement about the revenues (adjusted for inflation) of these three companies?
 - A Revenues of all three companies were equal.
 - **B** Revenues of all three companies could be equal.
 - C Revenue of Yahoo was definitely less than Facebook which was definitely less than Google.
 - **D** Total of Yahoo and Facebook was definitely higher than that of Google.
 - E None of the above.
- **61.** The difference in the average percentage increase in revenues, from 4th to 6th year, of Yahoo and Facebook is:
 - **A** 35%
 - **B** 40%
 - **C** 45%
 - **D** 50%
 - **E** 55%
- **62.** What would have been Facebook's revenue (in \$ million) in its sixth year of operation if the company had matched Google's percentage growth in revenues from the fifth to the sixth year? Choose the option that is nearest to the answer.
 - **A** 1600
 - **B** 1700
 - **C** 1900
 - **D** 2100
 - E None of the above
- **63.** Tina, Mina, Gina, Lina and Bina are 5 sisters, aged in that order, with Tina being the eldest. Each of them had to carry a bucket of water from a well to their house. Their buckets' capacities were proportional to their ages. While returning, equal amount of water got splashed out of their buckets. Who lost maximum amount of water as a percentage of the bucket capacity?
 - A Tina
 - B Mina
 - C Gina

- D Lina
- E Bina
- **64.** Ram, a farmer, managed to grow shaped- watermelons inside glass cases of different shapes. The shapes he used were: a perfect cube, hemi-spherical, cuboid, cylindrical along with the normal spherical shaped watermelons. Thickness of the skin was same for all the shapes. Each of the glass cases was so designed that the total volume and the weight of the all the water- melons would be equal irrespective of the shape. A customer wants to but water-melons for making juice, for which the skin of the water- melon has to be peeled off, and therefore is a waste. Which shape should the customer buy?
 - A Cube
 - **B** Hemi-sphere
 - **C** Cuboid
 - D Cylinder
 - E Normal spherical
- **65.** A man borrows 6000 at 5% interest, on reducing balance, at the start of the year. If he repays 1200 at the end of each year, find the amount of loan outstanding, in , at the beginning of the third year.
 - **A** 3162.75
 - **B** 4125.00
 - **C** 4155.00
 - **D** 5100.00
 - **E** 5355.00
- **66.** A spherical metal of radius 10 cm is molten and made into 1000 smaller spheres of equal sizes. In this process the surface area of the metal is increased by:
 - A 1000 times
 - **B** 100 times
 - **C** 10 times
 - D No change
 - E None of the above

67. Gopal sells fruit juice mixture using orange juice and pineapple juice. Gopal prepares this mixture by drawing out a jug of orange juice from a 10 litre container filled with orange juice, and replacing it with pineapple juice. If Gopal draws out another jug of the resultant mixture and replaces it with pineapple juice, the container will have equal volumes of orange juice and pineapple juice. The volume of the jug in litres, is

A 2 **B** < 2 and \leq 2.5 **C** 2.5 **D** > 2.5 and \leq 3 **E** \geq 3

- **68.** Nikhil's mother asks him to buy 100 pieces of sweets worth 100/-. The sweet shop has 3 kinds of sweets, kajubarfi, gulabjamun and sandesh. Kajubarfi costs 10/- per piece, gulabjamun costs 3/- per piece and sandesh costs 50 paise per piece. If Nikhil decides to buy at least one sweet of each type, how many gulabjamuns should he buy?
 - A 1
 B 2
 C 3
 - **D** 4
 - **E** 5
- **69.** A potter asked his two sons to sell some pots in the market. The amount received for each pot was same as the number of pots sold. The two brothers spent the entire amount on some packets of potato chips and one packet of banana chips. One brother had the packet of banana chips along with some packets of potato chips, while the other brother just had potato chips. Each packet of potato chips costs 10/- and the packet of banana chips costs less than 10/-. The packets of chips were divided between the two brothers so each brother received equal number of packets. How much money should one brother give to the other to make the division financially equitable?
 - **A** 1
 - **B** 2
 - **C** 4
 - **D** 5
 - **E** 7

- **70.** A city has a park shaped as a right angled triangle. The length of the longest side of this park is 80 m. The Mayor of the city wants to construct three paths from the corner point opposite to the longest side such that these three paths divide the longest side into four equal segments. Determine the sum of the squares of the lengths of the three paths.
 - **A** 4000 m
 - **B** 4800 m
 - **C** 5600 m
 - **D** 6400 m
 - **E** 7200 m

Instructions [71 - 72]

Answer question based on the following information.

Ramya, based in Shanpur, took her car for a 400 km trip to Rampur. She maintained a log of the odometer readings and the amount of petrol she purchased at different petrol pumps at different prices (given below). Her car already had 10 litres of petrol at the start of the journey, and she first purchased petrol at the start of the journey, as given in table below, and she had 5 litres remaining at the end of the journey.

	Odometer Reading (Km)	Petrol purchased (Litre)	Rate of Petrol (/litre)	
Start of journey	400 600	20 15	30 35	
	650	10	40	
End of journey 800				

71. What has been the mileage (in kilometers per litre) of her car over the entire trip?

- **A** 8.00
- **B** 8.50
- **C** 9.00
- **D** 9.50
- E None of the above
- **72.** Her car's tank-capacity is 35 litres. Petrol costs 45/- litre in Rampur. What is the minimum amount of money she would need for purchasing petrol for the return trip from Rampur to Shanpur, using the same route? Assume that the mileage of the car remains unchanged throughout the route, and she did not use her car to travel around in Rampur.
 - **A** 1714
 - **B** 1724
 - **C** 1734
 - **D** 1744
 - E Data insufficient to answer.

- **73.** A medical practitioner has created different potencies of a commonly used medicine by dissolving tables in water and using the resultant solution. Potency 1 solution: When 1 tablet is dissolved in 50 ml, the entire 50 ml is equivalent to one dose. Potency 2 solution: When 2 tablets are dissolved in 50 ml, the entire 50 ml of this solution is equivalent to 2 doses, ... and so on. This way he can give fractions of tablets based on the intensity of infection and the age of the patient. For particular patient, he administers 10 ml of potency 1, 15 ml of potency 2 and 30 ml of potency 4. The dosage administered to the patient is equivalent to
 - A > 2 and \leq 3 tablets
 - **B** > 3 and \leq 3.25 tablets
 - $C > 3.25 \text{ and} \le 3.5 \text{ tablets}$
 - **D** > 3.5 and \leq 3.75 tablets
 - **E** > 3.75 and \leq 4 tablets
- 74. Ram prepares solutions of alcohol in water according to customers' needs. This morning Ram has prepared 27 litres of a 12% alcohol solution and kept it ready in a 27 litre delivery container to be shipped to the customer. Just before delivery, he finds out that the customer had asked for 27 litres of 21% alcohol solution. To prepare what the customer wants, Ram replaces a portion of 12% solution by 39% solution. How many litres of 12% solution are replaced?
 - **A** 5
 - **B** 9
 - **C** 10
 - **D** 12
 - **E** 15
- **75.** City Bus Corporation runs two buses from terminus A to terminus B,one from each of the terminuses such that each bus makes 5 round trips in a day. There are no stops in between. These buses ply back and forth on the same route at different but uniform speeds. Each morning the buses start at 7 AM from the respective terminuses. They meet for the first time at a distance of 7 km from terminus A. Their next meeting is at a distance of 4 km from terminus B, while travelling in opposite directions. Assuming that the time taken by the buses at the terminuses is negligibly small, and the cost of running a bus is 20 per km, find the daily cost of running the buses (in)
 - **A** 3200
 - **B** 6800
 - **C** 4000
 - **D** 6400
 - E None of the above

- **76.** Shyam, a fertilizer salesman, sells directly to farmers. He visits two villages A and B. Shyam starts from A, and travels 50 meters to the East, then 50 meters North-East at exactly 45° to his earlier direction, and then another 50 meters East to reach village B. If the shortest distance between villages A and B is in the form of $a\sqrt{b} + \sqrt{c}$ meters, Find the value of a+b+c.
 - **A** 52
 - **B** 54
 - **C** 58
 - **D** 59
 - E None of the above.
- 77. Three truck drivers, Amar, Akbar and Anthony stop at a road side eating joint. Amar orders 10 rotis, 4 plates of tadka, and a cup of tea. Akbar orders 7 rotis, 3 plates of tadka, and a cup of tea. Amar pays 80 for the meal and Akbar pays 60. Meanwhile, Anthony orders 5 rotis, 5 plates of tadka and 5 cups of tea. How much (in) will Anthony pay?
 - **A** 75
 - **B** 80
 - **C** 95
 - **D** 100
 - E None of the above.
- **78.** A computer program was tested 300 times before its release. The testing was done in three stages of 100 tests each. The software failed 15 times in Stage I, 12 times in Stage II, 8 times in Stage III, 6 times in both Stage I and Stage II, 7 times in both Stage II and Stage III, 4 times in both Stage I and Stage III, and 4 times in all the three stages. How many times the software failed in a single stage only?
 - **A** 10
 - **B** 13
 - **C** 15
 - **D** 17
 - **E** 35

- **79.** Suresh, who runs a bakery, uses a conical shaped equipment to write decorative labels (e.g., Happy Birthday etc.) using cream. The height of this equipment is 7 cm and the diameter of the base is 5 mm. A full charge of the equipment will write 330 words on an average. How many words can be written using three fifth of a litre of cream?
 - **A** 45090
 - **B** 45100
 - **C** 46000
 - **D** 43200
 - E None of the above.

Instructions [80 - 81]

The following pie chart shows the percentage distribution of runs scored by a batsman in a test innings.



80. If the batsman has scored a total of 306 runs, how many 4s and 6s did he hit?

- A 31 and 3 respectively
- B 32 and 2 respectively
- C 32 and 3 respectively
- D 33 and 1 respectively
- E 33 and 2 respectively
- **81.** If 5 of the dot balls had been hit for 4s, and if two of the shots for which the batsman scored 3 runs each had fetched him one run instead, what would have been the central angle of the sector corresponding to the percentage of runs scored in 4s? {Use data from the previous question}

- **B** 163
- **C** 165
- **D** 167
- **E** 170
- **82.** Carpenter Rajesh has a circular piece of plywood of diameter 30 feet. He has cut out two disks of diameter 20 feet and 10 feet. What is the diameter of the largest disk that can be cut out from the remaining portion of the plywood piece?
 - A > 8.00 feet and \leq 8.20 feet
 - **B** > 8.21 feet and \leq 8.40 feet
 - **C** > 8.41 feet and \leq 8.60 feet
 - **D** > 8.61 feet and \leq 8.80 feet
 - **E** > 8.81 feet and \leq 9.00 feet
- **83.** Lionel and Ronaldo had a discussion on the ages of Jose's sons. Ronaldo made following statements about Jose's sons:
 - i. Jose has three sons.
 - ii. The sum of the ages of Jose's sons is 13.
 - iii. The product of the ages of the sons is the same as the age of Lionel.
 - iv. Jose's eldest son, Zizou weighs 32 kilos.
 - v. The sum of the ages of the younger sons of Jose is 4.
 - vi. Jose has fathered a twin.
 - vii. Jose is not the father of a triplet.
 - viii. The LCM of the ages of Jose's sons is more than the sum of their ages.

Which of the following combination gives information sufficient to determine the ages of Jose's sons?

- A i, ii, iii and iv
- **B** i, ii, iv and vi
- C i, ii, iii and v
- D i, ii, v and vii
- E i, ii, v and vi
- **84.** Ram and Shyam form a partnership (with Shyam as working partner) and start a business by investing 4000 and 6000 respectively. The conditions of partnership were as follows:
 - 1. In case of profits till 200,00 per annum, profits would be shared in the ratio of the invested capital.

2.Profits from 200,001 till 400,000 Shyam would take 20% out of the profit, before the division of remaining profits, which will then be based on ratio of invested capital.

3. Profits in excess of 400,000, Shyam would take 35% out of the profits beyond 400,000, before the division

of remaining profits, which will then be based on ratio of invested capital. If Shyam's share in a particular year was 367000, which option indicates the total business profit (in) for that year?

- **A** 520,000
- **B** 530,000
- **C** 540,000
- **D** 550,000
- E None of the above
- **85.** A property dealer bought a rectangular piece of land at 1000/sq. ft. The length of the plot is less than twice its breadth. Due to its size, there were no buyers for the full plot. Hence he decided to sell it in smaller sized pieces as given below. The largest square from one end was sold at 1200/sq. ft. From the remaining rectangle the largest square was sold at 1150/sq. ft. Due to crash in the property prices, the dealer found it difficult to make profit from the sale of the remaining part of the land. If the ratio of the perimeter of the remaining land to the perimeter of the original land is 3 : 8, at what price (in) the remaining part of the land is to be sold such that the dealer makes an overall profit of 10%?
 - A 500/sq. ft.
 - **B** 550/sq. ft.
 - **C** 600/sq. ft.
 - D 650/sq. ft.
 - E None of the above.

Answers

58. C	59. A	60. E	61. B	62. A	63. E	64. E	65. C	
66. E	67. D	68. A	69. B	70. C	71. A	72. D	73. B	
74. B	75. B	76. E	77. D	78. B	79. E	80. E	81. E	
82. C	83. E	84. D	85. B					

Explanations

58.**C**

VP (HR) visits the plant after a gap of 2 days i.e every third day. Similarly, VP (Operations) visits the plant every fourth day and VP (Sales) visits the plant every sixth day. To find the number of days after which all the three will come together is the lowest common multiple of 3, 4 and 6 which is 12. So, every 12th day, all three VPs would come together. If their meeting was held on 3rd January, then their subsequent meetings would be held on 15th January, 27th January, 8th February, 20th February and so on. However, the CEO is not available till 28th January. So, their next meeting would be held on 8th February. hence, option C is the correct answer.

59.**A**

Median = 5, Mode = 8

Mean = 5, => Sum of 5 salaries = 25

As mode is 8, it will occur 2 times but not 3 (:: sum is 25)

Also, median is 5, the third salary is 5 and the first two are less than 5

=> Sum of third , fourth and fifth salary = 5 + 8 + 8 = 21

Sum of first two = 25 - 21 = 4

First and second salaries cannot be same (:: mode is 8)

=> First and second salary = 1 and 3

 \therefore Sum (in lakh) of the highest and the lowest salaries = 1 + 8 = 9

60.**E**

We are not aware that which year, out of the given year is 2010. Hence, we can say that the data is insufficient. Therefore, option E is the best suitable answer.

61.**B**

The revenue of Yahoo in 4th year = 250 millions.

The revenue of Yahoo in 6th year = 1200 millions.

Therefore, average percentage increase in Yahoo's revenue in a year = $[(\frac{1200}{250})^{0.5} - 1] * 100 = 119\%$

The revenue of Facebook in year 4 = 300 millions

The revenue of Facebook in year 6 = 2000 millions

Therefore, average percentage increase in Facebook's revenue in a year = $[(\frac{2000}{300})^{0.5} - 1] * 100 = 159\%$

Therefore, the required difference = 159 - 119 = 40%. Hence, option B is the correct answer.

62.**A**

Google's percentage growth in revenues from the fifth to the sixth year = $\frac{3200 - 1500}{1500} \times 100$ = 113.33 percent.

Therefore, Facebook's revenue in the 6th year = $rac{100+113.33}{100} imes750$ = 1600 millions.

Therefore, option A is the correct answer.

63.**E**

Let the capacities of bucket of water carried by Tina, Mina, Gina, Lina and Bina respectively be W_T, W_M, W_G, W_L, W_B

It is given that : $W_T > W_M > W_G > W_L > W_B$

Let they spill x litres of water from the bucket.

Thus, %age of water spilled by them respectively be

$$= \frac{x}{W_T} \times 100, \frac{x}{W_M} \times 100, \frac{x}{W_G} \times 100, \frac{x}{W_L} \times 100, \frac{x}{W_B} \times 100$$

$$\therefore W_T > W_M > W_G > W_L > W_B$$

$$\therefore \frac{x}{W_T} \times 100 < \frac{x}{W_M} \times 100 < \frac{x}{W_G} \times 100 < \frac{x}{W_L} \times 100 < \frac{x}{W_B} \times 100$$

Thus, Bina lost maximum amount of water as a percentage of the bucket capacity.

64.**E**

Let the volume of watermelon = V

Total surface area = S

Thickness of the skin = t

=> Volume usable for juice = V-St

Hence, if total surface area is minimum then usable volume of the watermelon will be max.

For equal volume, sphere has the least surface area.

Ans - (E)

65.**C**

Amount man gets after 1 year

Function that gets and the year
=
$$6000 + (\frac{6000 \times 5 \times 1}{100}) - 1200$$

= $6000 + 300 - 1200 = 5100$
 \therefore Amount at the beginning of third year, i.e. after 2 years
= $5100 + (\frac{5100 \times 5 \times 1}{100}) - 1200$
= $5100 + 255 - 1200 = 4155$
66. **E**
Radius of larger sphere = $R = 10$ cm
Let radius of each of the smaller spheres = r cm
=> $\frac{4}{3}\pi R^3 = 1000 \times \frac{4}{3}\pi r^3$
=> $10^3 = 1000r^3$
=> $r = \sqrt[3]{1} = 1$ cm
Initial surface area of sphere = $4\pi R^2 = 4\pi \times 100 = 400\pi$
Final surface area of 1000 spheres = $1000 \times 4\pi r^2 = 1000 \times 4\pi = 4000\pi$
 \therefore Increase in surface area = $4000\pi - 400\pi = 3600\pi$
=> $\frac{3600\pi}{400\pi} = 9$ times

67.**D**

Let volume of jug = v litre

After first replacement, volume of orange juice = (10 - v) litre

Volume of pineapple juice = v litre

After second replacement, volume of orange juice remaining

$$=(10-v)-(rac{10-v}{10}v)=rac{(10-v)^2}{10}$$

Volume of pineapple juice remaining = $v - \frac{v^2}{10} = \frac{v(10-v)}{10}$ Total volume of pineapple juice = $\frac{v(10-v)}{10} + v = \frac{20v-v^2}{10}$

It is given that container has equal volumes of both juices.

=>
$$\frac{(10-v)^2}{10} = \frac{20v-v^2}{10}$$

 $100 + v^2 - 20v = 20v - v^2$
 $2v^2 - 40v + 100 = 0$
=> $v^2 - 20v + 50 = 0$
=> $v = 17.07, 2.93$
∴ Container is 10 litres, => $v \neq 17.07$
∴ $v = 2.93$ litres

68.**A**

Let Nikhil buy x, y and z pieces of kajubarfi, gulabjamun and sandesh respectively. $(x, y, z \ge 1)$ => x + y + z = 100 ------Eqn(I) Also, $10x + 3y + \frac{1}{2}z = 100$ $\Rightarrow 20x + 6y + z = 200$ -----Eqn(II)

Subtracting eqn(I) from (II), we get :

=> 19x + 5y = 100=> $y = \frac{100 - 19x}{5}$

If x = 1, y will not be natural. The only value of x for natural y is x = 5

$$= y = \frac{100-95}{5} = 1$$

Nikhil must buy 1 gulabjamun.

69.**B**

Let 'n' be the number of potato chips bought by the brothers. Also let 'x' be the cost price of a banana chips. (x < 10)

Total number of chips purchases = (n + 1). It is given that each brother has equal number of chips packets i.e. (n + 1) is an even number or we can say that 'n' is odd.

Total amount spend by the brother on these chips packets = 10n + x. It is given that the amount received for each pot was same as the number of pots sold.

Hence, we can say that 10n + x is a perfect square. We can see that the tens place digit is an odd number.

Perfect squares ending with an odd digit in the tens place = 16, 36, 196, 256 and so on {All $(10a \pm 4)^2$ type numbers}

We can see that unit place is 6 in all cases and that will be the same as cost price of a banana chips packet.

The difference between the amount with the two friends = Cost price of 1 potato chips packet - Cost price of 1 banana chips packet = 10 - 6 = 4

Hence, we can say that the brother, who has only chips packets with him, should given Rs.2 to the other brother so that they have the same amount with them.

Therefore, option B is the correct answer.

70.**C**



To find : $(BD)^2 + (BE)^2 + (BF)^2 =$? AC = 80 m AD = DE = EF = FC = 20 Let AB = a and BC = bIn \triangle ABC $(a)^2 + (b)^2 = (80)^2$ Also, (BE) = 1/2(AC) = 40=> BE = 40Using Apollonius theorem in \triangle ABE, as AD = DE => $(AB)^2 + (BE)^2 = 2[(BD)^2 + (AD)^2]$ => $(BD)^2 + 20^2 = \frac{1}{2}(a^2 + 40^2)$ -----Eqn(I) Similarly, for △ BEC, as EF = FC => $(BE)^2 + (BC)^2 = 2[(BF)^2 + (FC)^2]$ => $(BF)^2 + 20^2 = \frac{1}{2}(b^2 + 40^2)$ ------Eqn(II) Adding eqns (I) & (II), we get : => $(BD)^2 + (BF)^2 + 20^2 + 20^2 = \frac{1}{2}(a^2 + 40^2 + b^2 + 40^2)$ => $(BD)^2 + (BF)^2 + 20^2 + 20^2 = \frac{1}{2}(80^2 + 40^2 + 40^2)$ => $(BD)^2 + (BF)^2 = 4800 - 800 = 4000$ $\therefore (BD)^2 + (BE)^2 + (BF)^2 = 4000 + 40^2$ = 4000 + 1600 = 560071. A At the start, Ramya has 10 litres petrol. She purchased 20 litres, 15 litres and 10 litres. At the end, she has left 5 litres of petrol.

Petrol used = (10+20+15+10-5)=50 litres

Distance travelled = $800-400=400~\rm{km}$

: Mileage of Ramya's car = $\frac{400}{50} = 8$ km/litre

72. **D**

Ramya's car has 5 litres in the tank. She can fill a maximum of 30 litres more as tank capacity is 35 litres.

The cost of petrol in Rampur is Rs. 45/litre. As the cost of petrol is lower at all the succeeding petrol pumps and hence to minimise the cost, she will fill enough petrol to reach first petrol pump i.e. 150 km.

Initially she can travel = 8 imes 5 = 40 km using 5 litres of petrol

Hence to travel 110 km, she will need = $\frac{110}{8} = 13.75$ litre at the rate of Rs. 45/litre

On reaching the first petrol pump in the reverse journey, she will fill up enough petrol to reach the second petrol pump as the cost of petrol in the second pump is less than the cost of first pump and the distance is 50 km.

=> She needs = $\frac{50}{8} = 6.25$ litres at the rate of Rs. 40/litre

For the rest of the journey (200 km), she will need = $\frac{200}{8} = 25$ litres at the rate of Rs. 35/litre

 \therefore Total cost = $(13.75 \times 45) + (6.25 \times 40) + (25 \times 35)$

= $618.75 + 250 + 875 = 1743.75 \approx Rs.1744$

73.**B**

50 ml of potency 1 solution is equivalent to 1 tablet, 50 ml of potency 2 solution i equivalent to 2 tablets and so on.

Hence, 10 ml of potency 1 solution is equivalent to

$$=\frac{10}{50}=\frac{1}{5}$$

Similarly, 15 ml of potency 2 solution corresponds to = $rac{15}{50} imes 2=rac{3}{5}$

and 30 ml of potency 4 solution corresponds to = $\frac{30}{50} \times 4 = \frac{12}{5}$

... Required dosage

 $= \frac{1}{5} + \frac{3}{5} + \frac{12}{5}$ $= \frac{16}{5} = 3.2 \text{ tablets}$ 74. **B**

Let Ram replaces x litres of 12 % sol. with 39 % solution

Now, quality of 12 % solution in 27 litre = $\frac{12}{100} \times 27$

=> After replacing we have volume of 12 % solution

$$= \left(\frac{12}{100} \times 27\right) - \left(\frac{12x}{100}\right) + \left(\frac{39x}{100}\right)$$
$$= \frac{324 + 27x}{100}$$

This is equal to 27 litre of 21 % solution.

=>
$$\frac{324+27x}{100} = \frac{21}{100} \times 27$$

=> $27x = 567 - 324 = 243$
=> $x = \frac{243}{27} = 9$

Alternate Solution:

The mixture of two solutions 12% alcohol and 39% alcohol should yield 21% alcohol solution.

Using allegation:



The ratio = 18/9 =2:1

So the amount of 39% solution required = 27*1/(2+1) = 9

75.**B**

Let the distance between two termini = P km

Let the speed of the bus started from Terminus A be x and that of the bus started from terminus B be y. The two buses met at a distance of 7km from Terminus A

Since the time of travel for both buses is the same.

 $\frac{7}{x} = \frac{P-7}{y}$

 $\frac{x}{y} = \frac{y}{P-7}$ ----- Eq (1)

They met again at a distance of 4 km from terminus B.

Distance travelled by bus which started from Terminus A = P+4 Distance travelled by bus which started from Terminus A = 2P-4 So $\frac{x}{y} = \frac{P+4}{2P-4}$ --Eg (2) On solving Eq 1& 2, we get P=17 km Each bus covers a distance of 17*2=34 km on a round trip. Each bus makes 5 round trips in a day =34*5=170 km Cost of running one bus = $170 \times 20 = 3400$ \therefore Cost of running both buses = $3400 \times 2 = Rs.6,800$ 76.**E**



Shortest distance between A and B = $d = \sqrt{(AM)^2 + (BM)^2}$ ------Eqn(1)

 $\ln \bigtriangleup OPN$ => $sin45 = \frac{PN}{PO}$ $=>\frac{1}{\sqrt{2}}=\frac{PN}{50}$ $= PN = \frac{50}{\sqrt{2}} = 25\sqrt{2}$ => $BM = PN = 25\sqrt{2}$ Again, $tan45 = \frac{PN}{OP}$ $=> OP = 25\sqrt{2}$ $\Rightarrow AM = 50 + 25\sqrt{2} + 50 = 100 + 25\sqrt{2}$ Using eqn(I), we get : $\Rightarrow d^2 = (100 + 25\sqrt{2})^2 + (25\sqrt{2})^2$ => $d^2 = 10000 + 5000\sqrt{2} + 1250 + 1250 = 12500 + 5000\sqrt{2}$ => $d^2 = 2500(5 + 2\sqrt{2}) = 2500(5 + \sqrt{8})$ ------Eqn(II) Also, it is given that : $d = a \sqrt{b + \sqrt{c}}$ $= d^2 = a^2(b + \sqrt{c})$ -----Eqn(III) Comparing, eqn(II) & (III), we get : $\Rightarrow a^2(b + \sqrt{c}) = 2500(5 + \sqrt{8})$ $\Rightarrow a = 50, b = 5, c = 8$ $\therefore a + b + c = 50 + 5 + 8 = 63$

77. ${\bf D}$ Let cost of 1 roti, 1 tadka and 1 tea be Rs. x,y,z respectively.

Acc to ques,

=> 10x + 4y + z = 80 <-- Equation 1

and 7x + 3y + z = 60 <-- Equation 2

We have three equations and two unknowns. So let us try to find the value of x and y in terms of z.

Multiplying Equation 1 with 3 and subtracting 4 times (Equation 2) from it gives,

3 * (10x + 4y + z) - 4 * (7x + 3y + z) = 3 * 80 - 4 * 60Or, 2x - z = 0 $=> x = \frac{z}{2}$ Substituting it in Equation 1, we get 6z+4y=80 or $y=20-rac{3}{2}z$ To find : 5x + 5y + 5z = ? $=5\left[\frac{z}{2}+(20-\frac{3z}{2})+z\right]$ = $5 \times 20 = 100$ 78.**B** Let the software fails a, b and c times in a single stage, in two stage and in all stages respectively. Given : c = 4To find : a = ?Solution : a + 2b + 3c = 15 + 12 + 8= a + 2b + 3c = 35 -----Eqn(I) Also, b + 3c = 6 + 7 + 4 $= b + (3 \times 4) = 17$ = b = 17 - 12 = 5Using eqn(I), $= a + (2 \times 5) + (3 \times 4) = 35$ = a + 10 + 12 = 35 $\Rightarrow a = 35 - 22 = 13$ 79.**E** Height = 7 cm and Radius = 0.25 cm Volume of cone = $\frac{1}{3}\pi r^2 h$ $=\frac{1}{3} imes \frac{22}{7} imes (0.25)^2 imes 7=0.458cm^3$ $\therefore 0.458 cm^3$ can write 330 words => $1 cm^3$ can write = $\frac{330}{0.458} = 720.05$ words Now, 1 litre = $1000cm^3$ => $\frac{3}{5}$ litre = $\frac{3}{5} \times 1000 = 600 cm^3$ $\therefore 600 cm^3$ can write = 600 imes 720.05pprox 4, 32,000 words 80.**E** Total runs scored in 4's = $\frac{43.16}{100} \times 306$ = 132 Therefore, total number of 4's scored by the batsman = $\frac{132}{4}$ = 33 Total runs scored in 6's = $\frac{3.92}{100} \times 306$ = 12 Therefore, total number of 6's scored by the batsman = $\frac{12}{c}$ = 2 Hence, we can say that option E is the correct answer.

81.**E**

Net increment in the number of runs due to 5 the dot balls resulting in 4s and two 3s resulting in two 1s = 4*5 -2*2 = 16.

Therefore, the total number of runs scored by the batsman = 16 + 306 = 322 runs.

The number of runs scored by 4's = 132 + 20 = 152 {We know that batsman scored 132 runs from 4s alone} The angle subtended by 4's = $\frac{152}{322} \times 360$ = 169.93 \approx 170.

82.C

It is given that the 3rd disk also has the maximum diameter. This is possible only when all 3 discs touch each other externally.

Also the sum of the diameter of the two disks is 10+20 = 30 feets. Hence, we can say that centres of these two disk lie on a diameter of original plywood. The figure can be drawn as shown below,

Here, in the diagram O is the centre of original disk. A and C are the centres of disks having radius 10 feet and 5 feet respectively. D is the touching point of circles with centre A and C.

Let 'x' be the radius of the disk that is to be cut out from the remaining part.

We can say that AO = OD = CD = 5 feet. Also, AB = 10+x, BC = 5+X, OB = 15-x and AC = 15 feet.

Also, let 'y' be the length of BD.

By applying apollonius theorem in triangle ABD,

$$AB^{2} + BD^{2} = 2(OB^{2} + OD^{2})$$

 $(10 + x)^{2} + y^{2} = 2((15 - x)^{2} + 5^{2})$
 $x^{2} + 20x + 100 + y^{2} = 500 - 60x + 2x^{2}$
 $y^{2} - x^{2} + 80x = 400 ... (1)$

Similarly, by applying apollonius theorem in triangle OBC,

$$OB^2 + BC^2 = 2(BD^2 + DC^2)$$

 $(15 - x)^2 + (5 + x)^2 = 2(y^2 + 5^2)$
 $2x^2 - 20x + 250 = 2y^2 + 50$
 $2x^2 - 2y^2 - 20x + 200 = 0 ... (2)$

By equation (1) and (2) we can say that,

$$160x - 20x + 200 = 800$$

$$x = 600/140 = 30/7$$

Therefore, the diameter of the largest disk that can be cut out from the remaining portion of the plywood piece = 2*30/7 = 8.57 feet. Hence, option C is the correct answer.



83.**E**

Statement iii and iv are redundant. Thus, we can cancel out first three options.

From (i) , (ii) , (v), we have : Let A,B,C be the ages of Jose's sons in ascending order and A + B + C = 13and A + B = 4= C = 13 - 4 = 9Now, from (vi) we get A = B=> $A = B = \frac{4}{2} = 2$: i, ii, v and vi are required to answer the question. 84.**D** Ratio of profits earned by Ram : Shyam = 4000 : 6000 = 2 : 3 If profit < 2,00,000 % of profit earned by Shyam = $\frac{3}{5} \times 100 = 60\%$ If 2,00,000 < profit < 4,00,000, he gets 20 % and 60 % of the remaining profit. % of profit earned by Shyam = 20% + .80 \times 60% = 68% If profit > 4,00,000 % of profit earned by Shyam = 35 % + .65 imes 60% = 74% Now, for first 2,00,000 profit earned by Shyam = $\frac{60}{100}$ × 2,00,000 = Rs. 1,20,000 For second 2,00,000 profit earned by Shyam = $\frac{68}{100}$ imes 2,00,000 = Rs. 1,36,000 Let total profit earned by them = Rs. (4,00,000 + x)=> From Rs.x profit, Shyam received = 3,67,000 - 1,20,000 - 1,36,000 = Rs. 1,11,000 => $\frac{74}{100}$ imes *x* = 1,11,000 => x = 1,11,000 $imes rac{100}{74}$ = 1,50,000 ... Total profit = 4,00,000 + 1,50,000 = Rs. 5,50,000 85.**B** А Е (I-b) в b G н

Let length = l ft and breadth = b ft

i

F

D

ABCD is original plot. First square AEFD is sold of side = DF = b, => FC = (l - b)

After that square EBHG is sold of side GH = (l-b)

с

=> HC = b - (l - b) = (2b - l)

Perimeter of remaining land GHCF = 2 imes [(l-b) + (2b-l)]

= 2b

```
Perimeter of original land ABCD = 2(l + b)
Acc to ques
=>\frac{2b}{2(l+b)}=\frac{3}{8}
=>8b = 3l + 3b
=>5b=3l
Only one combination is possible, i.e. l=5 and b=3 (:: It is given that : l\ < 2b)
=> Area of land = 5 	imes 3 = 15 sq. ft
=> Cost of land = 15 \times 1000 = Rs.15,000
For overall profit to be 10 %, S.P. = 15,000 	imes rac{110}{100}
= Rs.16,500
Side of AEFD = b=3
=> S.P. of AEFD = 3^2 	imes 1200 = Rs.10,800
Side of EBHG = (l-b) = 5 - 3 = 2
S.P. of EBHG = 2^2 	imes 1150 = Rs.4,600
Length of remaining rectangular land GHCF = (l-b) = 5-3=2
Breadth = (2b - l) = 6 - 5 = 1
Let selling price per sq. ft of GHCF = Rs.x
S.P. of GHCF = 2 	imes 1 	imes = Rs.2x
... Total S.P.
\Rightarrow 10,800 + 4,600 + 2x = 16,500
\Rightarrow 2x = 16,500 - 15,400
=> x = \frac{1100}{2} = Rs.550
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