EXERCISE –1

Q.1 Let x = 1! + 2! + 3! + 4! + ... + 100!. Unit's digit of $x^{x^{x^{x^{\cdots\infty}}}}$ is
(a) 3
(b) 1
(c) or 3 depending upon the number of times x appears in the power.
(d) Can't be determined.

Q.2 A can is full of paint. Out of this 5 litres are removed and thinning liquid substituted. The process is repeated. Now the ratio of paint to thinner is 49 : 15. What is the full capacity of the can?
(a) 20 litres (b) 60 litres (c) 40 litres (d) 50 litres

Q.3 The ratio of sum of squares of first n natural numbers with square of sum of first n natural numbers is 17: 325. the value of n is
(a) 15 (b) 25 (c) 35 (d) none of these

Q4. A is greater than B by 15%. B is greater than C by $7\frac{1}{2}$ %. Find the value of A when C = 92.
(a) 112.53 (b) 113.73 (c) 114.33 (d) 115.15

Q.5 If 1 man or 2 women or 3 boys can do a piece of work in 44 days, then the same work will be done by 1 man, 1 woman and 1 boy in:
(a) 21 days (b) 24 days (c) 26 days (d) 33 days

Q.6 Two liquids A and B are in the ratio 5 : 1 in container 1 and in container 2, they are in the ratio 1 : 3. In what ratio should the contents of the two containers be mixed so as to obtain a mixture of A and B in the ratio 1: 1?
(a) 2 : 3 (b) 4 : 3 (c) 3 : 2 (d) 3 : 4

Q.7. If a carton containing a dozen mirrors is dropped, which of the following cannot be the ratio of broken mirrors to unbroken mirrors?
(a) 2: 1 (b) 3: 1 (c) 3: 2 (d) 7 : 5

Q.8 A can complete a job in 9 days, B in 10 days and C in 15 days. B and C start the work and are forced to leave after 2 days. The time taken to complete the remaining work is:
(a) 6 days (b) 9 days (c) 10 days (d) 13 days

Q.9   In a 100 metres race, A can beat B by 25 metres and B can beat C by 4 metres.
       In the same race, A can beat C by :
       (a) 29 metres   (b) 21 metres   (c) 28 metres   (d) 26 metres

Q.10.   In a 500 metres race, the ratio of speeds of two contestants A and B is 3 : 4. A
        has a start of 140 metres. Then, A wins by :
        (a) 60 metres   (b) 40 metres
        (c) 20 metres   (d) 10 metres

Q.11   A vessel contains 40 litres of milk; the milkman delivers 10 litres to the first
        house, and adds an equal quantity of water. He does exactly the same at the
        2nd and 3rd houses. What is the ratio of milk and water when he has finished
        delivering at the third house?
        (a) 27 : 37   (b) 26 : 38   (c) 1 : 4   (d) none of these

Q12.   About the number of pairs which have 16 as their H.C.F. and 136 as their
        L.C.M., we can definitely say that :
        (a) Only one such pair exists   (b) Only two such pairs exist
        (c) Many such pairs exist   (d) No such pairs exist

Q.13   The total surface area of a solid copper cube and a solid zinc cuboid are the
        same. The length, breadth and height of the cuboid are in the ratio 1: 2 : 4.
        Both are melted together in a vessel; what is the ratio of copper and zinc in
        the resultant mixture ?

       (a) $\left(\dfrac{14}{3}\right)^{\frac{3}{2}} : 8$ (b) $8 : \left(\dfrac{14}{3}\right)^{\frac{3}{2}}$

       (c) $\left(\dfrac{3}{14}\right)^{\frac{3}{2}} : 8$ (d) $8 : \left(\dfrac{3}{14}\right)^{\frac{3}{2}}$

Direction for Q 14 – 15: Two vessels have equal volumes of pure alcohol and Pepsi.
A bartender is mixing the drinks. He takes half the volume of the first vessel
containing alcohol and transfers it to the second vessel containing Pepsi. He now
transfers ½ of the resultant solution from the second vessel to the first. He repeats the
process once more transferring always ½ of the resultant solution to the other vessel.

Q.14   Find the fractional volume of alcohol in the first container?
        (a) $\dfrac{7}{16}$ (b) $\dfrac{11}{32}$ (c) $\dfrac{11}{21}$ (d) None of these.

Q.15   What is the ratio of Pepsi to alcohol in the second vessel after the process?
        (a) 6 : 5   (b) 5 : 6   (c) 2 : 1   (d) None of these.

Q.16   Which of the following number is not a square of any natural number:
        (a) 34692   (b) 4096   (c) 15309   (d) none of these

Q.17   The number of positive integers not greater than 100, which are not divisible
        by 2, 3 or 5 is
        (a) 24   (b) 26   (c) 29   (d) None of these

Q.18   A bullock cart has to cover a distance of 80 km in 10 hours. If it covers half
        of the journey in (3/5) of the time, what should be its speed to cover the
        remaining distance in the time left?
        (a) 8 km/hr   (b) 20 km/hr   (c) 6.4 km/hr   (d) 10 km/hr

Q.19.   4 people played a game of chess, where each one plays every other player.
        What is the maximum number of points that any player could gather if every
        win gets him 1 point ?
        (a) 4   (b) 3   (c) 2   (d)Data insufficient

Q.20   The value of each of a set of silver coins varies as the square of its diameter,
        if its thickness remains constant; and it varies as the thickness, if the
        diameter remains constant. If the diameters of two coins are in the ratio 4 : 3
        what should the ratio of their thickness be if the value of the first is 4 times
        that of the second?
        (a) 16 : 9   (b) 9 : 4   (c) 9 : 16   (d) 4 : 9

Q.21   A sum of Rs.2600 is lent out in two parts in such a way that the interest on
        one part at 10% for 5 years is equal to that on another part at 9% for 6 years.
        The sum lent out at 10% is:
        (a) Rs.1150   (b) Rs.1250   (c) Rs.1350   (d) Rs.1450

Q.22   If $x = \dfrac{\sqrt{7} - \sqrt{5}}{\sqrt{7} + \sqrt{5}}$ and $y = \dfrac{\sqrt{7} + \sqrt{5}}{\sqrt{7} - \sqrt{5}}$, find $x^3 + y^3$.
        (a) 1962   (b) 1692   (c) 1269   (d) 2196

Q.23   Find the unit's digit of $1^{5^5} + 2^{5^5} + 3^{5^5} + ... + 99^{5^5}$.
        (a) 1   (b) 2   (c) 4   (d) 0

Q.24   If ½ of the number of white mice in a certain laboratory is 1/8 of the total
        number of mice, and 1/3 of the number of gray mice is 1/9 of the total
        number of mice, then what is the ratio of white mice to gray mice in the
        laboratory?
        (a) 16: 27   (b) 2: 3   (c) 3: 4   (d) 4:5

Q.25   A cloth merchant has announced 25% rebate in price. If one needs to have a rebate of Rs 40, then how many shirts, each costing Rs 32, he should purchase?
(a) 6   (b) 5   (c) 10   (d) 7

Q.26   The solution set (x, y) for the system of equations $\log_2 xy = 5$ and $\log_{1/2} (x/y) = 1$, is
(a) (-4, -8)   (b) (4, 8)   (c) (8, 4)   (d) both (a) and (b)

Q.27   Solve for x: $\sqrt{x} + \sqrt{x - \sqrt{1-x}} = 1$

(a) 0   (b) 1   (c) $\dfrac{16}{25}$ (d) $\dfrac{25}{16}$

Q.28   The sum of two numbers is 29 and the difference of their squares is 145. The difference between the numbers is:
(a) 13   (b) 5   (c) 8   (d) 11

Q.29   An insurance company earns Rs 250 per person as annual premium for MEDICLAIM insurance that covers hospitalization bill up to Rs 18,900 at the rate of 80% of actual bills. It is estimated that only 1 out of every 100 insured persons would incur the hospitalization bill of Rs 15,000. This scheme costs the insurance company 10% of the revenue as administrative cost. How much would the company earn as profit per person?
(a) Rs.100   (b) Rs.150   (c) Rs.105   (d) Rs.90

Q.30   In the example given in the previous question, if instead of 1, 1.6 out of hundred incur hospitalization bills and the company wants to maintain its profit per person, how much should the premium be charged?
(a) Rs.225   (b) Rs.300   (c) Rs.330   (d) Rs.400

Q.31   The length and breadth of a square are increased by 30% and 20% respectively. The area of the rectangle so formed is more than the area of the square by:
(a) 50%   (b) 56%   (c) 60%   (d) 10%.

Q.32 2304 blocks are to be arranged in heaps in such a way that the number of blocks in each heap should be equal to the number of heaps. If the number of blocks in each heap is increased by 16, what will be the number of heaps?
(a) 32 (b) 48 (c) 36 (d) 34

Q.33 A fan is listed at Rs 150, with a discount of 20%. What additional discount must be offered to the customer to bring the net price to Rs 108?
(a) 8% (b) 10% (c) 15% (d) none of these

Q.34 Which of the two numbers is greater, 2^{300} or 3^{200} ?
(a) 2^{300} (b) 3^{200}
(c) Both are equal d) Not possible to say without log tables

Q.35 Two different numbers when divided by the same divisor leave remainders of 11 and 21 respectively and when their sum was divided by the same divisor, remainder was 4. What is the divisor ?
(a) 36 (b) 28 (c) 14 (d) 9

Q.36 A, B and C can do a work in 20, 25 and 30 days respectively. They undertook to finish it together for Rs.2220, then the share of A exceeds that of B by:
(a) Rs.120 (b) Rs.180 (c) Rs.300 (d) Rs.600

Q.37 Sameer spends 40% of his salary on food articles, and $1/3^{rd}$ of the remaining on transport. If he saves Rs 450 per month, which is half of the balance after spending on food items and transport, what is his monthly salary?
(a) Rs.2250 (b) Rs.2500 (c) Rs.3000 (d) Rs.3250

Q.38 The value of 1.1!+2.2!+3.3!+--------+n.n! is
(a) (n+1)! (b) (n+1)!+1 (c) (n+1)!-1 (d) none of these

Q.39   If $x^{\frac{1}{3}} + y^{\frac{1}{3}} + 2^{\frac{1}{3}} = 0$ then $\dfrac{(x+y+z)^3}{xyz} =$

(a) 0   (b) 1/3   (c) 9   (d)27

Q.40   The number B7A61B1A is divisible by which of the following? (A & B are any number between 0 to 9)

(a)7   (b)9   (c)11   (d)None of these

EXERCISE –2

Q.1 Find the value of $N = \dfrac{1}{2 \times 4} + \dfrac{1}{4 \times 6} + \dfrac{1}{6 \times 8} + \ldots\ldots\infty$.

(a) $\dfrac{1}{4}$ (b) 1   (c) ∞ (d) indeterminate

Q.2 A group of workers was put on a job. From the second day onwards one worker was withdrawn each day. The work was finished when the last worker was withdrawn. If no worker was withdrawn at any stage, the group would have finished the job in two-thirds time. How many workers were there in the group?

(a) 2   (b) 3   (c) 6   (d) 12

Q.3 The H.C.F. and L.C.M of 2 numbers are 21 and 4641 respectively. If one of the numbers lies between 200 and 300, what are the 2 numbers?

(a) 229, 349   (b) 143, 377   (c) 273, 357   (d) 255, 196

Q.4 A sum of money becomes (8/5) of itself in 5 years at a certain rate of simple interest. The rate per cent per annum is:

(a) 5%   (b) 8%   (c) 10%   (d) 12%

Q.5. If A = (1/3)B and B = (1/2)C, then A : B : C is.

(a) 1 : 3 : 6   (b) 2 : 3 : 6   (c) 3 : 2 : 6   (d) 3 : 1 : 2

Q.6 The product of two two-digit numbers is 2160 and their G.C.D is 12. The numbers are:

(a) 72, 30   (b) 36, 60   (c) 96, 25   (d) none of these

Q.7 The simple interest on a sum of money is 1/9 of the principal and the number of years is equal to the rate per cent per annum. The rate percent per annum is:

(a) 3   (b) 0.33   (c) 3.33   (d) 0.3

Q.8 One litre of water is evaporated from 6 litres of solution containing 5% salt. The percentage of salt in the remaining solutions is

(a) 5%   (b) 6%   (c) 1%   (d) 25%

Q.9 24 is divided into two parts such that 7 times the first part added to 5 times the second part makes 146. The first part is:

(a) 11   (b) 13   (c) 16   (d) 17

Q.10 Which of the following value of x do not satisfy the inequality $(x^2 - 3x + 2 > 0)$ at all ?

(a) $1 \leq x \leq 2$ (b) $-1 \geq x \geq -2$ (c) $0 \leq x \leq 2$ (d) $0 \geq x \geq -2$

Q.11   A lamp lighter has to light 100 gas lamps. To go from one lamp post to the next he takes 60 seconds. Each lamp burns 12 cubic feet of gas per hour. If he lights the first lamp at 7 p.m. then the gas burnt when he lights the last lamp is

(a) 1110 ft^3 (b) 1000 ft^3 (c) 999 ft^3 (d) 990 ft^3

Q.12   IBM and SGI quote for a tender. On the tender opening day, IBM realizes that their quotes are in the ratio 7 : 4 and hence decreases its price during negations to make it Rs.1 lakh lower than SGI's quoted price. SGI then realizes that the final quotes of the two were in the ratio 3 : 4. What was the price at which IBM won the bid?

(a) Rs.7 lakhs   (b) Rs.4 lakhs
(c) Rs.3 lakhs   (d) Rs.1 lakh

Q.13   The number of prime factors in the expression
$(6)^{10} \times (7)^{17} \times (11)^{27}$ is:

(a) 54   (b) 2   (c)3   (d)4

Q.14   Nupur has 73 litres of wine in a drum. She replaces 3.65 litres of it with water and keeps doing so till the time the concentration of wine is less than 85%. The minimum number of operations that Nupur has to perform is.

(a) 3   (b) 4   (c) 2   (d) none of these

Q.15   From the money that Ajay has, he gives as much to Bunti as much as Bunti has with him. Bunti then gives as much as money to Chintu as much as Chintu has with him. Finally Chintu gives as much money to Ajay as much as Ajay had before Chintu gave hime the money. How much money did each of the three friends Ajay, Bunti and Chintu have with them initially if between them they have totally Rs.48 and after the transactions each of them have equal amounts?

(a) 24, 14, 10   (b) 20, 16, 12
(c) 22, 14, 12   (d) 26, 12, 10

Q.16   Find the remainder when 51^{138} is divided by 7.

(a) 2   (b) 1   (c) 2^{138} (d) 3

Q.17   The highest power of 2 in 10! + 11! + 12! + 13! + ...+ 1000! is

(a) 8   (b) 9   (c) 10   (d) 11

Q.18   Simplify: 78² + 79² + 80² + 81² + 82².

(a) 31990   (b) 31992   (c) 32005   (d) 32010

Q.19   In an examination, Arjun obtains 10% less than the minimum number required to pass. Bheem obtains 11 $\frac{1}{9}$ % less than Arjun ; and Karan 41 $\frac{3}{17}$ %

less than the number of marks got by Arjun and Bheem together. Find Karan's result. (assume the passing percentage to be 40)
(a) pass   (b) fail   (c) data inadequate   (d) None

Q.20   If 'x' is an odd number, what will be the remainder if $x^3 - x + 1$ is divided by 24?
(a) 0   (b) 23   (c) 1   (d) Indeterminate

Q.21   A vessel contains 12 litres of wine and another contains 4 litres of water. 3 litres are taken from each and transferred to the other. Then again, 3 litres are taken from each vessel and transferred to the other. Ratio of wine to water in the two vessels is.
(a) The 1st vessel is higher   (b) The 2nd vessel is higher
(c) Is the same in both   (d) None of these.

Q.22   Two numbers are in the ratio 3 : 5. If each number is increased by 10, the ratio becomes 5 : 7. The numbers are:
(a) 3, 5   (b) 7, 9   (c) 13, 22   (d) 15, 25

Q23.   Greatest of the numbers

$$(2.89)^{0.5}, \qquad 2 - (0.5)^2, \qquad 1 + \frac{0.5}{1 - \frac{1}{2}}, \qquad \sqrt{3} \quad \text{is:}$$

(a) $(2.89)^{0.5}$ (b) $\sqrt{3}$ (c) $1 + \dfrac{0.5}{1 - \frac{1}{2}}$ (d) $2 - (0.5)^2$

Q.24   An alloy of Copper and Tin contains 77.78% of copper. After 18 kg of Tin is added, the copper content gets reduced to 50%. How much Copper and Tin do the new alloy have.
(a) 40, 15   (b) 25.2, 20   (c) 20,23   (d) None of these

Q. 25   Three utensils contain equal mixtures of milk and water in the ratio 6 : 1, 5 : 2, and 3 : 1 respectively. If all the solutions are mixed together, find the ratio of milk and water in the final mixture.
(a)65:19   (b)25:13
(c)35:18   (d) None of these

Q.26   If the units digit in the product 75p × 49 × 867 × 943 be 1, then the value of p is:
(a) 1   (b) 3   (c) 7   (d) 9

Q.27   There were 'd' dogs and 'c' cats in a house. One fine morning x of them escaped to freedom. If the keeper, knowing only that x = 9, was able to figure out without looking into the house that at least one dog has escaped, then which of the following does not represent a possible (d, c) pair?

(a) 12, 10   (b) 17, 7   (c) 22, 8   (d) None of these

Q.28   A and B can together finish a work in 30 days. They worked for it for 20 days and then B left. The remaining work was done by A alone in 20 more days. A alone can finish the work in:
(a) 48 days   (b) 50 days   (c) 54 days   (d) 60 days

Q.29   A man who went out between five o' clock and six o' clock and returned between six o' clock and seven o' clock , found that the hands of the watch had exactly changed places. when did he go out?
(a) 54 -6/121 min past 5   (b) 12-1/13 min past 5
(c) 32-4/13 min past 5   (d) 19-2/19 min past 5

Q.30   In measuring the side of a square, an error of 5% in excess is made. The error per cent in the calculated area is:
(a) 5%   (b) 10%   (c) 10. 25%   (d) 25%

Q.31   72% of the students of certain class took Biology and 44% took Mathematics. If each student took Biology or Mathematics and 40 took both, the total number of students in the class was:
(a) 260   (b) 250   (c) 360   (d) 440.

Q.32   A, B, C, D, E held a shooting competition, whoever hits the target wins the trip to US. They all shot successively, in the given order. What is the chance of C winning the trip?
(a) 4/31   (b) 1/8   (c) 3/10   (d) 3/5

Q.33   Mid-term(s) in the expression of $(x/2 - 4/x)^7$ is/are
(a) $-^7C_34x$ & $^7C_332x$ (b) $^7C_34x$ & $^7C_332x$
(c) $^7C_34x$ & $^7C_432x$ (d) $-^7C_34x$

Q.34   Area of the right angled triangle ABC is 6 units. Two of it's vertices are (-2, -2) and (1, -2). Which one of the following cannot be the third vertex?
(a) (-2, -6)   (b) (1, -6)   (c) (-2, 4)   (d) (1, 2)

Q.35   The points (2a, a), (a, 2a) and (a, a) encloses a triangle of area 2 units then the value of a is
(a) –2   (b) 4   (c) $\sqrt{2}$ (d) $2\sqrt{2}$

Q.36   If r – 1, r, and r + 1 are sides of a triangle; then r cannot be
(a) greater than 3   (b) less than or equal to 3
(c) less than 4   (d) less than or equal to 2

Q.37 A cow is tied to a pole in the middle of a field, with a 14-foot rope. If the cow eats 100 square feet of a grass a day, for how many days will the cow have enough to eat?
(a) 2　　　　(b) 18　　　　(c) 24　　　　(d) 6

Q.38 The number of ways in which 10 candidates A1, A2, ..., A10 can be ranked so that A1 is always above A2 is
(a) 101/2　　(b) $^{10}C_2\ 8!$　　(c) $^{10}C_2\ 9!$　　(d) a & b

Q.39 How many diagonals does a decagon have?
(a) 25　　　　(b) 45　　　　(c) 35　　　　(d) 55

Q.40 In an examination 20% candidates failed in English, 25% in Mathematics and 10% in both. If 2600 candidates passed in both the subjects, find the total number of the candidates appearing in the examination.
(a) 3000　　　(b) 3500　　　(c) 4000　　　(d) 4500

EXERCISE –3

Q1. How many consecutive zeros would be there at the end of 626! - 625!?

(a) 156　　　(b) 160　　　(c) 5　　　(d) none of these

Q.2   A man buys spirit at Rs.60 per litre, adds water to it and then sells it at Rs.75 per litre. What is the ratio of spirit to water if his profit in the deal is 37.5%?
(a) 9: 1   (b) 10 : 1   (c) 11 : 1   (d) None of these

Q.3   A traveler walks a certain distance. Had he gone half a kilometer an hour faster, he would have walked it in $\frac{4}{5}$ th of the time, and had he gone half a km an hour slower, he would have traveled $2\frac{1}{2}$ hours longer. What is the distance?
(a) 10 km   (b)15 km   (c) 30 km   (d) Data insufficient.

Q.4   The least multiple of 7, which leaves a remainder of 4, when divided by 6, 9, 15 and 18, is:
(a) 74   (b) 94   (c) 184   (d) 364

Q.5   A, B, and C started a business in which B and C were sleeping partners. They invested Rs. 4000, Rs. 3000 and Rs. 7000 respectively for a period of one year. A is paid 10% of the profit as compensation for his work, and then the rest is shared in ratio of their investments among all the three. If A gets Rs.6000, as his share of profit find out the amount that B & C together receive.
(a) Rs. 9000   (b) Rs. 7500   (c) Rs. 9600   (d) Rs. 10,800

Q.6   If a clock takes 30 seconds to strike 6, how long will it take to strike 12?
(a) 60 secs   (b) 62 secs   (c) 66 secs   (d) None of these

Q.7   Octal equivalent of $(1011.1111)_2$ is
(a) 13.74   (b) 13.04   (c) 11.17   (d) 13.17

Q.8   A dealer marks his goods 20% above cost price. He then allows some discount on it and makes a profit of 8%. The rate of discount is:
(a) 12%   (b) 10%   (c) 6%   (d) 4%

Q.9   My friend Asha was throwing a grand party and wanted to borrow from me 100 wine glasses. I decided to send them through my boy servant, Harish. Just to give an incentive to Harish to deliver the glasses, I offered him 3 paise for every glass delivered safely and threatened to forfeit 9 paise for every glass he broke. On settlement Harish received Rs. 2.40 from me. How many glasses did Harish break?
(a) 7   (b) 6   (c) 5   (d)None

Q.10   Three partners A, B & C invest Rs.6000, 8000, 10000 respectively in business. A receives 15% of the profit as Manager and B receives 10% of the profit as assistant manager, after which the remaining profit is divided in proportion

to the capital subscribed by each. Find share of C (in Rs.) when A receives Rs.1080.
(a) 1160   (b) 1120   (c) 1080   (d) 1000

Q.11   A certain number when divided by 899 leaves the remainder 63. Find the remainder when the same number is divided by 29.
(a) 5   (b) 4   (c) 1   (d) cannot be determined.

Q.12   Two clocks begin to strike 12 together. One strikes its stroke in 33 sec and the other in 22 sec. What is the interval between the 6th stroke of the first and the 8th stroke of the second?
(a) 4 seconds   (b) 3 seconds   (c) 2 seconds   (d) 1 second

Q.13   Three wheels can complete respectively 60, 36, 24 revolutions per minute. There is a red spot on each wheel that touches the ground at time zero. After how much time all these spots will simultaneously touch the ground again?
(a) 5/2 seconds   (b) 5/3 seconds
(c) 5 seconds   (d) 7.5 seconds.

Q.14   Two teams participating in a competition had to take a test in a given time. Team B chose the easier test with 300 questions, and team A the difficult test with 10% less questions. Team A completed the test 3 hours before schedule while team B completed it 6 hours before schedule. If team B answered 7 questions more than team A per hour, how many questions did team A answer per hour ?
(a) 15   (b) 18   (c) 21   (d) 24

Q.15   In a two-digit number, the digits differ by 1. If the digits are interchanged, the number increases by 20%. What is the number?
(a) 56   (b) 65   (c) 54   (d) 45

Q.16   Ram committed two mistakes in an exam where all the questions carried equal marks, and obtained 72%. If he had attempted 4 more questions and made 1 mistake, he would have obtained 84%. If there was no negative marking for wrong answers, how many questions were asked?
(a) 25   (b) 30   (c) 20   (d) 33

Q.17   The difference between a discount of 40% on Rs 500 and two successive discounts of 36% and 4% on the same amount is:
(a) 0   (b) Rs.2   (c) Rs.1.93   (d) Rs.7.20

Q18.   A worker is paid X rupees for the first 8 hours of work each day. He is paid Y rupees per hour for each hour he works in excess of 8 hours. He works for 13 hours on Monday, 11 hours on Tuesday, 9 hours on Wednesday, 10

hours on Thursday, and 9 hours on Friday. What is his average daily wage in rupees for a week with five working days.
(a) X + (7/5) Y   (b) X + 2Y
(c) 2X + Y   (d) 5X + 7Y

Q.19 $(BE)^2$ = MPB, where B, E, M & P are distinct integers, then M = ?
        (a) 2   (b) 3   (c) 9   (d) None of these

Q.20   Five digit numbers are formed using only 0, 1, 2, 3, 4 exactly once. What is the difference between the maximum and minimum number that can be formed?
        (a) 19800   (b) 41976   (c) 32976   (d) None of these

Q.21   Given X is an even number, identify the odd number among the choices:
        (a) X! + (X + 1)!   (b) X^x
        (c) $X^3 + X + 5$ (d) $X^2 + X^4$

Directions for questions 22 to 25 : Four friends A, B, C and D collected coins.

        i) They collected 100 altogether
        ii) None collected less than 10
        iii) Each collected an even number
        iv) Each collected a different number

Q.22   Based on the above, we can say that the number of coins collected by the boy who collected the most could not have exceeded:
        (a) 72   (b) 58   (c) 68   (d) 64

Q.23   If B collected 54, we can say (on the basis of the data available so far) that the difference in the numbers collected by the boy who collected the most and the boy who collected second highest could not have been less than:
        (a) 18   (b) 24   (c) 30   (d) 12

Q.24   B collected 54. If A collected two more than double the number collected by D, the number he (A) collected was
        (a) 34   (b) 22   (c) 30   (d) 12

Q.25   Then the number collected by D was:
   (a) 12   (b) 14   (c) 16   (d) 10

Direction for questions 26 to 27 : These questions are based on the following instructions:
Production pattern for no. of units (in cubic feet) per day.

Day	1	2	3	4	5	6	7
No. of units	150	180	120	250	160	120	160

For a truck that can carry 2000 cubic feet, hiring cost per day is Rs. 1000. Storing cost per cubic feet is Rs. 5 per day.

Q.26 If all the units should be sent to the market, on which days should the truck be hired to minimise the cost?
(a) 2nd, 4th, 6th, 7th (b) 7th
(c) 2nd, 4th, 5th, 7th (d) None of these

Q.27 If storage cost is reduced to Rs. 0. 8 per cubic feet per day, then on which day should the truck be hired?
(a) 4th (b) 7th (c) 4th and 7th (d) None of these

Q.28 n^3 is odd. Which of the following statement(s) is/are true?
(A) n is odd   (B) n^2 is odd   (C) n^2 is even
(a) A only   (b) B only   (c) A and B only   (d) A and C only.

Q.29 The diagram below shows two squares, each of whose sides equals 20. If BC = 6 and CF = 5 then what is the length of DE?
(a) 12   (b)15   (c) 18   (d) 19
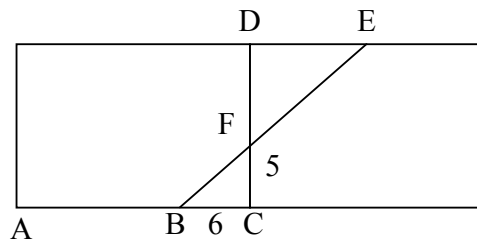
Q.30 If p is any three digit number and q is any number obtained with any type of permutations of the digits of p, then p – q is always divisible by
(a) 2   (b) 3   (c) 6   (d) 9

Q.31 If four whole numbers taken at random are multiplied together, then the probability that the last digit in the product is 1, 3, 7 or 9 is
(a) 4/25   (b) 4/10   (c) 2/5   (d) 16/625

Q.32 A rainy day occurs one in every 10 days. Half of the rainy days produce rainbows. What percent of all the days does not have rainbows?
(a) 95%   (b) 10%   (c) 50%   (d) 5%

Q.33 From a pack of 52 cards, all face cards are removed and four cards are drawn. Then the probability that they are of different suit and different denomination is …
(a) $(9/10)^4$ (b) $(10 \times 9 \times 8 \times 7)/10^4$

(c) 10 x 9 x 8 x 7/$^{40}C_4$ (d) None of these

Q.34 Five balls of different colours are to be placed in three boxes of different sizes. Each box can hold all five balls. The number of ways in which we can place the balls in the boxes so that no box remains empty is
(a) 132 (b) 155 (c) 143 (d) 150

Q.35 In the adjacent diagram, line passing through X (1,4) cuts an intercept of –1 on X-axis. It A (4,0). What are the co-ordinates of (B)
(a) (0, 21/2) (b) (0, 10) (c) (10, 0) (d) (0,8)
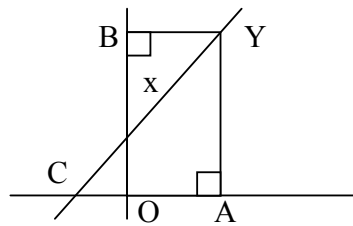
Q.36 Two cones with same base radius are attached base to base. The distance from vertex of one cone to that of other is 12 cm. If the radius of the cones is 7cm, the total volume of the shape thus formed is ..?
(a) 616 cm^3 (b) 1858 cm^3
(c) 890 cm^3 (d) 1728 cm^3
(e) cannot be determined

Q.37 What is the distance of the point P(3,5) from the line given by the equation : 45x – 3y + 1 = 0?
(a) 0 (b) 2√2 (c) 4√3 (d) 0.4

Q.38 The volume of a solid cylinder is exactly equal to the total volume of three smaller cylinders each with radius 3 cm and height 7 cm. What is the height of the larger cylinder if its radius is same as that of the smaller one?
(a) 7cm (b) 10cm (c) 15cm (d)21cm

Q.39 If the radii of two spheres are in the ratio 2:3, what should be the ratio of their volumes?
(a) 8:27 (b) 4:9 (c) 9:4 (d) 27:8

Q.40 How many arrangements can be made of the letters of the word DRAUGHT the vowels never being separated?
(a) 1440 (b) 1445 (c) 1450 (d) 1455

EXERCISE –4

Q.1   Selling an article at $2/3^{rd}$ of its Marked Price leads to a loss of 20%. If the
       MP is Rs.120, what is the Cost Price of the article?
       (a) 80   (b) 125   (c) 100   (d) 120

Q.2   Shyam, Arvind and Deepak have to push a cart-load to a shop 10km away.
       When both Shyam and Arvind push the cart, it moves at the speed of 5
       km/hr while Arvind and Deepak can push it at 6 km/hr. Arvind alone can
       push it at the speed of 3 km/hr. How long will it take to reach their
       destination if all 3 push it together?
       (a) 1 hr. 15 mins.   (b) 2 hrs.
       (c) 1 hr   (d) 1.5 hrs

Q.3   X,Yand Z start a venture together. Y and Z invest Rs.4000 and Rs.3000 respectively while X invests Rs.1000 initially and after 6 months withdraws his capital and decides to work as a working partner with 30% stake in the profits. If X gets Rs.800 at the end of the year, what was the total profit.
(a) 1200   (b) 3600   (c) 2400   (d) 4800

Q.4   1728 – 3 x 35 x 12 = ?
(a) 628   (b) 468   (c) 768   (d) 568

Q.5   Kapil Sharma bought a certain number of shares for Rs. 27, 400 plus ⅕‰ brokerage. When the market price of each share increased by Rs.13 each, he sold them to make a profit of Rs.2400. What was the market price at which Kapil bought the shares if the brokerage is ⅕‰ ?
(a).Rs.150   (b) Rs.137   (c) Rs.140   (d) Rs.130

Q.6   A, B, C and D are 4 brothers standing in a row (not necessarily in that order) such that the difference between the ages of two adjoining brothers is constant. A and B are twins while C is younger than A but older than D. If A is not standing at either of the extremes then B must be standing at
(a) The first position   (b) at either extremes
(c) Next to A   (d) None of these

Q.7   How many kgs of sugar costing Rs. 18 a kg should be mixed with 24 kgs of sugar costing Rs.20 per kg so as to get sugar costing Rs.18. 50 per kg ?
(a) 8   (b) 16   (c) 24   (d) 72

Q.8 Two trains of same length moving in opposite directions have their speeds in the ratio 2: 3. They take 10 seconds to cross each other. The faster train takes 25 seconds to cross a stationary train 500 meters long. What is the length of either train?
(a) 500 mts.   (b) 250 mts   (c) 750 mts   (d) 400 mts

Q.9 A shopkeeper sells a shirt at 15% profit and a saree at 15% loss. If the SP of both the shirt and the saree was the same, how much percent loss or profit did he make in the overall transaction?
(a) 2% loss   (b) 2.25% profit (c) 2% profit   (d) 2.25% loss

Q.10 Decrease of 20% in the SP increases the sale by 50% but decreases the profit to 0%. What was the initial profit percentage?
(a) 10%   (b) 12%   (c) 25%
(d) 30%

Q.11 Labourers working for 12 hours a day can complete a work in 30 days. How much time would 15 labourers take to do ½the work if they work for 12 hours a day?
(a) 5 days   (b) 4 days   (c) 10 days   (d) 15 days

Q.12 What is the angle between the hands of the clock at 8:24 p.m.?
(a) 100   (b) 107   (c) 106   (d) 108

Q.13 Two sample CAT papers containing equal number of questions were to be prepared by John and Raymond. John had tough and simple question in the ratio of 19: 6. Raymond had tough and simple question in the ratio of 47: 3. Later it was decided that the two papers should be merged. What is the percentage of tough questions in the final paper?
(a) 87   (b) 85   (c) 59   (d) 67

Q.14 Mr.Khanna earns $1/3^{rd}$ of his total income from his salary while $1/5^{th}$ of the rest by working for an office on weekends. He earns ⅙of the remaining from royalty payment as the author of a best seller he had written some time back and the remaining amount from investments in stocks. If he earns Rs.1200 by working on the weekends, what is the interest he gets from the investments?
(a) 2400   (b) 1200   (c) 3300   (d) 2000

Q.15 The ratio of the speeds of two trains is 3:2 The distance between them is 1000 meters and length of each train is 100 meters. What is the ratio of the time required for them to pass each other completely when they are moving in the same direction to the time required when they are moving in opposite directions?

(a) 2:3   (b) 3:2   (c) 5:1   (d) 1:5

Q.16   At what time between 3 o'clock and 4 o'clock, the minutes hand is 4 minutes behind the hour hand?
(a) 15 min past 3   (b) 27 min past 3
(c) 12 min past 3   (d) 6 min past 3

Q.17   The ratio of Ist class, IInd class & IIIrd class passengers on a station to travel in an express train is 1/21 : 1/7 : 1/3. If the total no. of passengers is 385, the number of Ist, IInd & IIIrd class passengers is respectively.
(a) 35, 105, 245   (b) 105, 35, 245
(c) 245, 35, 105   (d) 35, 245, 105

Q.18   In the preparation of a tea mixture, 1 kg of it goes waste out of every 100 kgs. In what ratio the two kinds of tea of rates Rs.24 and Rs.18 per kg, respectively, be mixed so that the cost of the mixture may come down to be Rs.20 per kg.
(a) 4:6   (b) 3:7   (c) 2:9   (d) 11:13

Q.19   Ajay can row three quarters of a kilometer against the current in 11 ¼ minutes and returns in 7 ½minutes. Find the speed of man in still water.
(a) 42 kmph   (b) 5 kmph   (c) 5.5 kmph   (d) 6 kmph

Q.20   Rahul invests Rs.6200 partly in 5% stock at Rs.132 and partly in 4% stock at Rs.99. If the dividend is the same from each stock, find the value of the each investment.
(a) Rs.3200 in 5%, Rs.3000 in 4%
(b) Rs.3000 in 5%, Rs.3200 in 4%
(c) Rs.3100 in both
(d) Data insufficient to say

Q.21   If m and n are integers and $\sqrt{(mn)}$ is 10. Which of the following cannot be the value of m + n?
(a) 29   (b) 25   (c) 52   (d) 50

Q.22   An electric pump can fill a tank in 3 hours. Because of a leak, it took 3.5 hours to fill the tank. In how much time, the leak can drain all the water of the tank?
(a) 20 hours   (b) 20.5 hours   (c) 21 hours   (d) 22 hours

Q.23   A man, who looked like a tourist, came to Ram's bicycle shop one day and bought a bicycle from him for Rs.350. The cost price of the bicycle was Rs.300. So Ram was happy that he had made a profit of Rs.50 on the sale. However, at the time of setting the bill, the tourist offered to pay in travelers

cheques as he had no cash money with him. Ram hesitated. He had no arrangement with the banks to encash travelers cheques. But he remembered that the shopkeeper next door has such a provision, and so he took the cheques to his friend next door and got cash from him.

The travelers cheques were all of Rs.100 each and so he had taken four cheques from the tourist totaling to Rs.400. On encashing them Ram paid back the tourist the balance of Rs.50.

The tourist happily climbed the bicycle and pedalled away whistling a tune. However, the next morning Ram's neighbour, who had taken the travelers cheques to the bank called on him and returned the cheques which had proved valueless and demanded the refund of his money. Ram quietly refunded the money to his neighbour and tried to trace the tourist who had given him the worthless cheques and taken away his bicycle. But the tourist could not be found. How much did Ram lose altogether in this unfortunate transaction?

(a) Rs.350   (b) Rs.250   (c) Rs.450   (d) Rs.400

Q.24   A regular working day is 8 hours and regular week is 5 working days. Ramesh is paid Rs.2.40 per regular hour and Rs.3.20 per hour overtime. If the earns Rs.432 in 4 weeks, what is the total number of hours he works?
(a) 180   (b) 175   (c) 160   (d) 195

Q.25   The value of $|\log_{10}e + \log_e 10|$ is
(a) 1   (b) 2   (c) less than 2   (d) greater than 2

Q.26   The remainder when 2^{3015} is divided by 17 is
(a) 1   (b) 2   (c) 4   (d) None of these

Q.27   Selling an article for Rs.5 less results to a drop in profit from 25% to 20%. What is the cost price of the article?
(a) Rs.150   (b) Rs.80   (c) Rs.100   (d) Rs.125

Q.28   9 men can do a piece of work in 24 days at the rate of 8 hours per day. How long would it take to finish the same work by 16 men working 12 hours a day?
(a) 18 days   (b) 9 days   (c) 6 days   (d) 10 days
(e) None of these

Q.29   Sunil has $4/5^{th}$ of the number of berries that Rahul has. If Sunil sells the berries at $2/3^{rd}$ the price per kg at which Rahul sells, and Rahul has 20% profit, what is the profit or loss percentage of Sunil?
(a) 10% profit   (b) 20% loss   (c) 20% profit   (d) 10% loss
(e) neither profit nor loss

Q.30   Which is greater (i) 18^{88888} (ii) 5^{177776}
(a) i   (b) ii
(c) both are equal   (d) the numbers are not defined

Q.31 A man running at 12 kmph is pursued by a dog running at 16 kmph. If the distance between the man and the dog is 300 meters when the dog started running, how much time will it take for the dog to overtake the man?
(a) 5 minutes   (b) 4.5 mins   (c) 3 mins   (d) 6 mins

Q.32 Ghelaram sells two types of rice A and B costing Rs.5 and Rs.11 respectively.Ghelaram sells a mixture of these two qualities. He charges Rs.2197 for 169 kg of the mixture. What is the ratio in which he has mixed the A quality of rice costing Rs.5/- kg with rice costing Rs.11/-kg?
(a) 1:2   (b) 2:3   (c) 4:5
(d) Indeterminable

Q.33 Ravi shankar takes money from the employees co-operative society at lower rate of interest and saves in a scheme, which gives him a compound interest of 20%, compounded annually. Find the least number of complete years after which his sum will be more than double.
(a) 2 years   (b) 4 years   (c) 6 years   (d) 8 years

Q.34 How many numbers divisible by 8 are there between 900 and 1700?
(a) 95   (b) 100   (c) 105   (d) 110

Q.35 A person has to make a journey of 72 kms. He rides a cycle at 12 kms/hr. After going a certain distance, the cycle is punctured and he walks the remaining distance at 4 ½kms/hr. Find when the cycle is punctured if the total time for the jouney is 8 ½hrs.
(a) 50 kms   (b) 52 kms   (c) 54 kms   (d) 56 kms

Q.36 A litre of water weighs a kilogram and a litre of another liquid weighs 1,350 grams. A mixture of two weighs 1,250 gram/litre. The volume of water and the liquid in a litre of mixture is
(a) 22/7,15/7   (b) 5/7, 2/7   (c) ¾1/4   (d) ¼¾

Q.37 Supposing a clock pendulum takes 7 seconds to strike 7, how long will the same clock take to strike 10?
(a) 10 seconds   (b) 9.5 seconds
(c) 10.5 seconds   (d) 11 seconds

Q.38 If P9 = 1 + 22 + 333 + 4444 + ...+ 999999999, then P9 – P8 is
(a) 10^9 (b) 10^9 - 1   (c) 10^9 + 1   (d) 10^8 –1

Q.39 If the average of p numbers is a, and when x is added to the p numbers, the average of the p+1 numbers is b, then x is equal to which of the following ?
(a) pa + b   (b) p(a + b)   (c) 2pa – pb   (d) (b – a)p + b

Q.40 Aashish writes letters to four of his friends. He asks each of them to copy the letter and mail to four different persons with the request that they continue the chain similarly. Assuming that the chain is not broken, and that it costs 25 paise to mail one letter; what will be the total amount spent on postage (in rupees) till the 8th set of letters is mailed?
(a) 17640   (b) 21845   (c) 12880   (d) None of these

EXERCISE –5

Q.1 Raj invests Rs.2400 partly in 3% stock at 75 and partly in 4% stock at 96. If the total income from both is Rs.97.50, find the sum invested in each.
(a) Rs.1500 in 3%, Rs.900 in 4%   (b) Rs.900 in 3%, Rs.1500 in 4%
(c) Rs.1200 in each   (d) Rs.2000 in 3%, Rs.400 in 4%

Q.2 The average speed of a train including stoppages was 27 kms/hr and excluding stoppages was 41 kms/hr. How many minutes did the train stop per hour.
(a) 20.5 min   (b) 15 min   (c) 18.5 min   (d) 20 min

Q.3 Two pipes A and B would fill a cistern in 24 and 32 minutes respectively. Both pipes being opened, find when the first pipe must be turned off so that the cistern may be just filled in 16 minutes?
(a) 10 minutes   (b) 12 minutes
(c) 14 minutes   (d) 16 minutes

Q.4 P,Q,R are consecutive integers. Which of the following is true?
(a) P+Q+R is always even   (b) P+Q+R is always odd
(c) P+2Q+R is always even   (d) P+2Q+R is always odd

Q.5 A student walks from his house at a speed of $2^{1/2}$ kms/ hr and reaches his school 6 minutes late. The next day he increases his speed by 1 km/hr and reaches his school 6 minutes early. How far is the school from his house.
(a) 1 ¼ kms   (b) 1 ¼ kms   (c) 2 kms   (d) 1 ¾ kms

Q.6 If the price of sugar increases by 20%, one can buy 2 kgs less in Rs.50. What is the amount of sugar that could be bought before the price hike?
(a) 10   (b) 8   (c) 16   (d) 12

Q.7 If Ramesh incurs 10% loss by selling an article costing him Rs.50 after giving a discount of 20%, what will be the selling price of the article?
(a) 40   (b) 56.25   (c) 45   (d) 47.25

Q.8 How many times are the minute hand and the hour hand at right angle in a week?
(a) 156   (b) 308   (c) 168   (d) 161

Q.9 In what ratio should water be added to a liquid costing Rs.15 per litre so as to make a profit of 25% by selling the mixture at 12.50 per litre?
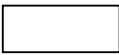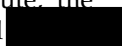(a) 2:1   (b) 3:1   (c) 1:2   (d) 1:3

Q.10   Ram can do a piece of work in 90 days, Sohan in 40 days and Raj in 12 days. They work for a day each in turn i.e. first day Ram does it alone, second day Sohan alone and third day Raj alone. After that the cycle is repeated three times. They get Rs.240 for this job. If the wages are divided in proportion to the work each had done. Find the amounts each will get,
(a) Rs.14, Rs.64, Rs.162   (b) Rs.24, Rs.74, Rs.142
(c) Rs.34, Rs.64, Rs.142   (d) Rs.24, Rs.54, Rs.162

Q.11   Rohan buys 150 articles on which he has to pay Rs.50 on carriage. The articles were marked for sale at Rs.12.50 each. Rohan sells 90 of them at this price and the remaining after allowing a discount of 20% on the marked price. Altogether he finds that he makes a profit of 38% on his outlay. Calculate the amount he pays for each article.
(a) Rs.10   (b) Rs.9   (c) Rs.8   (d) Rs.7

Q.12   The sides of the triangular piece of ground measure 15547, 17647, 3521 feet respectively. Find the length of the largest hurdle that can be used to fence it exactly without bending or cutting a hurdle.
(a) 6m   (b) 6.5 m   (c) 7 m   (d) 7.5 m

Q.13   A bus number had a certain peculiarity about it. The number plate showed the bus number was a perfect square and also if the plate was turned upside down, the number would still be perfect square. The bus company had only five hundred buses numbered from 1 to 500. What was the number?
(a) 169   (b) 36   (c) 196   (d) cannot say

Q14   Three containers P, Q and R have volumes p, q and r respectively; and container P is full of water while the other two are empty. If from container P water is poured into container Q which becomes $1/3^{rd}$ full, and into container R which becomes half full, how much water is left in container P?
(a) $p - q/2 - r/3$ (b) $(6p-2q-3r)/6$
(c) $(5p-3q-2r)/6$ (d) $(p-q-r)/6$

Q.15   An ant can crawl in the area marked [   ] at 1 inch per minute, the area marked [▨] at 3 inches per minute, and the area marked [▬] at 5 inches per minute. If BE = 51 inches, AC and BD each equals to 29 inches, CE = 42 inches and DF = 37 inches. How long would it take for an ant to crawl from A to E?

Start

A   B   C   D   E   F

(a) 41 minutes   (b) 47 minutes
(c) 52 minutes   (d) 75 minutes

Q.16 The average age of the students in a class is 8. If the age of the teacher is 28 and the average age increases by 0. 5 considering the teacher's age too then the total number of students in the class is :
(a) 24   (b) 36   (c) 48   (d) 39

Q.17 Bozo invests some amount in the bullion market and four times that amount in real estate. After two years, the bullion prices rise by 20% and the real estate prices rise by 5%. He disinvests everything and puts the amount in stocks, which crash to 40% of the value. If he had invested 20,000 in real estate, what was the total amount he has with him in the end?
(a) Rs.10,000   (b) Rs.10,800
(c) Rs.12,800   (d) Rs.12,000

Q.18 12 men working for 5 hrs a day finish constructing 4 walls of a room each with dimensions 15x12x1/2 in two days. How long would it take to finish the same work if 5 men work for 6 hours a day?
(a) 1   (b) 3   (c) 2   (d) 8

Q.19 In a 500m race Runman beats Bhagtaram by 100m. In 800m race Bhagtaram beats Padtabhau by 200m. By how much did Runman beat Padtabhau in a race of 1000 m?
(a) 300m   (b) 500m   (c) 400m   (d) 600m

Q.20 How much water when added to 270ml of 18% nitric acid give an acid of 10% concentration?
(a) 300ml   (b) 240ml   (c) 216 ml   (d) 144ml

Q.21 Equal sums of money are deposited in two different banks by Shehnaz Treasurywala, one at CI, compounded annually, and the other at SI, both at 5% p.a. If after two years, the difference in the amounts come to Rs.200, what are the amounts deposited with each bank?
(a) 64000   (b) 72000   (c) 80000   (d) 8400

Q.22 A train running between two towns arrives at its destination 10 minutes late when it goes 40 kms per hour and 16 minutes late when it goes 30 kms per hr. The distance between the two towns is
(a) 11 km   (b) 12 km   (c) 13 km   (d) 14 km

Q.23 If $(x+y)/z = 1$, then
(a) x not equal to z   (b) z not equal to 1
(c) x + y + z not equal to 0   (d) x not equal to y

Q.24 A 60 metres long train travelling at 42 kms/hr crosses a train 84 metres long travelling at 30 kms/hr in the same direction. How long will it take to fully cross it?

(a) 42 sec   (b) 43.2 sec   (c) 44.2 sec   (d) 45.2 sec

Q.25   Three equal glasses are filled with mixtures of spirit and water. The ratio of the spirit to water in each glass is as follows : in the first glass as 3 : 4, in the second glass as 4 : 5 and in the third glass as 5 : 6. The contents of the three glasses are emptied into a single vessel. What is the ratio of the spirit to water in the mixture now?
(a) 920 : 1159   (b) 1159 : 920   (c) 11 : 9   (d) None of these

Q.26   If a, b and c are three natural numbers such that c is a factor of the product ab and c is coprime to a, then
(a) b is a factor of c   (b) c is a factor of b
(c) a is a factor of b   (d) b is a factor of a

Q.27   A manufacturer sells goods to an agent at profit of 10%. The agent's wholesale price to a shopkeeper is at a profit of 20% and shopkeeper's profit is 25%. Find the manufacturing cost of goods bought from the shop for Rs.41.25.
(a) Rs.20   (b) Rs.21   (c) Rs.25   (d) Rs.30

Q.28   A gardener had a number of shrubs to plant in rows. At first he tried to plant 2 in each row, then 3, then 4, then 5 and then 6 but always, 1 left. On trying 7, he had none left. What is the smallest number of shrubs he could have had?
(a) 201   (b) 401   (c) 501   (d) 301

Q.29   1080 mangoes were distributed among few boys. Every boy was given as many mangoes as the number of boys. But 9 mangoes fell short this way. How many boys were there?
(a) 31   (b) 33   (c) 35   (d) 37

Q.30   If $a/b = c/d$ and $d/c = x/y$. Which of the following is true?
(a) $y / a = x / b$ (b) $xy = ab$
(c) $ac/bd = x/y$ (d) $x + c + d - y$

Q.31   If $a < b < 0$ then
(a) $a/b < 1$ (b) $a + b > -1$
(c) $a/b > 1$ (d) $ab > 1$

Q.32   The weight of a body, as calculated by the average of 7 different experiments is 53.735 g. The average of the first three experiments is 54.005 g, the fourth experiment was greater than the fifth by .004 g while the average of sixth and the seventh was 0.010 g less than the average of the first three. Find the weight of the body as obtained by the fourth experiment.
(a) 53 gm   (b) 53.072 gm
(c) 54.072 gm   (d) 55.072 gm

Q.33   A student bought books, note-books and pencils from a stationer. If the ratio of the number of books to the number of note books is the same as the ratio of the number of note books to the number of pencils, find the number of note books if books and pencils are 20 & 5 respectively.
(a) 7   (b) 8   (c) 9   (d) 10

Q.34   m + n = 0, but 1/m + 1/n not equal to 0
(a) m = n   (b) m > 0   (c) m < 0   (d) $m^2 > n^2$

Q.35   Shyam can buy 10 kg more rice when the price reduces by 10%. If the price increases by 12.5%, how much less can he buy for Rs.1,800. What was the original price?
(a) 15 kg Rs.12   (b) 10 kg, Rs.20   (c) 9 kg, Rs.20
(d) 9 kg, Rs.20

Q.36   Atul lent some money in the ratio 1: 2 at 5% SI and 8% SI respectively. His total income after 2 years was Rs.420. Find the total sum.
(a) Rs.1000   (b) Rs.4500   (c) Rs.3000   (d) Rs.1500

Q.37   The ratio of milk to water in a mixture is 9:1. Some water is mixed in it and now the new mixture contains 80% milk. If the initial mixture was 2 litres, how much water is mixed?
(a) 250 ml   (b) 300 ml   (c) 400 ml   (d) 500 ml

Q.38   Samir wants to donate some hens to 14 fakirs, cows among 11 Brahmins and some goats to 12 churches. At the market, he finds that with every cow, he is getting a hen free and also a discount on the purchase of one goat. Hence he decides to buy equal number of cows and goats. What is the minimum number of cows or goats that he should buy so that he is left with enough to gift a cow, a hen and a goat to each of his 5 sisters. How many cows does Samir gift to each Brahmin?
(a) 924,12   (b) 924,80   (c) 929,12   (d) 929,84

Q.39   X, Y and Z are riding on a highway. X's speed is half of that of Y and three fourths of that of Z. If Y takes 10 hrs, how much time will Z take?
(a) 15   (b) 12   (c) 18   (d) 14

Q.40   If petrol costs 30 ps per gallon or 40 ps. per gallon, how far can a driver who uses equal amounts of the two kinds of petrol drive for Rs.350? He gets 15 miles to the gallon on an average.
(a) 100 miles   (b) 200 miles   (c) 150 miles   (d) 35 miles

EXERCISE - 6

Q.1 If $x = a(b - c)$, $y = b(c - a)$, $z = c(a - b)$, then $\left[\dfrac{x}{a}\right]^3 + \left[\dfrac{y}{b}\right]^3 + \left[\dfrac{z}{c}\right]^3 = ?$

(a) $\dfrac{3xyz}{abc}$ (b) $\dfrac{xyz}{abc}$ (c) 3xyzabc   (d) 3

Q.2 Given that x and y are distinct positive integers. We want $\dfrac{x + y}{xy}$ to be an integer.
(a) This is impossible
(b) This is possible for a unique value of the pair (x, y).
(c) This is possible for finite values of the pair (x, y).
(d) This is possible for infinite values of the pair (x, y).

Q.3 Values of x which satisfies $\left|\dfrac{11 - x}{2}\right| < 3$ are

(a) $5 < x < 17$ (b) $-3 > x > -17$
(c) $-4 < x < 17$ (d) $x < 17$

Q.4 The area of a rectangle remains the same if the length is increased by 9 meters and the breadth is decreased by 5 meters. The area remains unaffected if the length is decreased by 7 m and breadth is increased by 5 m. Find the dimensions of the rectangle.
(a) 43m, 38m   (b) 63m, 40m
(c) 72m, 35m   (d) 12m, 7m

Q.5 The number of real solutions of the equation $|x|^2 + 5|x| + 4 = 0$ are :
(a) 4   (b) 3   (c) 2   (d) 0

Q.6 $|x| = y + 5$ is equivalent to
(a) $x + y + 5 = 0$ (b) $x + y - 5$ or $x - y - 5 = 0$
(c) $x - y - 5 = 0$ (d) $x - y - 5 = 0$ or $x + y + 5 = 0$

Q.7 Which of the following is NOT true?
(a) $| a \times b | = | b \times a |$ (b) $| a \times b | = |a| \times |b|$
(c) $|a + b| < |a| \times |b|$ (d) $| a - b | \geq |a| - |b|$

Q.8 Given p, q, r, are all odd numbers, then $p^2 + (q - r)$ is
(a) Prime   (b) Even
(c) Odd   (d) cannot be determined

Q.9 If a, b, and c are in GP, then $\log_a n$, $\log_b n$ & $\log_c n$ are in

(a) AP   (b) GP   (c) HP   (d) None

Q.10   Evaluate the expression $4x^3 + 2x^2 - 8x + 7$ when $x = \dfrac{\sqrt{3}+1}{2}$.

(a) 5   (b) 10   (c) 20   (d) 25

Q.11   Solve: $ax + y = 2$, $x + ay = 2a$, where 'a' is a constant, $a \neq \pm 1$.
(a) (1,1)   (b) (a, 1)
(c) (0, 2)   (d) No real solution possible

Q.12   The roots of the equation $x^2 - 4 = 0$ are.....
(a) Real   (b) Imaginary
(c) Not defined   (d) Insufficient

Q.13   The two linear equations $2x + 5y = 12$ and $x + y = 3$ will intersect each other at
(a) (35/3, 5/3)   (b) (2, 1)
(c) (1, 2)   (d) (-1, 2)

Q.14   If $3x - 4y = 8$ then $12x - 16y$ is:
(a) 16   (b) 20   (c) 32   (d) 40

Q.15   If $1/3 + \frac{1}{2} + 1/x = 4$, then $x =$
(a) 18/5   (b) 19/6   (c) 24/11   (d) 6/19

Q.16   Simplify the given equation $\dfrac{x^3 - abc + (ab - bc - ca)x + (a + b - c)x^2}{(a - c)x + x^2 - ac}$

(a) (x-b)   (b) (x+b)

(c) $\dfrac{(x + a)(x - b)}{(x - c)}$ (d) (x-b)

Q.17   If R=99, find $R(R^2+3R+3)$
(a) 999999   (b) 999991   (c) 99999   (d) 998099

Q.18   Find the value of x for the equation $3^x - 3^{x-1} = 486$
(a) 5   (b) 6   (c) 4   (d) 7

Q.19   Find the greatest integer X for which $-6X - 1 > 27$ is true
(a) –6   (b) –7   (c) –8   (d) –5

Q.20   When $x^2 + 4xy + 4y^2$ takes a minimum value then
(a) x = -2y   (b) x = 2y   (c) 2x = y   (d) –2x =y

Q.21 What is the sum of the 11 terms of an Arithmetic Progresion whose 3rd term is 10 and the 9th term is 20 ?
(a) 135 (b) 165 (c) 330 (d) None of these

Q.22 Consider the following simultaneous equations: $x + y + z = 6$ and $6x + 6y + 6z = 36$. The number of solution(s) for which above equations will be satisfied is/are
(a) 0 (b) 1 (c) 3 (d) Infinite

Q.23 If the operation * is defined * a = a² - 2, then *(*5) is:
(a) 23 (b) 527 (c) 529 (d) 621

Q.24 If a, b, & c are integers and $\sqrt{ab} = c$ then
(a) both a and b must be perfect squares
(b) either **a** is a perfect square or **b** is a perfect square
(c) **c** cannot be a perfect square
(d) **c** need not be greater than zero.

Q.25 The profit for a firm is given by
$P = x^3 - 6x^2 + 12x + 38 = 0$ Where x is the output quantity. How much should the firm produce to maximize the profit?
(a) 2 (b) 3 (c) 4 (d) 2

Q.26 The range of k for which the roots are imaginary for the equation
$x^2 + (k + 1) x + 8 = 0$ is
(a) $k < 4 \sqrt{2} + 1$ (b) $-(4\sqrt{2} + 1) \le k \le 4\sqrt{2} - 1$
(c) $k > 4\sqrt{2} -$ (d) None of these

Q.27 A father's age is equal to the sum of the ages of his three sons. If in nineteen years one-third of the father's age will be equal to one-fifth the sum of the ages of the sons, what is the father's age now?
(a) 28 (b) 38 (c) 48 (d) 58

Q.28 Tabu's age is $1/3^{rd}$ of her fahter's age. Tabu's father's age will be 12 year more than twice of Rohit's age after 10 years. If Rohit's eighth birthday was celebrated 3 years before, then what is Tabu's present age?
(a) 24 (b) 30 (c) 14 (d) 18

Q.29 If $y = 3^{x-1} + 3^{-x-1}$ where x is real, then the least value of y is
(a) 2 (b) 2/3 (c) 6 (d) None of these

Q.30 The value of $x^6 y^5 z^{11} \div x^7 y^3 z^2 * z^3 y^{-3}$ for z = 2, x = 8 and y = 16 is …..?
(a) 4 (b) 8 (c) 32 (d) 1/2

Q.31 If $\log_5 64 = x$ then $\log_5 8 = $ …...?

(a) $x/2$ (b) $x^{1/2}$ (c) 1   (d) $1/2$

Q.32   A man purchased 40 fruits: Apples and oranges for Rs.17. Had he purchased as many oranges as apples and as many apples as oranges, he would have paid Rs.15. Find the cost of one pair of an apple and an orange.
(a) 70 paise   (b) 60 paise   (c) 80 paise   (d) 1 rupee

Q.33   How many roots are possible for the equation : $\log_2 x^2 + \log_x 2 = 3$?
(a) 3   (b) 2   (c) 1   (d) None

Q.34 $a + b = 2c \; \forall \; a, b, c \in R$. Then which of the following is true?
(I) a!b! is least possible   (II) a!b! is greatest possible
(III) a = c
(a) I and III   (b) II and III   (c) I only   (d) II only

Q.35   Greatest value of $y = (x + 1)^{1/3} - (x - 1)^{1/3}$ on [0, 1] is
(a) 1   (b) 2   (c) 3   (d) $2^{1/3}$

Q.36   If $a^2 > a^3 > a^4$ then which of the following represents all possible values of a.
(a) $a < 0$ (b) $-1 < a < 0$ (c) $a < 1$ (d) $0 < a < 1$

Q.37   If α, β are the roots of the quadratic equation $6x^2 - 6x + 1 = 0$ then
$\frac{1}{4}(a + b\alpha + c\alpha^2 + d\alpha^3) + \frac{1}{4}(a + b\beta + c\beta^2 + \beta^3) =$
(a) $a + b/2 + c/3 + d/4$ (b) $a/4 + b/3 + c/2 + d$
(c) $a + b + c + d$ (d) $a/2 + b/3 + c/4 + d$

.

Q.38   If $\log^2 x - 5 \log x + 6 = 0$, then the value(s) of x could be
(a) 2   (b) e^2 (c) e^3 (d) e^2 and e^3 both

Q.39   If $1, \omega, \omega^2$ are three cube roots of unity, then $(1 - \omega + \omega^2)(1 - \omega^2 + \omega^4)(1 - \omega^4 + \omega^8) \ldots$ to n factors equals
(a) zero   (b) 1   (c) 2^n (d) $2^n - 1$

Q.40   Minimum value of $f(x) = |3 - x| + |2 + x| + |5 - x|$, will be
(a) 0   (b) 7   (c) 8   (d) 10

EXERCISE - 7

Q.1   The equation $e^{\sin x} - e^{-\sin x} - 4 = 0$ will have
(a) one real value of x   (b) two real value of x
(c) no real value of x   (d) none of these

Q.2   The value of the expression $\left[\dfrac{\sqrt{2}+1}{2\left(\sqrt{2}-1\right)} - \dfrac{\sqrt{2}-1}{2\left(\sqrt{2}+1\right)} \right]^{\frac{1}{3}}$.

(a) $(\sqrt{2}+1)/(\sqrt{2}-1)$ (b) $\sqrt{2}$
(c) $\sqrt{2}/(\sqrt{2}+3)$ (d) $\sqrt{2}/(\sqrt{2}+1)$

Q.3   What is the number whose square is equal to the sum of the squares of 4683 and 4460.
(a) 6467   (b) 5442   (c) 1170   (d) 7863

Q.4   Sum to inifnite for $1^2 + 2^2/2! + 3^2/(2!)^2 + 4^2/(2!)^3 + 5^2/(2!)^4 + \ldots\ldots$
(a) 12   (b) 24   (c) 27/2   (d) None of these

Q.5   For real x the equation $\left|x/(x-1)\right| + |x| = x^2/|x-1|$ has
(a) exactly one solution   (b) exactly two solution
(c) at least two roots   (d) infinite number of solution

Q.6   If $g_1, g_2 \ldots\ldots g_{2n+1}$ are in GP and $g_{n+1} = 50$, then $g_1 \, g_{2n+1}$ is
(a) 200   (b) 250   (c) 2500   (d) 1250

Q.7   The value of a for which quadratic equation $3x^2 + 2(a^2 + 1)x + (a^2 - 3a + 2) = 0$ possesses roots of opposite sign lies in
(a) $(-\infty, 1)$ (b) $(-\infty, 0)$ (c) $(1, 2)$ (d) $(3/2, 2)$

Q.8   Let $f(x) = x^6 - 25x^5 + 49x^4 - 73x^3 + 87x^2 + 113x + 54$. Find the value of $f(23)$.
(a) 1029   (b) 10   (c) 15   (d) 8

Q.9   Mr. Roaming started at a point walks 2 km south, then 4 km west, then one km south, then 3 km west, then 2 km south and then 5 km west to arrive at the destination. What is the shortest distance from the starting point to the destination ?
(a) 9 km   (b) $9\sqrt{2}$ km   (c) $11\sqrt{3}$ km   (d) 13 km

Q.10   If $4^{a-5+b} = 2^{a+b} \times 2^b \times 2^{a-4} - 63$, find the sum of a and b
(a) 2   (b) 3   (c) 4   (d) 5

Q.11   If a and b are two unequal positive numbers, then:

(a) $2ab > \sqrt{ab} > \dfrac{a+b}{2}$ (b) $\sqrt{ab} > \dfrac{2ab}{a+b} > \dfrac{a+b}{2}$

(c) $\dfrac{2ab}{a+b} > \dfrac{a+b}{2} > \sqrt{ab}$ (d) $\dfrac{a+b}{2} > \sqrt{ab} > \dfrac{2ab}{a+b}$

Q.12 If H(n) = nearest integer greater than or equal to n, L(n) = nearest integer lower than or equal to n , A(m,n) = average of m and n, then the value of
A[H{L(3.1) - H(6.1)},
L {H(7.3) – L(1.9)}] is :
(a) 1 . 5   (b) – 4 .5   (c) 0 . 5   (d) - 3

Q.13 The value of the sum $\dfrac{1}{100^2 - 100} + \dfrac{1}{101^2 - 101} + \ldots\ldots\ldots + \dfrac{1}{9999^2 - 9999}$

is :

(a) $\dfrac{9900}{9999}$ (b) $\dfrac{1}{101}$ (c) $\dfrac{1}{9999}$ (d) $\dfrac{100}{9999}$

Q.14 If $0 < a, b, c < 1$ and $a + b + c = 1$ then
(a) $((1-a)/a)((1-b)/c)((1-c)/c) \geq 8$ (b) $((1-a)/a)((1-b)/c)((1-c)/c) \geq 6$
(c) $((1-a)/a)((1-b)/c)((1-c)/c) < 8$ (d) None of these

Q.15 The real term of the sequence a+bi , (a-1)+(b-1)i ,(a-2)+(b-2)i ……is
(a) (b-1)th term   (b) bth term
(c) (b+1)th term   (d) None of these.

Q.16 The sum of n terms of an AP is $an + bn^2$ where a, b are real numbers. Then common difference of A.P. is
(a) 2a   (b) 2b   (c) a+b   (d) a-b

Q.17 If a+b = 2 and a, c, b are in harmonic progression then the geometric mean of a and b is given by …
(a) $c^{1/2}$ (b) 1   (c) ab/2   (d) 2
(e) cannot be determined.

Q.18 There are five nos. that are in AP as well as GP with the first term as a. The numbers therefore must have the middle term as …
(a) 0   (b) 1   (c) a
(d) equal to common difference

Q.19 If $\sqrt{(6x^2 - 5x + 11)} + \sqrt{(6x^2 - 5x - 25)} = 12$, then value of $6x^2 - 5x$ is
(a) 181/4   (b) 200   (c) Many solutions   (d) No solution

Q.20 Recently, while in London, I decided to walk down the escalator of a tube station. I did some quick calculation in my mind. I found that if I walk down twenty-six steps, I require thirty seconds to reach the bottom. However, if I am able to step down thirty-four stairs I would only require eighteen seconds to get to the bottom. If the time is measured from the moment the top step begins to descend to the time I step off the last step at the bottom, can you tell the height of the stair way in steps?
(a) 44   (b) 48   (c) 46   (d) 42

Q.21 What is 11th term of 2/9, ½2/7, 1/3.....

(a) –2   (b) 1   (c) –3/13   (d) None of these

Q.22 If a, b, c are in AP, then the roots of the equation $ax^2 + 2bx + c = 0$ are

(a) real   (b) imaginary   (c) equal if a = c   (d) both a and c

Q.23 The expressions $y + x^3 + yx$ and $y^3 + y^2 + x$ are equal if

(a) y = 0   (b) $x^2 = 1$ (c) $y + x^3 = x + y^3$ (d) $x^2 = y^2$

Q.24 The numerator of a fraction is a multiple of two nos. One of the nos. is greater than other by 2. The greater no. is smaller than the denominator by 1. If the denominator is given as 5 + c (c is a constant), then the minimum value of the fraction is

(a) 2   (b) –2   (c) –1/2   (d) 1/2

Q.25 A family has several children. Each boy in this family has as many sisters as brothers but each girl has twice as many brothers as sisters. How many brothers and sisters are there ?

(a) 4 brothers, 3 sisters   (b) 3 brothers, 4 sisters

(c) 4 brothers, 4 sisters   (d) cannot say

Q.26 If the sum of the roots of the quadratic equation $ax^2 + bx + c = 0$ (abc ≠ 0) is equal to sum of the squares of there reciprocals then a/c, b/a, c/b are in

(a) AP   (b) GP   (c) HP   (d) None of these.

Q.27 If x, y and z are the sizes of a triangle satisfying the condition that the sum of the products of two sides is 5, then the sum of the squares of it's sides lies in the interval

(a) [5, 7.5]   (b) [5, 10]   (c) [10, 15]   (d) [5, 15]

Directions : Qns.28-29 : Refer to the definitions of the following two operations.
a # b = ab + 1/ab and c##d = (c+1/c)(d+1/3), where a, b, c and d are non - zero real numbers.

Q.28 Which of the following is equal to 99 # 1/99 ?

(a) 20 # 20   (b) 4 # ½   (c) ¼# 2   (d) 10 # 5

Q.29 Which expression is equivalent to c ## d?

(a) c ## (c#d)   (b) (c#d) + (c# 1/d)

(c) c#(c#d)   (d) c# (d##d)

Q.30 Oranges cost anywhere from 15 ps. Per pound to 30 ps per pound. What is the greatest number of pound of oranges you can buy with Rs.5?

(a) 33   (b) 20   (c) 16   (d) 17

Q.31 Salim was going from Paris to Budapest via Rome, a distance of 1200 km, by train. From Paris he takes the TGV, which travels at 500 km/hr, and gets down at Rome. Then, he immediately takes a bike and rides the remaining part of the journey at a speed of 200 km/hr. If he takes a total of three hours from Paris to Budapest, what is the distance (in kms) from Paris to Rome?
(a) 800   (b) 900   (c) 940   (d) 1000

Q.32 Little Manu took a certain number of toffees from the toffee-jar but later fearing that his mother would catch him, he put back half of them into the jar. When asked how many toffees he had taken, he admitted to have taken only $1/3^{rd}$ of what he had initially taken. Based on this his mother calculated how many toffees should have been left in the jar, but observes that the actual number is 5 short. How many toffees did Manu take initially?
(a) 60   (b) 120   (c) 30   (d) 25

Q.33 The no. of real solution(s) of $\cos(\log x) = 3^{2x} + 3^{-2x}$ is/are
(a) zero   (b) one   (c) two   (d) infinite

Q.34 The coefficients of x in the (2r + 1)th term and (r − 2)th terms in the expansion of $(1 + x)^{15}$ are equal. The rth term is
(a) $^{15}C_3 \, x^3$ (b) $^{15}C_5 x^5$ (c) $^{15}C_6 \, x^6$ (d)Data insufficient

Q.35 Find the greatest value of xyz for positive values of x, y, z subject to the condition yz + zx + xy = 12
(a) 64   (b) 8   (c) 16   (d) 32

Q.36 The number of solution of $\sqrt{(x + 3)} + \sqrt{x} = 1$, is
(a) two   (b) one   (c) none   (d) None of these

Q.37 Which one of the following holds?
1. $7^7 > 1.3.5.7.9 \ldots.13$
2. $2^n > 1 + n\sqrt{2^{n-1}}$
3. $1/(7+1) + 1/(7+2) + \ldots.+ 1/(2.7) > \frac{1}{2}$
(a) 1   (b) 2 & 3   (c) 3 & 1   (d) all of these

Q.38 Sum of n terms of following series will be :
$(2n − 1) + 2(2n − 3) + 3(2n − 5) + \ldots….$
(a) $1/6 \, n^2 \, (n+1)(2n+1)$ (b) $1/6 \, n \, (n+1) \, (2n+1)$ (c) $1/6n \, (n+1) \, (2n+1)^2$
(d) None of these

Q.39 If $(a + 1/a)^2 = 3$, then $a^3 + 1/a^3$ equals
(a) 0   (b) $3\sqrt{3}$ (c) $10\sqrt{3}/3$ (d) $6\sqrt{3}$

Q.40 'a_n' is the nth term of a GP. If $\Sigma a_{2n} = x$ and $\Sigma a_{2n+1} = y$. Then for n = (1, 2, …200) the common ratio is

(a) x/y (b) y/x (c) $\sqrt{x}/y$ (d) $\sqrt{y}/x$

EXERCISE - 8

For (Q. 1- 4): In a class of 33 students, 20 play cricket, 25 footballs and 18 table tennis. 15 play both cricket and football, 12 play football and table tennis, 10 table tennis and cricket. Each student plays at least one game.

Find the number of students:

Q.1   Who play only cricket?
      (a) 5   (b) 7   (c) 2   (d) 3

Q.2   Who play all the three games?
      (a) 5   (b) 7   (c) 2   (d) 3

Q.3   Who play only two games?
      (a) 16   (b) 18   (c) 20   (d) 22

Q.4   Who play only one game?
      (a) 18   (b) 16   (c) 10   (d) 5

Q.5   A line is drawn from top left corner to the bottom right corner of a rectangle ABCD. Area 1 and 2 are also rectangles. Then,
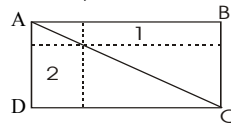

      (a) area of 1 > area of 2
      (b) area of 1 < area of 2
      (c) area of 1 = area of 2
      (d) relationship depends upon the dimensions of the rectangle and the position of P along the diagonal.

Q.6   The area of the largest triangle that can be inscribed in the outermost circle is $\dfrac{3\sqrt{3}}{4}$ cm². Find the total circumference of all five circles (given that the centers of all the circles are collinear).
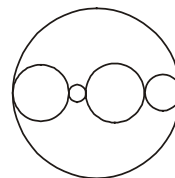
(a) 2 π   (b) 3π   (c) 4π   (d) can't be determined

Q.7   In a square of side 10 cm, with each vertex as center, 4 quarter circles are drawn, which are tangent to each other at the center of the square. Find the shaded area.
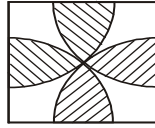

Qn 6

(a) $50\pi - 100$ (b) $100(\pi - 1)$ (c) $75\pi - 100$ (d) 25π

Q.8   There are two circles, in which larger one with centre P and radius p and the smaller one with centre Q and radius q touch each other internally. Find which of the following statements is true?
(a) p + q can be equal to PQ   (b) p + q can be less than PQ
(c) p – q can be less than PQ   (d) p – q is equal to PQ

Q.9   A curve is composed by connecting 6 quarter circumferences with different sizes as shown in the figure. Length of the small square is 2 cm. Find the length of the curve.

(a) 42 π   (b) 84π   (c) 21π   (d) 7π
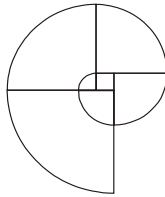
Q.10   How many other arrangements of the alphabets of SUNRISE are possible in which all the vowels are not together?
(a) (7! – 5!)/2   (b) (7! – 5! – 2!)/2
(c) 2460   (d) Both a and c

Q.11   What is the smallest possible radius of a circle such that it is possible to place 6 points on the circumference with an integer distance between any two?
(a) $1/\pi$ (b) $2/\pi$ (c) $6/\pi$ (d) $3/\pi$

Q.12 A tower is standing 200 mts. away from a cliff. The angle of elevation to the top of the cliff from the top of the tower is 30^0 while that from the bottom of the tower is 45^0. What is the height of the tower ?
(a) 200 ($\sqrt(3-1)/\sqrt3$ (b) 200$\sqrt3$ ($\sqrt3$-1)   (c) 200$\sqrt3/(\sqrt3$-1)
(d) 200

Q.13 A thirsty crow stops by a spherical pot containing water. But unfortunately the water level in the pot is too low. The smart crow put in 576 round pebbles in the pot and the water level rises upto the top thus bringing the water into the reach of the crow. If the radius of each peeble is 1 cm and the pot was initially 2/3rds full, what is the radius of the pot?
(a) 12   (b) $12(3/2)^{1/3}$ (c) $12/(3)^{1/3}$ (d) 576

Q.14 A cone of radius 14 cm height 15 cm is cut in a plane parallel to its base. If the area of the circle at the intersection is 154 sqm then what is the height from the base at which the cone is cut?
(a) 10cm   (b) 5 cm   (c) 15 cm   (d) 7.5 cm

Q.15 There are two similar triangles. The lengths of the sides of one of them are 2 cm, 3 cm and 4 cm. The perimeter of the second triangle is 81 cm. Find the lengths of the corresponding sides of the other triangle.
(a) 18, 36, 27   (b) 18, 27, 36   (c) 27, 18, 36   (d)36,27, 18

Q.16 A five digit no. is formed with digits 1 to 9. The no. has the same digits on all the odd positions. A distinct digit is repeated on all the even positions. The sum of the two digits at one odd and consecutive even position is 10. Find the number if the product of all the five digits in the number has to be maximum.
(a) 91919   (b) 73737   (c) 64646   (d) 82828

Q.17 The chord RS of length 8 cm , of a circle with center C,cuts one of the diameter PQ in a point T such that CT=TQ, If RT = 6,then the diameter of the circle is
(a) 14 cm   (b) 8 cm   (c) 16 cm   (d) None of these

Q.18 How many three digit odd nos. can be formed from the digits : 2, 0, 3, 5? (repetition not allowed).
(a) 8   (b) 4   (c) 12   (d) 6

Q.19 Himanshu received a coded message : CHANGTANGSANG, which he has to decipher by forming a single word. He knows the correct position of all the A's. Find the chance that he is able to decode the message correctly?
(a) 3!3!/10!   (b) 36/101   (c) ½   (d)1/31

Q.20 A five digit number $x_1x_2x_3x_4x_5$ is such that x_5 is the greatest digit and the digits from x_3 on either side are in decreasing order. Total number of such numbers is

(a) $^9C_5.^4C_2$ (b) $^9C_4.^3C_2$ (c) $^9C_5.^4C_2 + ^9C_4.^3C_2$ (d) None of these