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| **TIME & WORK** |

1. **A can do a piece of work in 30 days which B alone can do it in 20 days. In how many days will they finish the work, both working together?**

**LCM of 30 and 20 = 60 (60/2 + 3) = (60/5) = 12 days**

1. **A can do a piece of work in 36 days which B alone can do it in 45 days. In how many days will they finish the work, both working together?**

**LCM of 36 and 45 = 180 (180/5 + 4) = (180/9) = 20 days**

1. **A sum of money is sufficient to pay A’s wages for 21 days or B’s wages for 28 days. The money is sufficient to pay the wages of both for:**

**LCM of 21 and 28 = 84. The money is sufficient to pay the wages of both for**

**(84/4+3) = 12 days.**

1. **If Ramesh, Suresh and Harish can do a piece of work in 15 days, 10 days and 6 days respectively, how long will they take to do it, if all the three work at it together?**

**LCM of 15, 10 and 6 = 30 (30/2+3+5) = (30/10) = 3 days**

1. **Two persons A and B working together can dig a trench in 8 hours while A alone can dig it in 12 hours. In how many hours B alone can dig such a trench?**

**RULE: (A + B) – A = B LCM of 8 and 12 = 24**

**= (24/3 – 2) = (24/1) = 24 hours**

1. **A and B together can complete a piece of work in 35 days while A alone can complete the same work in 60 days. B alone will be able to complete the same work in:**
2. **42 days (b) 72 days (c) 84 days (d) 96 days**

**RULE: (A + B) – A = B LCM of 35 and 60 = 420**

**= (420/12 – 7) = (420/5) = 84 days**

1. **A and B together can do a piece of work in 6 days and A alone can do it in 9 days. In how many days can B alone do it?**

**LCM of 6 and 9 is 18.**

**RULE: (A + B) – A = B**

**(18/3 – 2) = 18 days**

1. **If A, B and C together can finish a piece of work in 4 days; A alone can do it in 12 days and B in 18 days, then C alone can do it in:**
2. **21 days (b) 16 days (c) 14 days (d) 9 days**

**RULE: (A + B + C) – A – B = C LCM of 4, 12 and 18 = 36**

**= (36/9-3-2) = (36/4) = 9 days**

1. **A and B working together could mow a field in 28 days and with the help of C they could have mowed it in 21 days. How long would C take by himself?**

**LCM of 28 and 21 = 84**

**(A + B + C) – (A + B) = C**

**(84/4 – 3) = 84 C alone can complete the work in 84 days.**

1. **A and B can do a piece of work in 12 days; B and C can do it in 15 days; A and C can do it in 20 days. In how many days will A, B and C finishes it, working all together?**

**RULE: (A + B) + (B + C) + (C + A) = 2(A + B + C) LCM of 12, 15 and 20 = 60**

**Implies (60/5+4+3) = (60/12) = 5 days**

**Therefore (A+B+C) will complete the work in (5x2) = 10 days**

1. **A and B can do a piece of work in 18 days; B and C can do it in 24 days; A and C can do it in 36 days. In how many days can they do it all working together?**
2. **12 (b) 13 (c) 16 (d) 26**

**RULE: (A + B) + (B + C) + (C + A) = 2(A + B + C) LCM of 18, 24 and 36 = 72**

**= (72/4+3+2) = (72/9) = 8 days**

**Therefore, all together can do it in (8x2) = 16 days**

1. **A and B can do a piece of work in 12 days, B and C in 15 days, C and A in 20 days. How long would each take separately to do the same work?**

**Total units of the work = LCM of 12, 15 and 20 = 60**

**RULE: (A + B) + (A + C) – (B + C) = 2A**

**(60/5 + 3 – 4) = (60/4) = 15 days. Means A alone can complete the work in 15 x 2 = 30 days**

**RULE: (A + B) + (B + C) – (A + C) = 2B**

**(60/5 + 4 – 3) = (60/6) = 10 days. Means B alone can complete the work in 10 x 2 = 20 days**

**RULE: (B + C) + (C + A) – (A + B) = 2C**

**(60/4 + 3 – 5) = (60/2) = 30 days. Means C alone can complete the work in 30 x 2 = 60 days**

1. **A and B can do a piece of work in 72 days; B and C can do it in 120 days; A and C can do it in 90 days. In what time can A alone do it?**
2. **150 days (b) 120 days (c) 100 days (d) 80 days**

**RULE: (A + B) + (A + C) – (B + C) = 2A LCM of 72, 120 and 90 = 360**

**= (360/5 + 4 – 3) = (360/6) = 60 days**

**Therefore A alone can complete the work in (60x2) = 120 days**

**RULE: “Capacity” means ‘the ability of a person to do a particular work’. It means ‘more capacity less time taken / less capacity more time taken’.**

1. **A can do a certain job in 12 days. B is 60% more efficient than A. The number of days, it takes B to do the same piece of work is:**
2. **6 (b) 6¼ (c) 7½ (d) 8**

**Capacities of A and B = 100 : 160 = 5 : 8**

**5 …………12 days**

**8 ………….? (more capacity, less time – indirect proportion)**

**= (5x12)/8 = (60/8) = 7½ days**

1. **A can do a piece of work in 15 days and B alone can do it in 10 days. B works at it for 5 days and then leaves. A alone can finish the remaining work in:**
2. **6½ days (b) 7½ days (c) 8 days (d) 9 days**

**Total work = LCM of 15 and 10 = 30 units**

**Capacities of A and B = 2 : 3**

**B works it for 5 days = 3 x 5 = 15 units Remaining work = 30 – 15 = 15**

**A can do it in (15/2) = 7½ days**

1. **A is twice as good a workman as B and together they finish a piece of work in 14 days. The number of days taken by A alone to finish the work, is:**

**Capacities of A and B are 2 and 1 respectively.**

**3 capacity of A and B together can complete the work in 14 days, means, 2 capacity of A alone complete the work in (3 x 14/2) = 21 days.**

1. **A is thrice as good a workman as B and takes 10 days less to do a piece of work than B takes. B alone can do the whole work in how many days?**

**The capacities of A and B are 3 and 1 respectively.**

**B with capacity 1 can complete the work in x days.**

**A with capacity 3 can complete the work in (x – 10) days.**

**(Indirect proportion – less capacity more days – more capacity less days)**

**1x = 3(x – 10) or 2x = 30 or x = 15 days**

1. **A is twice as good a workman as B and together they finish a piece of work in 18 days. In how many days will A alone finish the work?**

**Capacities of A and B are 2 and 1 respectively. Capacities of A and B = 2 + 1 = 3**

**3 capacity …….18 days**

**2 capacity ………..(3 x 18/2) = 27 days**

1. **A and B together can do a piece of work in 7 days. If A does twice as much work as B in a given time, find how long A alone would take to do the work?**

**Capacities of A and B are 2 and 1 respectively.**

**3 capacities of A and B complete the work in 7 days. 2 capacity of A take (3 x 7/2) = 10 ½ days**

1. **A can do a work in 25 days and B can do it in 20 days. They work together for 5 days and then A goes away. In how many days will B finish the remaining work?**

**Total work = LCM of 20 and 25 = 100 units**

**Capacities are A and B are 4 and 5 respectively.**

**Work done by A and B in 1 day = 5 + 4 = 9 units**

**In 5 days they complete 9 x 5 = 45 units of work.**

**Remaining work = 100 – 45 = 55 units**

**B alone complete 55 units work in (55/5) = 11 days**

1. **16 men can do a piece of work in 10 days. How many men are needed to complete the work in 40 days?**

**To do a work in 10 days, 16 men are needed (or) to do the work in 1 day, (16 x 10) men are needed. So, to do the work in 40 days, (16x10/40) = 4 men are needed.**

1. **A can do a piece of work in 5 days. How many days will he take to complete 3 works of the same type?**

**He will take 3 x 5 = 15 days**

1. **A can do a work in 10 days. B takes 15 days to complete it. C takes as long as A and B would take working together. How long will it take A, B and C to complete the work together?**

**A in 10 days, B in 15 days. A and B together in (30/3 + 2) = 6 days**

**A in 10 days, B in 15 days and C in 6 days. LCM = 30**

**A, B and C together in (30/3+2+5) = 3 days**

1. **Ram can do (2/3) of a work in 16 days. In how many days can he finish (1/12) of the work?**

**2 parts of work can be done in 16 days means total (3 parts) of work can be done in 24 days.**

**(1/12) of the work can be done in (1/12)(24) = 2 days.**

1. **Sudhir can do (4/5) of a work in 8 days. In how many days can he finish (1/10) of the work?**

**4 parts of work can be done in 8 days means total (5 parts) of work can be done in 10 days. (1/10) of the work can be done in (1/10)(10) = 1 day.**

1. **Vinay can do (1/4) of a work in 5 days. In how many days can he finish (1/5) of the work?**

**Total work can be done in 4 x 5 = 20 days. (1/5) of the work can be done in**

**(1/5)(20) = 4 days**

1. **A certain number of men can do a work in 60 days. If there were 8 men less it could be finished in 10 days more. How many men were there?**

**60x = 70(x – 8) implies 10x = 560 or x = 56 men**

1. **3 men can complete a piece of work in 6 days. Two days after they started the work, 3 more men joined them. How many days will they take to complete the remaining work?**

**After two days, 3 men can complete the remaining work in 4 days.**

**When 3 more joined, 6 men can complete the work remaining work in 2 days.**

1. **A group of men decided to do a work in 10 days, but five of them became absent. If the rest of the group did the work in 12 days, find the original number of men?**

**x men …………10 days**

**(x – 5) men…………..12 days 10x = 12(x – 5)**

**On solving x = 30 men**

1. **There is a sufficient food for 400 men for 31 days. After 28 days, 280 men leave the place. For how many days will the rest of the food last for the rest of the men?**

**After 28 days, food is sufficient for 400 men for 3 days. For 400 – 280 = 120 people the food will last for more days.**

**400 men …………3 days**

**120 men …………(400 x 3/120) = 10 days**

1. **A can do a piece of work in 12 days. A does the work for 2 days only and leave the job. B does the remaining work in 5 days. In how many days B alone can do the complete work?**

**A’s 10 days work can be completed by B in 5 days. Similarly, A’s 12 days work can be completed by B in 6 days.**

1. **Mohan can mow his lawn in x hours. After 2 hours it begins to rain. The unmowed part of the lawn is:**

**Mohan mows the whole lawn in x hours. In 2 hours, he mows (2/x) of the lawn.**

**Therefore, unmowed part = 1 – (2/x) = (x – 2/x) part**

1. **If factory A turns out x cars an hour and factory B turns out y cars every 2 hours, the number of cars which both factories turn out in 8 hours is:**

**Factory A in 2 hours turns out ………..2x cars**

**Factory B in 2 hours turns out ………….y cars**

**In 2 hours both turn out (2x + y) cars and in 8 hours they turn out 4(2x + y) cars**

1. **A can complete a work in 6 days and B in 5 days. They work together, finish the job and receive Rs22000 as wages. B’s share should be:**

**Capacities of A and B are 5 : 6**

**We know that amount should be distributed on their capacities ratio but not on their days ratio.**

**B’s share = 22000(6/11) = Rs12000**

1. **A, B and C together earn Rs1500 per day while A and C together earn Rs940 and B and C together earn Rs760. The daily earning of C is:**

**C= (A + C) + (B + C) – (A + B + C) = 940 + 760 – 1500 = Rs200**

1. **A and B working separately can do a piece of work in 9 and 12 days respectively. If they work for a day alternately, A beginning, in how many days the work will be completed?**

**Capacities of A and B are 4 and 3 respectively.**

**Total units of work = LCM of 9 and 12 = 36 units**

**(A + B) in 2 days complete 7 units of work. Likewise 35 units of work can be done in 10 days**

**Remaining = 36 – 35 = 1 unit**

**On 11th day A will go to the work and completes the remaining work (1 unit) in (1/4)th of the day.**

**Therefore total work can be done in 10 + (1/4) = 10 ¼ days**

**ALLIGATION & MIXTURE**

1. **In what ratio must tea powder at Rs 620 be mixed with tea powder at Rs 720 per kg so that the mixture must be worth Rs 645 per kg? (3:1)**
2. **In what ratio must basmati rice at Rs 93 per kg be mixed with rice at Rs 108 per kg so that the mixture be worth Rs 100 per kg? (8:7)**
3. **A man lent out Rs 9600 partly at 12% and partly at 14% simple interest. His annual income after 1½ years was Rs 1800. Find the sum lent at different rates?**

**Total income on Rs 9600 for 1½ years = Rs 1800**

**Rate = (100 x 1800)/(9600 x (3/2) = 12.5%**

**Here rate of 1st part = 12% rate of second part = 14% mean rate = 12.5%**

**1st part : 2nd part = 1.5 : 0.5 = 15:5 = 3:1**

**First part = 9600(3/4) = Rs 7200 second part = 9600 – 7200 = Rs 2400**

1. **A sum of Rs 11800 was divided among 50 boys and girls such that each boy received Rs 260 and each girl Rs 180. Find the number of boys and girls?**

**Average money received by each = (11800/50) = Rs 236**

**Sum received by each boy is Rs 260, sum received by each girl Rs 180 and average is Rs 236.**

**Ratio of number of boys and girls = 56 : 24 = 7:3**

**No. of boys = 50(7/10) = 35 No. of girls = 50-35 = 15**

1. **A man travelled a distance of 90 km in 9 hours partly on foot at 8 kmph and partly on bicycle at 17 kmph. Find the distance travelled on foot?**

**Average distance covered in 1 hour = (90/9) = 10 km**

**Distance covered in one hour on foot = 8 km**

**distance covered in 1 hour on bicycle = 17 km**

**Average distance = 10 km**

**Ratio of times taken = 7:2**

**Therefore out of 9 hours he took 7 hours on foot**

**Distance covered on foot = 8 x 7 = 56 km**

1. **How many kilograms of dry fruits costing Rs 900 per kg must be mixed with 27 kg of dry fruits costing Rs 700 per kg so that there may be a gain of 10% by selling the mixture at Rs 924 per kg?**

**Selling price of 1 kg of mixture = Rs 924 and gain is 10%**

**Cost price of 1 kg of mixture = 924x100/110 = Rs 840**

**Cost price of first kind = Rs 900 cost price of second kind = Rs 700**

**Mean price = Rs 840**

**Ratio of quantities of first and second kind = 140 : 60 = 7:3**

**7:3 ::x:27 or x = 7x27/3 = 63 kg**

1. **A merchant has 1000 kg of sugar, part of which he sells at 8% profit and the rest at 18% profit. He gains 14% on the whole. Find the quantity sold at 18% profit? (600 kg)**
2. **A sum of Rs 4000 is lent out in two parts, one at 8% simple interest and the other at 10% simple interest. If the annual interest is Rs 352, find the sum lent at 8%?**

**Average rate per cent per annum = 352x100/4000 = 8.8%**

**Rate of first part is 8% and rate of second part is 10% mean rate = 8.8%**

**Ratio of first and second parts = (1.2) : (0.8) = 3:2**

**First part = (3/5)(4000) = Rs 2400**

1. **A sum of Rs 3120 was divided among 100 boys and girls in such a way that each boy gets Rs 36 and each girl Rs 24. Find the number of girls? (40)**
2. **A mixture of 20 kg of spirit and water contains 10% water. How much water must be added to this mixture to raise the percentage of water to 25%?**

**(2+x)/(20+x) = (25/100) on solving we get x = 4 kg**

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| **CLOCKS** |

**RULE: Between x and (x + 1) o’ clock, the two hands will be together at (60/11)(x) minutes**

**past x.**

1. **At what time between 4 and 5 o’ clock are the hands of the clock together?**

(60/11)(4) = (240/11) = 21 (9/11) min past 4.

1. **At what time, are the hands of a clock together between 2 and 3?**

(60/11)(2) = (120/11) = 10 (10/11) min past 2.

1. **At what time between 5 and 6 are the hands of a clock together?**

(60/11)(5) = (300/11) = 27 (3/11) min past 5.

1. **At what time between 9 and 10 will be hands of a watch be together?**

(60/11)(9) = (540/11) = 49 (1/11) min past 9.

**RULE: To find the angle between hands of a clock, angle between two hands**

**= 30 (Diff of hrs and Minutes/5) +(minutes/2)**

1. **At what angle are the hands of a clock inclined at 25 minutes past 5?**

30 (Diff of 5 and 25/5) + (25/2) = 30 x 0 + 12.5 = 12.5 degrees

1. **At what angle is the hands of a clock are inclined at 15 minutes past 5?**

30(Diff of 5 and 15/5) + (15/2) = 30 x 2 + 7.5 = 67.5 degrees

1. **Find the angle between the two hands of a clock of 15 minutes past 4 o’ clock?**

30(Diff of 4 and 15/5) + (15/2) = 30 x 1 + 7.5 = 37.5 degrees

1. **At what angle are the two hands of a clock inclined at 20 minutes past 5?**

30(Diff 5 and 20/5) + (20/2) = 30 x 1 + 10 = 40 degrees

**PIPES & CISTERNS**

1. **Two pipes A and B can fill a tank in 30 minutes and 15 minutes respectively. If both the pipes are opened simultaneously, how much time will be taken to fill the tank?**
2. **8 min (b) 9 min (c) 10 min (d) 12 min**

**LCM of 30 & 15 = 30 (30/2+1) = 10 min**

1. **A pipe can fill a tank in 10 hours and another pipe can empty it in 12 hours. If both the pipes are opened, find the time in which tank is filled?**
2. **30 hours (b) 40 hours (c) 50 hours (d) 60 hours**

**LCM of 10 & 12 = 60 (60/6-5) = 60 hours**

1. **A water tank is (2/5)th full. Pipe A can fill the tank in 10 minutes and the pipe B can empty it in 6 minutes. If both the pipes are open, how long will it take to empty or fill the tank completely?**
2. **6 minutes to empty**
3. **6 minutes to fill**
4. **9 minutes to empty**
5. **9 minutes to fill**

**LCM of 10 & 6 = 30 (30/3-5) = - 15 minutes**

**Negative sign indicates the tank will be emptied.**

**(2/5)th tank will be emptied in (15x2/5) = 6 minutes**

1. **A pipe can fill (1/4) of cistern in 16 minutes. In how many minutes, it can fill (3/4) of the cistern?**

**Time to fill the full tank = 16 x 4 = 64 minutes**

**(3/4) tank will be filled in (3 x 64/4) = 48 minutes**

1. **A pipe can fill a tank in 15 hours. Due to a leak in the bottom , it is filled in 20 hours. If the tank is full, how much time will the leak take to empty it?**

**LCM of 15 & 20 = 60 (60/4-3) = 60 hours**

**Therefore the tank will be emptied in 60 hours**

1. **Pipe A can fill a tank in 20 hours while pipe B alone can fill it in 30 hours and pipe C can empty the full tank in 40 hours. If all the pipes are opened together, how much time will be needed to make the tank full?**

**LCM of 20, 30 & 40 = 120 (120/6+4-3) = (120/7) hours**

1. **Three pipes A, B and C can fill a cistern in 6 hours. After working together for 2 hours, C is closed and A and B fill the cistern in 8 hours. Find the time in which the cistern can be filled by pipe C?**

**A+B+C can fill (2/6) = (1/3) of the cistern in 2 hours.**

**Unfilled part 1-(1/3) = (2/3) is filled by (A+B) in 8 hours. That means (A+B) can fill the total cistern in (8x3/2) = 12 hours**

**(A+B+C) – (A+B) = C LCM of 6 & 12 is 12**

**(12/2-1) = 12 C alone can fill the cistern in 12 hours**

1. **A pipe can fill a tank in 12 minutes and another pipe in 15 minutes, but a third pipe can empty it in 6 minutes. The first two pipes are kept open for 5 minutes in the beginning and then the third pipe is also opened. In what time is the cistern emptied?**

**Total capacity of the tank = LCM of 12, 15 & 6 = 60 units**

**Capacities of pipes A, B and C = 5, 4 and 10**

**In 5 minutes A and B can fill (9x5) = 45 units, later pipe C is also opened.**

**(45/5+4-10) = - 45 Negative sign indicates emptying.**

1. **Two pipes can separately fill a tank in 20 hours and 30 hours respectively. Both the pipes are opened to fill the tank but when the tank is (1/3) full, a leak developed in the tank through which (1/3) of the water supplied by both the pipes leak out. What is the total time taken to fill the tank?**

**LCM of 20 & 30 = 60 (60/3+2) = 12 hours**

**(1/3) of the tank is filled in (12/3) = 4 hours**

**Now (1/3) of the supplied water leaks out. That means the filler pipes are only**

**1-(1/3) = (2/3) as efficient as earlier.**

**The work (12 – 4= 8) hours will be completed now in 8/(2/3) = 8(3/2) = 12 hours**

**Total time needed is 12 + 4 = 16 hours**

**PERMUTATIONS & COMBINATIONS**

1. **In how many ways 3 prizes can be given away to 7 boys when each boy is eligible for any of the prizes?**
2. **27 (b) 81 (c) 343 (d) 2187**

**Two prizes can be given to the same boy, but two boys cannot get the same prize, therefore we must start with the prize.**

**Each of the three prizes can be given away to any one of the 7 boys in 7 ways.**

**Required number = 7 x 7 x 7 = 343**

1. **A letter lock consist of three rings each marked with 10 different letters. In how many ways it is possible to make an unsuccessful attempt to open the lock?**
2. **998 (b) 999 (c) 1000 (d) 1001**

**Each of the three rings can have only one of the 10 different letters in 10 ways.**

**Total number of attempts = 10 x 10 x 10 = 1000**

**But out of these 1000 attempts only one attempt is successful.**

**Unsuccessful attempts = 1000 – 1 = 999**

1. **In how many ways 4 boys and 4 girls can be seated in a row so that boys and girls are alternative?**

**Case 1: when a boy sits in the first place BGBGBGBG**

**4 boys can be seated in 4! ways and 4 girls can be seated in 4! Ways**

**Case 2: when a girl sits in the first place GBGBGBGB**

**4 girls can be seated in 4! ways and 4 girls can be seated in 4! ways**

**Total possible ways = 4!4! + 4!4! = 2(4!4!) = 2 x 24 x 24 = 1152**

**RULE: Number of circular arrangements of ‘n’ different things = (n – 1)!**

1. **In how many ways can 5 Indians and 5 Englishmen be seated along a circle so that they are alternate?**

**5 Indians can be seated along a circle in 4! Ways. 5 English men can be seated in 5! Ways**

**Total ways = 4!5!**

1. **How many different words can be formed with the letters of the word ‘PENCIL’ when vowels occupy even places?**
2. **140 (b) 142 (c) 144 (d) 150**

**There are 6 letters in the word PENCIL and no letter is repeated. There are two vowels and there are 3 even places are available for two vowels (2nd, 4th, 6th)**

**3 vowels can be arranged in 3! ways = 6 ways**

**Four consonants can be arranged in remaining four places in 4! = 24 ways**

**Required number = 24 x 6 = 144 ways**

1. **In how many ways can 8 Indians, 4 Americans and 4 Englishmen be seated in a row so that all persons of the same nationality sit together?**

**First we consider each of the same nationality as 1 unit. Hence 3 units**

**Later each national can be arranged internally in 8!, 4! and 4! ways respectively.**

**Total possible ways = 3! 8! 4! 4!**

1. **4 boys and 2 girls are to be seated in a row in such a way that two girls are always together. In how many different ways can they be seated?**
2. **120 (b) 240 (c) 360 (d) 480**

**We consider 2 girls as one unit. Now there are 5 students**

**Possible ways of arranging them are 5! = 120 ways**

**Two girls can be arranged internally in 2! = 2 ways**

**Total ways = 120 x 2 = 240**

**RULE: If there are ‘m’ horizontal and ‘n’ vertical lines, then the number of different rectangles formed are given by (mc2 x nc2)**

1. **In a chess board there are 9 vertical and 9 horizontal lines. Find the number of rectangles formed in the chess board?**

**(9c2)(9c2) = 36 x 36 = 1296**

**RULE: In a party every person shakes hands with every other persons. If there was a total of H handshakes in the party, the number of persons ‘n’ who were present in the party can be calculated from the equation given as n(n-1)/2 = H**

1. **8 men entered a lounge simultaneously. If each person shook hands with the other then find the total number of handshakes?**

**(n)(n-1)/2 = 8x7/2 = 28**

1. **In a party every person shakes hands with every other persons. If there was a total of 210 handshakes in the party, find the number of persons who were present in the party?**

**(n)(n-1)/2 = 210 implies n = 21**

**PROBABILITY**

1. **In a simultaneous throw of two dice, find the probability of getting a total 8?**
2. **(2/9) (b) (5/36) (c) (1/6) (d) (7/6)**

**In a simultaneous throw of two dice sample space = 6 x 6 =36**

**Favourable cases are (2,6), (6,2), (3,5), (5,3), (4,4)**

**Probability = (5/36)**

1. **In a simultaneous throw of two coins, find the probability of getting at least one head?**

**Possible cases are (HH,HT, TH, TT) Therefore (3/4)**

1. **A bag contains 6 black and 8 white balls. One ball is drawn at random. What is the probability that the ball is drawn is white?**
2. **(4/7) (b) (3/4) (c) (4/5) (d) (1/8)**

**Total balls = 6+8 = 14 Number of white balls = 8**

**Probability = (8/14) = (4/7)**

1. **A bag contains 8 red and 5 white balls. 2 balls are drawn at random. What is the probability that both are white?**
2. **(5/16) (b) (2/13) (c) (3/26) (d) (5/39)**

**Number of ways of drawing 2 balls out of 13 = 13c2 = (13x12)/2 = 78**

**Number of ways of drawing 2 balls out of 5 = 5c2 = (5x4)/2 = 10**

**Probability = (10/78) = (5/39)**

1. **A bag contains 9 red, 7 white and 4 black balls. A ball is drawn at random. What is the probability that the ball drawn is NOT red?**
2. **(1/11) (b) (9/20) (c) (2/11) (d) (11/20)**

**P(red) = 9/(9+7+4) = (9/20)**

**P(not red) = 1 – (9/20) = (11/20)**

1. **What is the probability that an ordinary year has 53 Sundays?**
2. **(53/365) (b) (1/7) (c) (2/7) (d) (48/53)**

**An ordinary year has 365 days i.e. 52 weeks and 1 day. So, the probability that this day is a Sunday is (1/7)**

1. **What is the probability is that a leap year selected randomly will have 53 Mondays?**
2. **(2/7) (b) (5/7) (c) (1/7) (3/7)**

**A leap year has 366 days = 52 weeks + 2 days. These 2 days can be (Sun+Mon), (Mon+Tue), (Tue+Wed), (Wed+Thu), (Thu+Fri), (Fri+Sat), (Sat+Sun)**

**Probability = (2/7)**

1. **In a throw of die, the probability of getting a prime number is:**
2. **(1/3) (b) (1/2) (c) (2/3) (d) (3/4)**

**Numbers on the die = (1, 2, 3, 4, 5, 6) Prime numbers are 2, 3, 5**

**Probability = (3/6) = (1/2)**

1. **A bag contains 3 red, 5 yellow and 4 green balls. 3 balls are drawn randomly. What is the probability that the balls drawn contain balls of different colours?**

**Total balls = 3+5+4 = 12 nc3 = 12c3 = (12 x 11 x 10)/(3 x 2) = 220**

**In order to have 3 different coloured balls, the selection of one ball of each colour is to be made = 3c1 x 5c1 x 4c1 = 3 x 4 x 5 = 60**

**Probability = (60/220) = (3/11)**

**NUMBER, RANKING & TIME SEQUENCE TEST**

1. **Rahul ranked ninth from the top and thirty eighth from the bottom in a class. How many students are there in the class?**

**8 + Rahul + 37 = 46 students**

1. **In a queue, Amrita is 10th from the front while Mukul is 25th from behind and Mamata is just in the middle of the two. If there are 50 persons in the queue, what position does Mamta occupy from the front?**
2. **20th (b) 19th (c) 18th (d) 17th**

**Number of persons between Amrita and Mukul = 50 – (10 + 25) = 15**

**Since Mamta lies in middle of these 15 persons, so Mamta’s position is 8th from Amrita i.e. 18th from the front.**

1. **In a row of boys, Deepak is seventh from the left and Madhu is twelfth from the right. If they interchange their positions, Deepak becomes twenty-second from the left. How many boys are there in the row?**
2. **19 (b) 31 (c) 32 (d) 33**

**(From left) 6 + Deepak (From right) Madhu + 11**

**After interchanging positions, 6 + Madhu + 14 people + Deepak + 11 = 33 boys**

1. **A bus for Delhi leaves every thirty minutes from a bus stand. An enquiry clerk told a passenger that the bus had already left ten minutes ago and the next bus will leave at 9.35 a.m. At what time did the enquiry clerk gives this information to the passenger?**
2. **9.10 a.m. (b) 9.08 a.m. (c) 9.05 a.m. (d) 9.15 a.m.**

**The next bus will leave at 9.35 a.m. This means that the previous bus had left at 9.05 a.m.**

**But it happened ten minutes before the clerk gave the information to the passenger.**

**The enquiry clerk gave the information at 9.15 a.m.**

|  |
| --- |
| **SERIES COMPLETION** |

1. **Which number would replace question mark in the series 7, 12, 19, ?, 39.**
2. **24 (b) 26 (c) 28 (d) 29**

**Clearly, the given sequence follows the pattern +5, +7, +9 ……**

**7 + 5 = 12 12 + 7 = 19 19 + 9 = 28**

1. **Which fraction comes next in the sequence (1/2), (3/4), (5/8), (7/16), ?**
2. **(9/32) (b) (10/17) (c) (11/34) (d) (12/35)**

**Numerators are set of odd numbers, next is 9.**

**Denominator are 21, 22, 23, 24, next is 25 = 32 Next fraction = (9/32)**

1. **3, 9, 27, 81, ?**
2. **324 (b) 243 (c) 210 (d) 162**

**Each term of the given series is obtained by multiplying its preceding term by 3.**

**Next number = 81 x 3 = 243**

1. **1, 9, 17, 33, 49, 73, ?**
2. **97 (b) 98 (c) 99 (d) 100**

**The pattern is +8, +8, +16, +16, +24, + 24**

**Next number = 73 + 24 = 97**

1. **1, 2, 3, 5, 8, ?**
2. **9 (b) 11 (c) 13 (d) 15**

**Each term in the series is the sum of the preceding two terms.**

**1 + 2 = 3 2 + 3 = 5 3 + 5 = 8 5 + 8 = 13 is the next number**

1. **0.5, 1.5, 4.5, 13.5, ?**
2. **45.5 (b) 39.5 (c) 30.5 (d) 40.5**

**Each term of the sequence is obtained by multiplying the preceding term by 3.**

**0.5 x 3 = 1.5 1.5 x 3 = 4.5 4.5 x 3 = 13.5 13.5 x 3 = 40.5**

1. **3, 6, 18, 72, ?**
2. **144 (b) 216 (c) 288 (d) 360**

**The pattern is x2, x3, x4 ……**

**Next number = 72 x 5 = 360**

1. **5, 17, 37, 65, ?, 145**
2. **95 (b) 97 (c) 99 (d) 101**

**The numbers are 22 + 1, 42 + 1, 62 + 1, 82 + 1 …..**

**Missing number = 102 + 1 = 101**

1. **840, 168, 42, 14, 7, ?**
2. **1 (b) 7 (c) 9 (d) 12**

**The pattern is 840 ÷ 5 = 168 168 ÷ 4 = 42 42 ÷ 3 = 14 14 ÷ 2 = 7**

**Missing number is 7 ÷ 1 = 7**

**FIND THE WRONG TERM IN THE GIVEN SERIES:**

1. **Find the wrong number in the series: 7, 28, 63, 124, 215, 342, 511**
2. **7 (b) 28 (c) 124 (d) 215**

**Clearly, the correct sequence is 1 less than cubes of the numbers starting from 2**

**23 – 1 = 7 33 – 1 = 27 – 1 = 26 is the correct answer**

1. **Find the wrong number in the series: 24, 27, 31, 33, 36**
2. **24 (b) 27 (c) 31 (d) 33**

**Each term in the series is increased by 3 to obtain the next term.**

**So, 31 is wrong and must be replaced by (27 + 3) = 30**

1. **Find the wrong number in the series: 15, 16, 22, 29, 45, 70**
2. **16 (b) 22 (c) 45 (d) 70**

**The pattern is +1, +4, +9, +16, …….**

**So 22 is wrong and must be replaced by (16 + 4) = 20**

1. **Find the wrong number in the series: 6, 14, 30, 64, 126**
2. **6 (b) 14 (c) 64 (d) 126**

**Each term is multiplied by 2 and then increased by 2 to obtain the next term.**

**So 64 is wrong and must be replaced by (30 x 2 + 2) = 62**

1. **Find the wrong number in the series: 5, 10, 40, 80, 320, 550, 2560**
2. **80 (b) 320 (c) 550 (d) 2560**

**The sequence is x2, x4, x2, x4, ……………**

**So, 550 is wrong and must be replaced by (320 x 2) = 640**

1. **Find the wrong number in the series: 10, 14, 28, 32, 64, 68, 132**
2. **28 (b) 32 (c) 64 (d) 132**

**Alternately, the numbers are increased by four and doubled to get the next number.**

**10 + 4 = 14, 14 x 2 = 28, 28 + 4 = 32, 32 x 2 = 64, 64 + 4 = 68, 68 x 2 = 136**

1. **Find the wrong number in the series: 56, 72, 90, 110, 132, 150**
2. **72 (b) 90 (c) 110 (d) 150**

**The numbers are 7 x 8, 8 x 9, 9 x 10, 10 x 11, 11 x 12, 12 x 13**

**So, 150 is wrong and must be replaced by (12 x 13) = 156**

1. **Find the wrong number in the series: 2, 5, 10, 50, 500, 5000**
2. **5 (b) 10 (c) 50 (d) 5000**

**Each term of the series is the product of the preceding two terms.**

**2 x 5 = 10, 5 x 10 = 50, 10 x 50 = 500, 50 x 500 = 25000 So, 5000 is wrong**

1. **Find the wrong number in the series: 105, 85, 60, 30, 0, -45, -90**
2. **105 (b) 60 (c) 0 (d) -45**

**The sequence is -20, -25, -30, …………….**

**So, 0 is wrong and must be replaced by (30 – 35) = -5**

1. **Find the wrong number in the series: 325, 259, 202, 160, 127, 105, 94**
2. **94 (b) 127 (c) 202 (d) 259**

**The sequence is 94 (+11) = 105 105 (+22) = 127 127 (+33) = 160**

**160 (+44) = 204 Therefore 202 is wrong**

1. **What is the next term in: BDF, CFI, DHL, ?**
2. **CJM (b) EIM (c) EJO (d) EMI**

**Clearly, the first, second and third letters of each term are respectively moved one, two and three steps forward to obtain the corresponding letters of the next. Hence the answer is EJO**

1. **AZ, GT, MN, ?, YB**
2. **KF (b) RX (c) SH (d) TS**

**The first letter of each term is moved six steps forward while the second letter is moved six steps backward to obtain the corresponding letters of the next term.**

**So the answer is SH**

1. **BEH, KNQ, TWZ, ?**
2. **IJL (b) CFI (c) BDF (d) ADG**

**All the letters of each term are moved nine steps forward to obtain the corresponding letters of the next term. So CFI is the answer**

1. **3F, 6G, 11I, 18L, ?**
2. **21O (b) 25N (c) 27P (d) 27Q**

**The letters in the first, second, third and fourth terms are respectively moved one, two, three and four steps forward to obtain letter in the subsequent terms. The sequence followed the numbers is +3, +5, +7, +9.**

**So, P is the required letter and 18 + 9 = 27 27P is the answer**

1. **KM5, IP8, GS11, EV14, ?**
2. **BX17 (b) BY17 (c) CY18 (d) CY17**

**The first letter of each term is moved two steps backward and the second letter is moved three steps forward to obtain the corresponding letters of the next term. The number in each term is 3 more than that in the preceding term. CY17 is the answer**

1. **2Z5, 7Y7, 14X9, 23W11, 34V13, ?**
2. **27U24 (b) 47U15 (c) 45U15 (d) 47V14**

**The first numbers in the terms follow the sequence +5, +7, +9, +11, +13. The middle letters form the series Z, Y, X, W, V,U. The last numbers form the series 5, 7, 9, 11, 13, 15.**

**47U15 is the answer**

1. **C4X, F9U, I16R, ?**
2. **K25P (b) L25P (c) L25O (d) L27P**

**The first letter of each term is moved three steps forward and the last letter is moved three steps backward to obtain the corresponding letters of the next term. The numbers form sequence 22, 32, 42, 52. L25O is the answer**

**SERIES COMPLETION**

1. **- - a b a - - b a – a b**
2. **abbba (b) abbab (c) baabb (d) bbaba**

**The series is ab/ab/ab/ab/ab/ab. Thus the pattern (ab) is repeated, answer is (b)**

1. **– b a a – a a b – a – a**
2. **aabb (b) aaba (c) abab (d) baab**

**The series is aba/aba/aba/aba. Thus pattern (aba) is repeated, answer is (c)**

1. **b a – b – a a b – a – b**
2. **abaa (b) abba (c) baab (d) babb**

**The series is baab/baab/baab. So (b) is the answer**

1. **g f e – i g – e i i – f e i – g f – i i**
2. **eifgi (b) figie (c) ifgie (d) ifige**

**The series is (gfeii) is repeated. So (c) is the answer**

1. **c – b b a – c a b - a c – a b – a c**
2. **abcbc (b) acbcb (c) babcc (d) bcacb**

**The series is cabbac/cabbac/cabbac. So the answer is (b)**

**CODING-DECODING**

1. **If in a certain language MYSTIFY is coded as NZTUJGZ, how is NEMESIS coded in that language?**
2. **MDLHRDR (b) OFNFTJT (c) ODNHTDR (d) PGOKUGU**

Clearly, each letter in the word MYSTIFY is moved one step forward to obtain the corresponding letter of the code. OFNFTJT is the answer

1. **If TAP is coded as SZO, then how is FREEZE coded?**
2. **EQDFYG (b) ESDFYF (c) GQFDYF (d) EQDDYD**

Clearly, each letter in the word TAP is moved one step backward to obtain the corresponding letter of the code. EQDDYD is the answer

1. **In a certain code, SIKKIM is written as THLJJL. How is TRAINING written in that code?**
2. **SQBHOHOH (b) UQBHOHOF (c) UQBJOHHO (d) UQBJOHOH**

Clearly, the letters in the word SIKKIM are moved alternately one step forward and one step backward to obtain the letters of the code. UQBHOHOF is the answer

1. **In a certain code, MENTION is written as LNEITNO. How is PATTERN written in that code?**
2. **APTTREM (b) PTAETNR (c) OTAETNR (d) OTAETRN**

Clearly, to obtain the code, the first letter of the word MENTION is moved one step backward and the remaining letters are reversed in order, taking two at a time. OTAETNR is the answer

1. **In a certain code, FORGE is written as FPTJI. How is CULPRIT written in that code?**
2. **CSJNPGR (b) CVMQSTU (c) CVNSVNZ (d) CXOSULW**

Clearly, the first letter in the word FORGE remains as it is and the second, third, fourth and fifth letters are respectively moved one, two, three and four steps forward to obtain the corresponding letters of the code. CVNSVNZ is the answer

1. **In a certain code, MONKEY is written as XDJMNL. How is TIGER written in that code?**
2. **QDFHS (b) SDFHS (c) SHFDQ (d) UJHFS**

The letters of the word are written in a reverse order and then each letter is moved one step backward to obtain the code. QDFHS is the answer

1. **If FRIEND is coded as HUMJTK, how is CANDLE written in that code?**
2. **EDRIRL (b) DCQHQK (c) ESJFME (d) FYOBOC**

The first, second, third, fourth, fifth and sixth letters of the word are respectively moved two, three, four, five, six and seven steps forward to obtain the corresponding letters of the code. EDRIRL is the answer

1. **If D = 4 and COVER = 63, then BASIS = ?**
2. **49 (b) 50 (c) 54 (d) 55**

Clearly, in the given code, A = 1, B = 2, C = 3,…….so that

COVER = 3 + 15 + 22 + 5 + 18 = 63

Now, in BASIS, B = 2, A = 1, S = 19, I = 9 Total = 50

1. **If Z = 52 and ACT = 48, then BAT will be equal to:**
2. **39 (b) 41 (c) 44 (d) 46**

In the given code, A = 2, B = 4, C = 6, …….Z = 52

So, ACT = 2 + 6 + 40 = 48 and BAT = 4 + 2 + 40 = 46

1. **If AT = 20, BAT = 40, then CAT will be equal to:**
2. **30 (b) 50 (c) 60 (d) 70**

Taking A = 1, B = 2,………T = 20…….Z = 26

AT = 1 x 20 = 20 CAT = 3 x 1 x 20 = 60