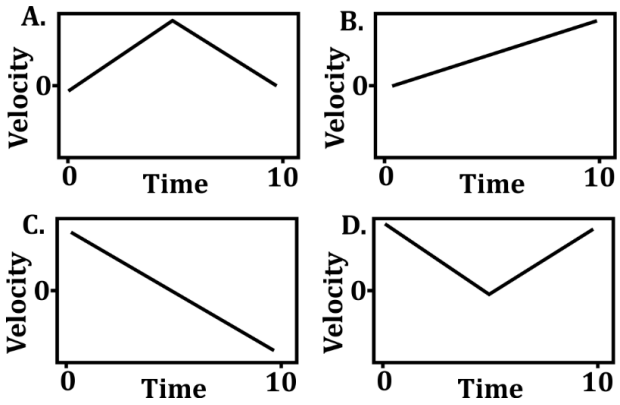
SCIR NET General Aptitude Chemical Science PYP Held on Dec. 2023 Shift-1

Q1. Which one of the following graphs represents the velocity vs time relation for the motion of a ball thrown upward and returning toward the ground, remaining in air for 10 seconds? (Ignore air resistance.)



(a) A
(b) B
(c) C
(d) D

Q2. A fair coin is tossed 10 times. Let H and T be the number of heads and the number of tails, respectively. The maximum possible value of H x T is
(a) 15
(b) 20
(c) 25
(d) 30

Q3. Two 1.5 L bottles A and B are each filled with 1 L of water. 2 packets of ORS are dissolved in A and 1 packet in B. Then B is filled completely by pouring from A. The ORS concentrations in bottles A and B will be in the ratio
(a) 5.6
(b) 4:5
(c) 3:4
(d) 2.3

Q4. Chairs in 3 colours are placed around a round table such that no two neighbouring chairs have the same colour, and no two pairs of consecutive chairs (in the same direction) have colours in the same order. The maximum number of chairs that can be so placed is
(a) 6
(b) 7
(c) 8
(d) 9

Q5. In a puzzle of filling a grid, each row and column in the 9x9 grid, as well as each 3x3 sub-grid shown with heavy borders, must contain all the digits 1-9.

1	3		8			6		
		2			7	A	B	C
			1	2		D	7	9
2	8							
	9			3			1	
							2	3
5	7			8	3			
			4			9		
		9			2		6	7

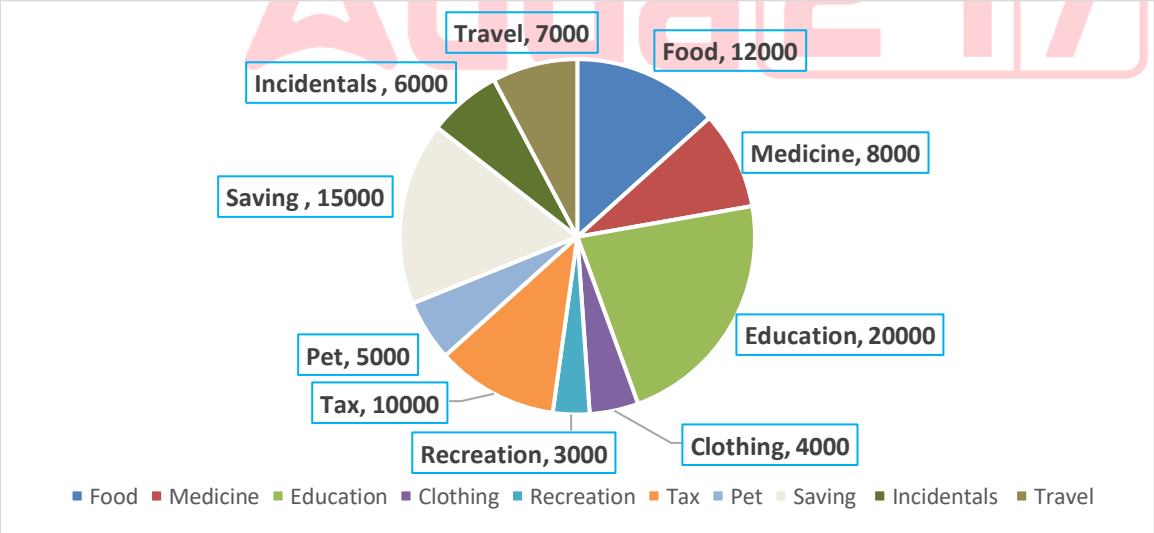
In the above partially filled grid, the number 3 appears in square marked

(a) D
(b) C
(c) B
(d) A

Q6. In a queue each woman is preceded and followed by exactly two men. Which of the following is a possible number of persons in the queue?

(a) 39
(b) 42
(c) 45
(d) 47

Q7. A family whose expenses are shown in the pie chart decides to save 20% more by cutting on certain expenses. What will be the consequent change in the angle of the pie for Savings in the chart?



(a) 10°
(b) 12°
(c) 15°
(d) 18°

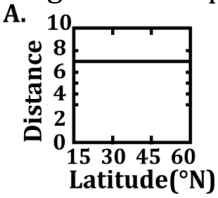
Q8. A person leaves for New Delhi, India from New York, USA by a 20 hour flight on a Monday at 6 am, spends 10 hrs in New Delhi and returns to New York by a 20 hour flight on the Wednesday of the same week at 8 am. Based on this, how much is the local time difference between New Delhi and New York?
(a) Cannot be determined
(b) 10 hours
(c) 12 hours
(d) 16 hours

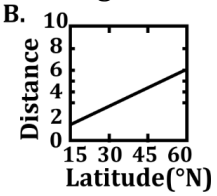
Q9. The ratios of girls to boys in two sections in a class are 3:4 and 3:7 respectively. Their ratio in the entire class (when the two sections are combined) is 4:7. Which of the following can be the strength of the girls in the entire class?
(a) 36
(b) 42
(c) 45
(d) 48

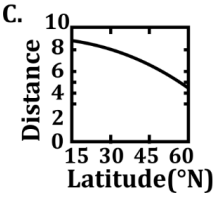
Q10. If $9X^2+16Y^2+24$ is a perfect square, X and Y being integers, then the smallest possible non-negative value of X + Y is
(a) 0
(b) 1
(c) 2
(d) 123 3

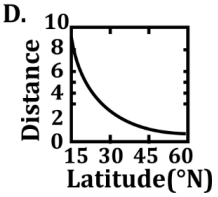
Q11. The monthly production of a commodity increases by 50% (over the previous month) every even month and drops by 20% (over the previous month) every add month. If the monthly production at the close of March was 1 ton, the production at the end of September will be approximately
(a) 3.6 tons
(b) 2.2 tons
(c) 3.0 tons
(d) 1.7 tons

Q12. Which of the following graphs correctly shows the distance (in arbitrary units) between two longitudes 1º apart along the latitude being considered?

A.


B.


C.


D.


(a) A
(b) B
(c) C
(d) D

Q13. Which among the following integers can never be written as the sum of squares of three integers?
(a) 6
(b) 7
(c) 8
(d) 9

Q14. The product 1 ×2×3×4x... × 51 ends with
(a) 10 zeros
(b) 11 zeros
(c) 12 zeros
(d) 14 zeros

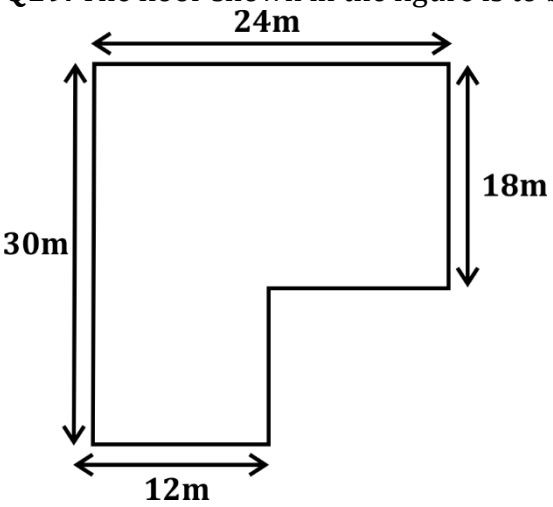
Q15. In the following finite sequence of integers, how many 9s are divisible by their immediate next terms?
8,3,4,9,3,5,9,5,9,9,9,4,5,9,5,6,3,3,5,7,2,3,9,9,8,9,3,9,1,9,4
(a) 3
(b) 4
(c) 5
(d) 6

Q16. Consider three configurations of steel wires for bearing a load
A 2 wires of 1 mm diameter each, together
B 1 wire of 2 mm diameter
C 4 wires of 1 mm diameter each, together
The correct comparison of the load bearing capability of the three configurations is
(a) A=B=C
(b) A<B=C
(c) A<C<B
(d) A B C

Q17. A bucket has 101 water at 15°c. How much water at 50°c should be added to get a mixture of temperature 40°C? (Assume no heat loss in mixing.)
(a) 15 L
(b) 20 L
(c) 25 L
(d) 30 L

Q18. Shyam buys a watch at a 10% discount on its maximum retail price (MRP). He sells it to Mohan for Rs. 3960 making a profit of 10%. What is the MRP (in Rs.) of the watch?
(a) 4040
(b) 4000
(c) 3960
(4) 4356

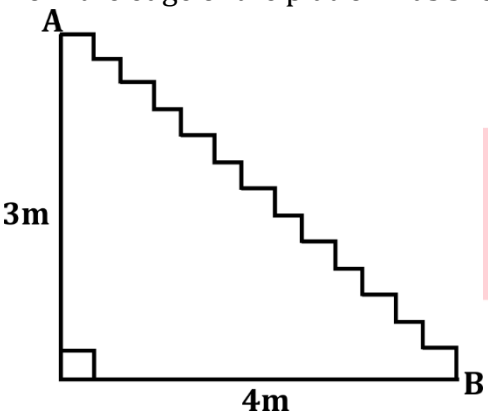
Q19. The floor shown in the figure is to be covered with square tiles.



If all tiles are to be of the same size, what is the smallest number of tiles that will do the job?

(a) 14
(b) 6
(c) 32
(d) 16

Q20. A flight of 13 steps from the ground to a platform of height 3 m is to be carpeted. The steps are all equal and have tread a and rise b. The staircase starts from a point on the ground horizontally 4 m away from the edge of the platform as shown.



Assuming that the width of the carpet is adequate, what is the length of the carpet (in meter) needed to cover all the steps?

(a) 7
(b) 5
(c) $(3a + 4b)/\sqrt{13}$
(d) $\sqrt{13}\ (a+b)$