

JUNE 2016 GENERAL APTITUDE: CSIR NET CHEMICAL & MATHEMATICAL SCIENCES

1. It takes 2 hours for Tiwari and Deo to do a job. Tiwari and Hari take 3 hours to do the same job. Deo and Hari take 6 hours to do the same job.

Which of the following statements is incorrect?

- (1) Tiwari alone can do the job in 3 hours
- (2) Deo alone can do the job in 6 hours
- (3) Hari does not work at all
- (4) Hari is the fastest worker

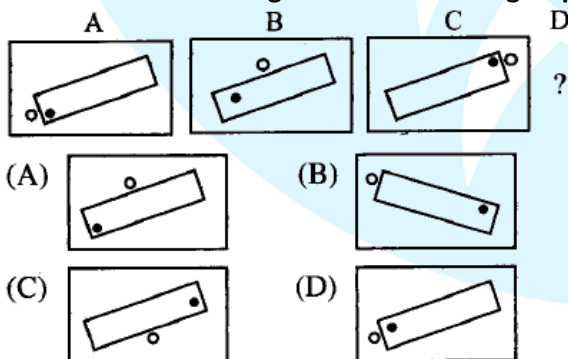
2. Abdul travels thrice the distance Catherine travels, which is also twice the distance that Binoy travels. Catherine's speed is $\frac{1}{3}$ of Abdul's speed, which is also $\frac{1}{2}$ of Binoy's speed. If they start at the same time then who reaches first?

- (1) Both Abdul and Catherine
- (2) Binoy
- (3) Catherine
- (4) All three together

3. For a certain regular solid; number of faces + number of vertices = number of edges + 2. For three such distinct (not touching each other) objects, what is the total value of faces + vertices - edges?

- (1) Two
- (2) Six
- (3) Four
- (4) Zero

4. What will be the next figure in the following sequence



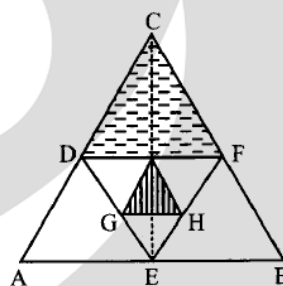
5. A, B, C, D are points on a circle with AB= 5 cm, BC= 12 cm, AC= 13 cm and AD= 7 cm. Then, the closest approximation of CD is:

- (1) 9 cm
- (2) 10 cm
- (3) 11 cm
- (4) 14 cm

6. Choose the four digit number, in which the product of the first & fourth digits is 40 and the product of the middle digits is 28. The thousands digit is as much less than the unit digit as the hundreds digit is less than the tens digit:

- (1) 5478
- (2) 5748
- (3) 8745
- (4) 8475

7. Equilateral triangles are drawn one inside the other as shown. What is the ratio of the two shaded areas?



- (1) 2: 1
- (2) $\sqrt{3} : 4$
- (3) 4: 1
- (4) 8: 1

8. A frog hops and lands exactly 1 metre away at a time. What is the least number of hops required to reach a point 10 cm away?

- (1) 1
- (2) 2
- (3) 3
- (4) It cannot travel such a distance

9. A train running at 36 km/h crosses a mark on the platform in 8 sec and takes 20 sec to cross the platform. What is the length of the platform?

- (1) 120 m
- (2) 40 m
- (3) 280 m
- (4) 160 m

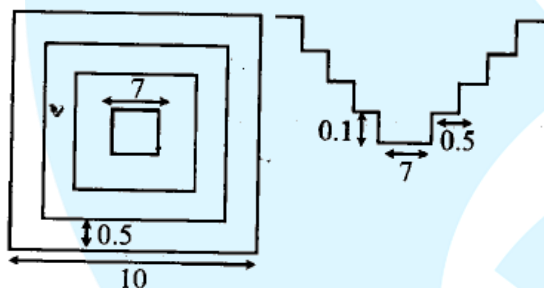
10. When a polynomial $f(x)$ is divided by $x - 5$ or $x - 3$ or $x - 2$, it leaves a remainder of 1. Which of the following would be the polynomial?

- (1) $x^3 - 10x^2 + 31x + 31$ (2) $x^3 - 10x^2 + 31x - 29$
 (3) $x^3 - 10x^2 + 31x - 31$ (4) $x^3 - 10x^2 + 31x + 29$

11. Water is slowly dripping out of a tiny hole at the bottom of a hollow metallic sphere initially full of water. Ignoring the water that has flowed away, the centre of mass of the system:

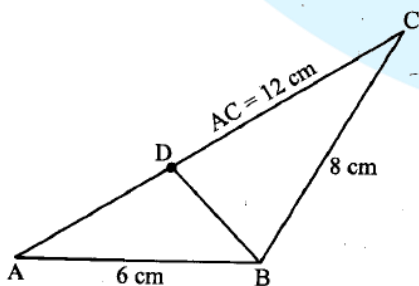
- (1) remains fixed at the centre of the sphere
 (2) moves down steadily as the amount of water decreases
 (3) moves down for sometime but eventually returns to the centre of the sphere
 (4) moves down until half of the water is lost and then moves up

12. The diagram (not to scale) shows the top view and cross section of a pond having a square outline and equal sized steps of 0.5 m width and 0.1 m height. What will be the volume of water (in m^3) in the pond when it is completely filled?



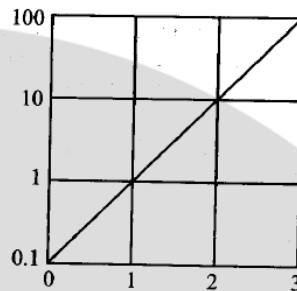
- (1) 40.0 (2) 29.4
 (3) 19.4 (4) 11.3

13. D is a point on AC in the following triangle such that $\angle ADB = \angle ABC$. Then BD (in cm) is:



- (1) 8 (2) 6
 (3) 3 (4) 4

14. The function $f(x)$ is plotted against x as shown. Extrapolate and find the value of the function at $x = -1$.



- (1) -0.01 (2) -0.1
 (3) 0.01 (4) 0.1

15. A notebook contains only hundred statements as under:

This notebook contains 1 false statement.
 This notebook contains 2 false statements.

...

99. This notebook contains 99 false statements.
 100. This notebook contains 100 false statements.
 Which of the statements is correct?

- (1) 100th
 (2) 1st
 (3) 99th
 (4) 2nd

16. A chocolate bar having $m \times n$ unit square tiles is given. Calculate the number of cuts needed to break it completely, without stacking, into individual tiles:

- (1) $(m \times n)$
 (2) $(m - 1) \times (n - 1)$
 (3) $(m \times n) - 1$
 (4) $(m \times n) + 1$

17. A person paid income tax at the rate of $R\%$ for the first Rs 2 lakhs, and at the rate of $(R + 10)\%$ for income exceeding Rs. 2 lakhs. If the total tax paid is $(R + 5)\%$ of the annual income, then what is the annual income?

- (1) Rs 2.5 lakhs
 (2) Rs 3.0 lakhs

18. An experiment leads to the following set of observations of the variable 'v' at different times 't'

t	0	1	2	3	4	5	6
v	5	6.1	9.1	13.7	21.6	30.8	41.4

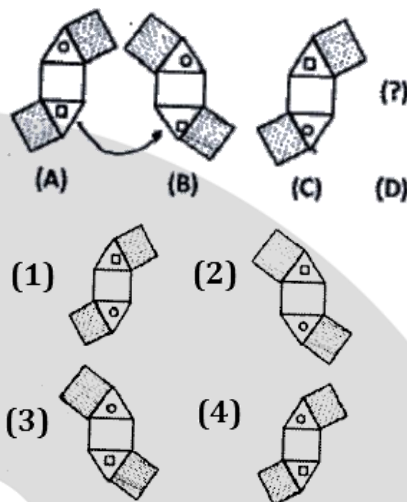
Allowing for experimental errors, which of the following expressions best describes the relationship between t and v ?

- (1) $v \propto t^2$ (2) $(v-5) \propto t^2$
(3) $v = 5t + t^2$ (4) $(v - 5) = (t + 5)^2$
19. The difference between the squares of the ages (in complete years) of a father and his son is 899. The age of the father when his son was born:
- (1) cannot be ascertained due to inadequate data
(2) is 27 years
(3) is 29 years
(4) is 31 years
20. A bicycle tube has a mean circumference of 200 cm and a circular cross section of diameter 6 cm. What is the approximate volume of water (in cc) required to completely fill the tube, assuming that it does not expand ?
- (1) 600π (2) 1200π
(3) 3600π (4) 1800π

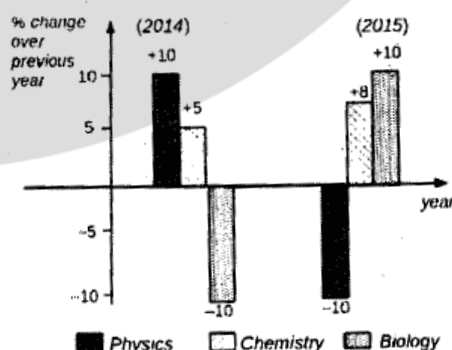
JUNE 2016 GENERAL APTITUDE: CSIR NET LIFE SCIENCES & PHYSICAL SCIENCES

- An infinite number of identical circular discs each of radius $\frac{1}{2}$ are tightly packed such that the centres of the discs are at integer values of coordinates x and y . The ratio of the area of the uncovered patches to the total area is
 - $1-\pi/4$
 - $\pi/4$
 - $1-\pi$
 - π
- It takes 5 days for a steamboat to travel from A to B along a river. It takes 7 days to return from B to A. How many days will it take for a raft to drift from A to B (all speeds stay constant)?
 - 13
 - 35
 - 6
 - 12
- "My friend Raju has more than 1000 books", said Ram. "Oh no, he has less than 1000 books", said Shyam. "Well, Raju certainly has at least one book", said Geeta. If only one of these statements is true, how many books does Raju have?
 - 1
 - 1000
 - 999
 - 1001
- Of the following, which is the odd one out?
 - Cone
 - Torus
 - Sphere
 - Ellipsoid
- A student appearing for an exam is declared to have failed the exam if his/her score is less than half the median score. This implies
 - $1/4$ of the students appearing for the exam always fail.
 - if a student scores less than $1/4$ of the maximum score, he/she always fails.
 - if a student scores more than $1/2$ of the maximum score, he/she always passes.
 - it is possible that no one fails.

- Find the next figure 'D'



- N is a four digit number. If the leftmost digit is removed, the resulting three digit number is $1/9^{\text{th}}$ of N. How many such N are possible?
 - 10
 - 9
 - 8
 - 7
- AB and CD are two chords of a circle subtending 60° and 120° respectively at the same point on the circumference of the circle. Then AB : CD is
 - $\sqrt{3} : 1$
 - $\sqrt{2} : 1$
 - $1 : 1$
 - $\sqrt{3} : \sqrt{2}$
- Which of the following inferences can be drawn from the below graph?



- (1) The total number of students qualifying in Physics in 2015 and 2014 is the same
 (2) The number of students qualifying in Biology in 2015 is less than that in 2013
 (3) The number of Chemistry students qualifying in 2015 must be more than the number of students who qualified in Biology in 2014
 (4) The number of students qualifying in Physics in 2015 is equal to the number of students in Biology that qualified in 2014

10. What is the minimum number of moves required to transform figure 1 to figure 2? A move is defined as removing a coin and placing it such that it touches two other coins in its new position.

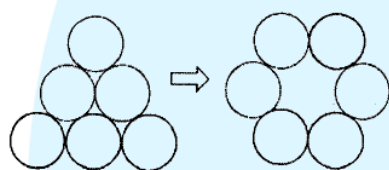
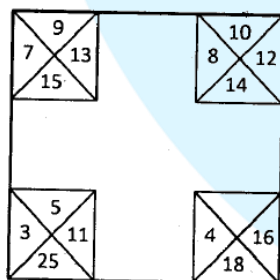


Fig 1

Fig 2

- (1) 1
 (2) 2
 (3) 3
 (4) 4

11. The relationship among the numbers in each corner square is the same as that in the other corner squares. Find the missing number.







- (1) 10
 (2) 8
 (3) 6
 (4) 12

12. Which of the following best approximates $\sin(0.5^\circ)$?

- (1) 0.5
 (2) $0.5 \times \frac{\pi}{90}$
 (3) $0.5 \times \frac{\pi}{180}$
 (4) $0.5 \times \frac{\pi}{360}$

13. What comes next in the sequence?



- (1)  (2) 
 (3)  (4) 

14. Which of the following statements is logically incorrect?

- (1) I always speak the truth
 (2) I occasionally lie
 (3) I occasionally speak the truth
 (4) I always lie

15. How many times starting at 1:00 pm would the minute and hour hands of a clock make an angle of 40° with each other in the next 6 hours?

- (1) 6
 (2) 7
 (3) 11
 (4) 12

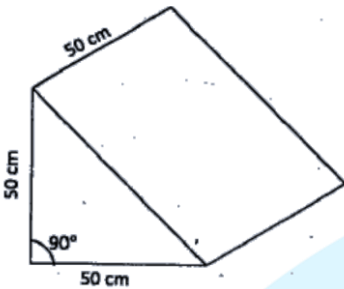
16. Brothers Santa and Chris walk to school from their house. The former takes 40 minutes while the latter, 30 minutes. One day Santa started 5 minutes earlier than Chris. In how many minutes would Chris overtake Santa?

- (1) 5
 (2) 15
 (3) 20
 (4) 25

17. The set of numbers (5, 6, 7, m, 6, 7, 8, n) has an arithmetic mean of 6 and mode (most frequently occurring number) of 7. Then $m \times n =$

- (1) 18
 (2) 35
 (3) 28
 (4) 14

18. The diagram shows a block of marble having the shape of a triangular prism. What is the maximum number of slabs of $10 \times 10 \times 5 \text{ cm}^3$ size that can be cut parallel to the face which the block is resting on?



- (1) 50
(2) 100
(3) 125
(4) 250

19. A solid contains a spherical cavity. The cavity is filled with a liquid and includes a spherical bubble of gas. The radii of cavity and gas bubble are 2 mm and 1 mm, respectively. What proportion of the cavity is filled with liquid?

- (1) $\frac{1}{8}$
(2) $\frac{3}{8}$
(3) $\frac{5}{8}$
(4) $\frac{7}{8}$

20. Fill in the blank: F2, __, D8, C16, B32, A64

- (1) C4
(2) E4
(3) C2
(4) D16

JUNE 2016

CSIR NET GENERAL APTITUDE

CHEMICAL & MATHEMATICAL SCIENCES

ANSWER KEY									
1	2	3	4	5	6	7	8	9	10
4	2	3	3	3	1	3	2	1	2
11	12	13	14	15	16	17	18	19	20
3	2	4	3	3	3	3	2	3	4

LIFE SCIENCES & PHYSICAL SCIENCES

ANSWER KEY									
1	2	3	4	5	6	7	8	9	10
1	2	2	1,2	4	2	4	3	2	2
11	12	13	14	15	16	17	18	19	20
3	3	3	4	3	2	4	2	4	2

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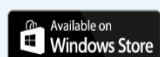
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