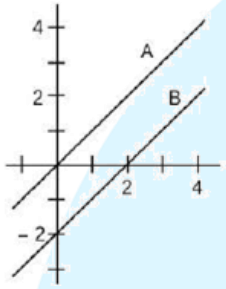
NOVEMBER 2020 GENERAL APTITUDE: CSIR NET MATHEMATICAL SCIENCES

1. **Find the value of:**
$f(0) if\ f(x+2) = (x+1)^{34} - (x+1)^{33} + 5$
(1) 5 (2) 7
(3) 6 (4) 72

2. **The shortest distance between the parallel lines A and B in the following figure is**

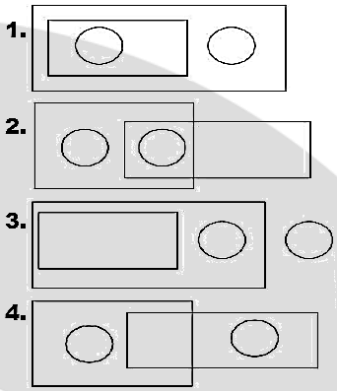


(1) $\sqrt{2}$ (2) 2
(3) $2\sqrt{2}$ (4) $2\sqrt{3}$

3. **Two varieties A and B of rice cost Rs. 30 and Rs. 90 per kg whereas two varieties C and D of pulses, Rs 100 and Rs 120 per kg, respectively. If at least one kg each of A and B and at least half a kg each of C and D have to be purchased, then the minimum and maximum costs of a total of 5 kg of these provision are, respectively**
(1) Rs 150 and Rs 600 (2) Rs 260 and Rs 530
(3) Rs 290 and Rs 470 (4) Rs. 370 and Rs 460

4. **One of four suspects A, B, C and D has committed a crime. A and D are always truthful, and B and C are always untruthful. C and D are identical twins and the interrogator does not know who is who. If A says, "D is innocent", B says, "A is guilty" and among C and D one says, "A is innocent" and the other says, "B is guilty", then which of the following is FALSE?**
(1) D said "A is innocent" (2) D is innocent
(3) B is innocent (4) C is innocent

5. **Which is an appropriate diagram to represent the relation between the following categories: quadruped, mammal, whale house lizard?**

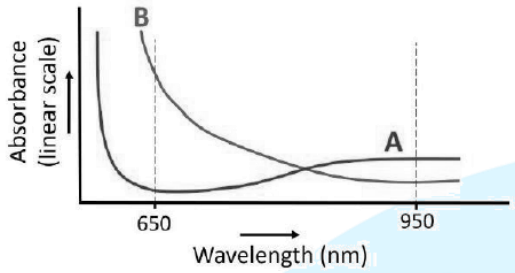


6. **A 7m long tube having inner diameter of 2 dcm is filled with water. The water is then poured into a cylindrical bucket having inner base area of 200 cm^2. What will be the approximate height (in cm) of water in the bucket?**
(1) 22 (2) 44
(3) 9 (4) 11

7. **Water is being filled in a cone from the top at a constant volumetric rate. The rate of increase of the height of the water column**
(1) is linearly dependent on time
(2) Depends on the apex angle of the cone.
(3) Increases as cube-root of the volumetric rate.
(4) Increases as square-root of the volumetric rate

8. **A square board is divided into 9 smaller identical squares by drawing lines. Three bullets are shot at the board randomly. The probability that at least 2 bullets hit the same small square is,**
(1) 1/3 (2) 56/81
(3) 25/81 (4) 2/3

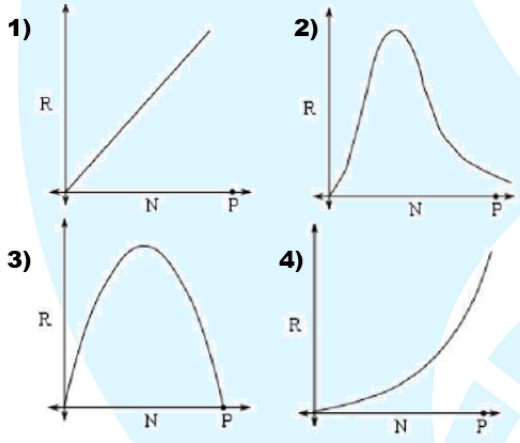
9. **The wavelength dependant absorbance of two compounds, A and B, is shown. Absorbance of mixture is a linear function of the concentration of the compounds. R is defined as a ratio of absorbance at 650nm to the absorbance at 950 nm.**



If the mixture contains 95% of compound A and R must be

(1) 95 (2) 5
(3) 1 (4) Less than 1

10. An epidemic is spreading in a population of size P. The rate of spread R of the disease at a given time is proportional to both the number of people affected by the disease (N), and the number of people not yet affected by the disease. Which of the following graphs of R vs N is correct?



11. A and B complete a work in 30 days. B and C complete the same work in 24 days whereas C and A complete the same work in 28 days. Based on these statements which of the following conclusions is correct?

(1) C is the most efficient and B is the least efficient
(2) B is the most efficient but the least efficient one cannot be determined
(3) C is the most efficient but the least efficient one cannot be determined
(4) C is the most efficient and A is the least efficient

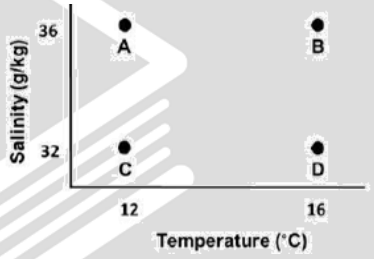
12. Clock A loses 4 minutes every hour, clock B always shows the correct time and clock B shows the correct time and clock C gains 3 minutes every hour. On a Monday, all the the three clocks showed the same time 8 pm. On the following Wednesday, when the clock C shows 2pm, what time will clock A show?

(1) 7:20 AM (2) 8:40 AM
(3) 9:20 AM (4) 10: 40 AM

13. In a class, there is one pencil for every two students, one pencil for every two student, one eraser for every student, and one ruler for every four student's. If the total number of these stationery items required is 65. , how many students are present in the class?

(1) 55 (2) 60
(3) 65 (4) 70

14. The figure shows temperature and salinity of four samples of water. Which one of the samples has the highest density ?



(1) A (2) B
(3) C (4) D

15. The given tables show the number of active and recovered cases of a certain disease. Assuming that the linear trend for both continues, on which day will recovered cases be twice that of the active cases?

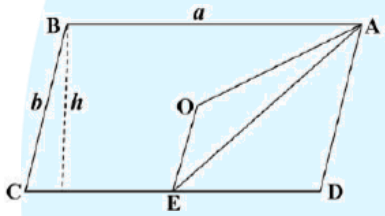
Day	0	1	4	7	10
Active cases	990	1000	1030	1060	1090
Recovered cases	760	800	920	1040	1160

(1) 61 (2) 62
(3) 63 (4) 64

16. A boat weighs 60 kg, and oarsmen A and B weigh 80 and 90 kg, respectively. Rowing at a constant power, the time required to complete a course is proportional to the total weight. Rowing alone, A and B complete the course in 1 and 1 ½ hours, respectively. Assuming that their power add up, how long they take to complete the course if they row together?

(1) 49.4 min (2) 57.5 min
(3) 62.6 min (4) 72.5 min

17. Consider a parallelogram ABCD with centre O and E as the midpoint of side CD. The area of the Triangle OAE, is

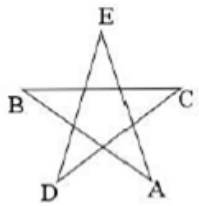


(1) $\frac{1}{5}ah$ (2) $\frac{1}{6}ah$
(3) $\frac{1}{8}ah$ (4) $\frac{1}{7}ah$

18. The sum of the first n even numbers is

(1) divisible by n and not by (n+1)
(2) Divisible by (n+1) and not by n
(3) divisible by both n and (n+1)
(4) Neither divisible by n nor by (n+1)

19. A,B,C,D and E are the vertices of a regular pentagon as shown in the figure



The angle ΔABC is

(1) 48^0 (2) 72^0
(3) 54^0 (4) 36^0

20. On a 200 m long straight road, maximum number of poles are fixed at 20 m interval. How many of these poles should be removed in order to have maximum number of poles at an interval of 40 m on the road?

(1) 8 (2) 6
(3) 5 (4) 4

NOVEMBER 2020 GENERAL APTITUDE: CSIR NET PHYSICAL SCIENCES

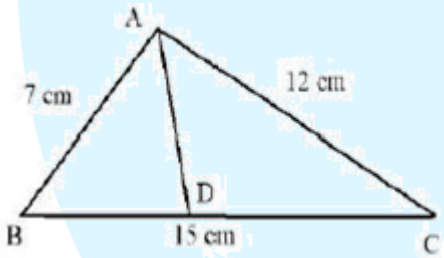
1. A couple lives in a house with their sons and daughters and no one else. The couple has four sons and each of the sons has exactly two sisters. How many persons live in that house?

(1) 8 (2) 10
(3) 12 (4) 14

2. A bank pays interest to its depositors compounded yearly. If a deposit becomes Rs. 54,000/- at the end of 3rd year and Rs. 64,800/- at the end of 6th year, what is the principal invested in the deposit?

(1) 40,000
(2) 42,500
(3) 45,000
(4) 48,000

3. In the following ΔABC, AB = 7 cm, BC = 15 cm and AC = 12 cm. D is a point on BC such that ΔADC and ΔABC are similar. Then AD (in cm) =



(1) 5.6 (2) 5.8
(3) 6.1 (4) 6.4

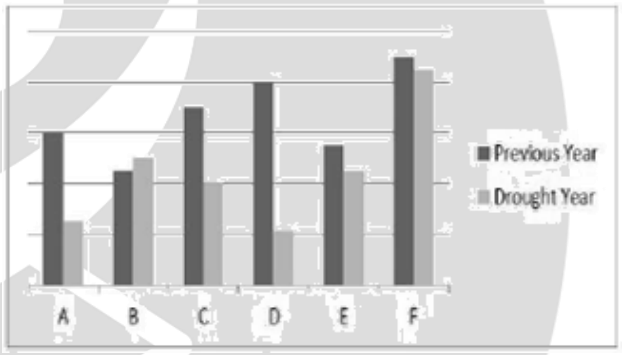
4. Ten glass vases were to be packed one each in 10 boxes marked "Glass". Twelve brass vases were to be packed one each in 12 boxes marked "Brass". Four vases and boxes got mixed up. A customer orders 1 glass and 1 brass vase and is sent appropriately marked boxes. The chance that the customer does not get the ordered vases in correctly marked boxes is

(1) 4/5 (2) 5/6
(3) 2/3 (4) 1/3

5. Anwara, Bharati, Colin and Tarun commute by different modes of transport namely, Cycle (C), utorickshaw (A), Bus (B) and Train (T). The initials of the mode of transport and the name of the person match in exactly two cases. If Tarun travels by Train, and Colin rides neither an Autorickshaw nor a Bus, then

(1) Anwara rides an Autorickshaw
(2) Anwara rides a Bus
(3) Bharati rides a Bus
(4) Bharati rides a Cycle

6. Rice production in six states A, B, C, D, E and F in two consecutive years are shown in the diagram in linear scale



Among the states that saw a fall in production in the drought year, the maximum and minimum relative fall was, respectively, in states,

(1) D and F (2) C and B
(3) C and E (4) D and A

7. Based on the table, what is the maximum number of diamonds one can buy for Rs. 10 lakh?

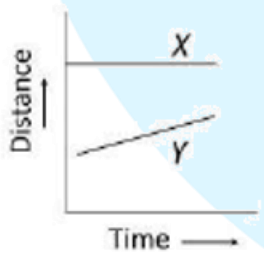
Size (in carat)	Rate (Rs. Lakh per carat)	Number in stock
0.25	1	20
0.5	2	10
1	4	5
2	8	1

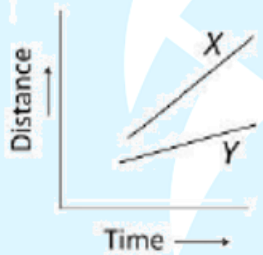
(1) 20 (2) 25
(3) 30 (4) 36

8. **For a disease, every infected person infects three others on the 5th day and recovers. On an average, men and women are infected in the proportion 4:1. The total number of women who were infected by the end of 35 days, is closest to**
(1) 972
(2) 820
(3) 656
(4) 502

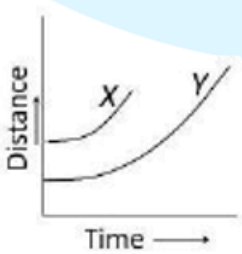
9. **The maximum tolerable exposure time for noise is given to be about 8 hours at 85 dB and 90 seconds at 110 dB. Assuming linear noise tolerance response of the ear, an increase of 3 dB in noise level in this range would reduce the exposure time by roughly**
(1) 45 min
(2) 60 min
(3) 90 min
(4) 120 min

10. **Distance covered by cars, X and Y, with time is given below. Assuming constant acceleration for each car, which of the following graphs shows that had higher acceleration than Y?**

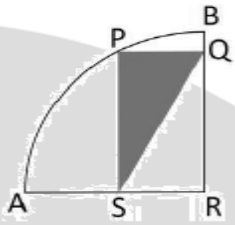
1.


2.


3.

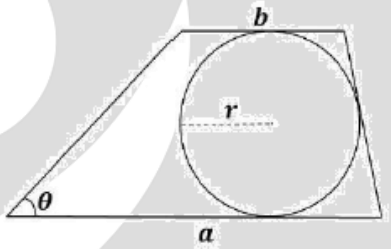

4.


11. **PQRS is a rectangle inscribed in a quarter circle as shown. The area of shaded region is 24 cm and PQ = 6 cm.**



The area of the quarter circle is
(1) 36π (2) 25π
(3) 13π (4) 48π

12. **Area of the trapezium as shown in the figure, is**



(1) $ab + r^2 tan\theta$
(2) $r(a+b)cos\theta$
(3) $2r(a+b)$
(4) $r(a+b)$

13. **From an initially full bucket, water is dripping continuously from the bottom. The centre of mass of the bucket with water**
(1) remain stationary
(2) moves upward all the way
(3) moves downward all the way
(4) moves downward first and then moves up

14. **Seven persons A, B, C, D, E, F, and G are sitting in a row. E and B are sitting adjacent to each other. F is sitting between D and G. If C is sitting four places left of F, who among the following cannot be sitting at the centre?**
(1) G (2) B
(3) D (4) F

15. Starting from the same point at the same instant of time, three cyclists P, Q and R move on a circular path in the same direction with speeds 18, 27 and 36 km/h, respectively. The circumference of the circular path is 5.4 km. After a lapse of how much time would they all meet at the starting point again?

(1) 12 min (2) 24 min
(3) 36 min (4) 48 min

16. Supply of food to a community is reducing at a constant rate, as a result of which the population is dying out. Ignoring other factors, which of these statements can be made about the long-term trend for the population?

(1) It will eventually die out completely.
(2) It will stabilise at a non-zero number.
(3) It will increase after reaching a minimum.
(4) It will fall and rise repeatedly.

17. A marksman had four successes in six attempts. What is the probability that he had three consecutive successes?

(1) 9/15
(2) 12/15
(3) 13/15
(4) 6/15

18. The scores of the six students of Group A in an examination are 38, 45, 42, 58, 62 & 55. In the same examination, the scores of the six students of Group B of size 7 are 38, 41, 44, 46, 49 & 52, where one score is missing. If the arithmetic means of the scores of the two groups are same, then what is the missing score?

(1) 80 (2) 65
(3) 63 (4) 62

19. A wire is bent into the shape of a square enclosing an area M. If the same wire is bent to form a circle, the area enclosed will be

(1) $\frac{4\sqrt{2M}}{\pi}$ (2) M
(3) $\frac{4M}{\pi}$ (4) $\frac{\pi M}{2\sqrt{2}}$

20. In a flight of 600km, an aircraft was slowed down due to bad weather. Its average speed for the trip was reduced by 200 km/h and the time of flight increased by 30 minutes. What was the scheduled duration of the flight?

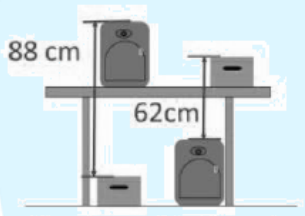
(1) 1 hour (2) 1 hour 30 minutes
(3) 2 hours (4) 45 minutes

NOVEMBER 2020 GENERAL APTITUDE: CSIR NET CHEMICAL SCIENCES

1. **Four identical cones with base diameter of 10 cm are compactly placed inside a box in upright position. What will be the area of square (in cm) formed by connecting tips of the cones?**
   (1) 400 (2) 144
   (3) 100 (4) 25

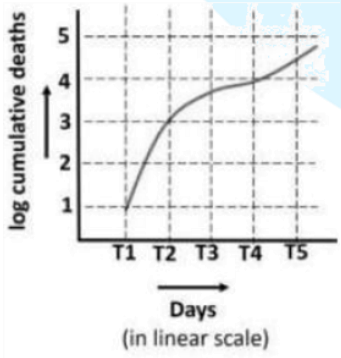
2. **How many hollow spheres having inner radius of 1 cm can be completely filled by transferring water from a completely filled hollow sphere having inner diameter of 20 cm?**
   (1) 400 (2) 100
   (3) 1000 (4) 8000

3. **The two identical bags and two identical boxes are placed as shown. The top of the table is at the height of**



Drawing not to the scale
   (1) 65 cm (2) 70 cm
   (3) 75 cm (4) 3.80 cm

4. **The above graph shows the cumulative number of deaths during a pandemic. The time intervals shown in the graph are equal. The largest increase in the number of deaths was during the period**



   (1) T1 to T2 (2) T2 to T3
   (3) T3 to T4 (4) T4 to T5

5. **The period of a pendulum is given as T = 2 TT (U/g)12 where g = 9.81 m/s2 and 1 = 3.1416. The period of a pendulum of length 1 m correct to the first place of decimal in seconds is**
   (1) 1.8 (2) 1.9
   (3) 2.0 (4) 2.1

6. **The sides a, b and c of a AABC satisfy the equati (a - 8)2 + (6 - 15) + (C-17)2 = 0. Then AABC is**
   (1) Equilateral
   (2) Right-angled
   (3) Isosceles
   (4) Obtuse angled triangle

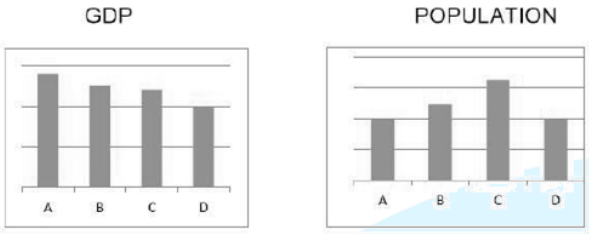
7. **In the given subtraction problem, each letter represents a digit Between 0 and 9.**

	T	A	S	5
-		R	S	R
	2	T	A	9

The values of R, A and T are, respectively
   (1) 6, 9, 3 (2) 4, 8, 3
   (3) 6, 9, 2 (4) 4, 2, 9

8. **Three apartments, which are in a row, are occupied by Umar, Ramesh and John. Only one of them is the landlord, whose apartment is at one end. Ramesh's apartment is not next to John's apartment. The apartment on the left is not the landlord's, the one in the middle is not Ramesh's and the one on the right is not John's. Who is the landlord?**
   (1) Umar
   (2) Ramesh
   (3) John
   (4) The above information is insufficient to identify the landlord.

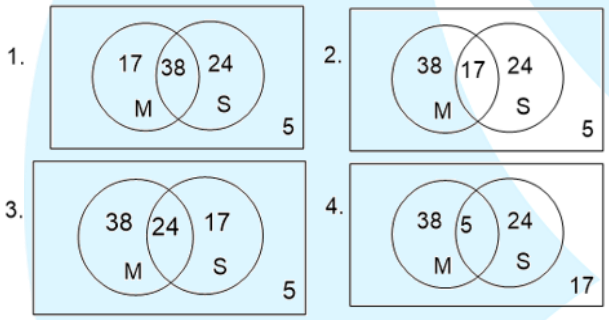
9. **The gross domestic products (GDP) and total population of four countries A,B,C and D in appropriate units are shown in the accompanying figures.**



Counties with highest and the lowest per capita GDP are, respectively Options:

(1) A and C (2) A and D
(3) C and D (4) C and B

10. In class of 84 students, 29 failed in Science (s), 43 failed in math's (M) and 17 students passed in both. Which of the following vein diagrams is the correct depiction of the situation?



11. A milk vendor has 50 L of milk and supplies 5 L to every customer. After each transaction he adds 5L of water. What is the percentage of milk contained in a litre of solution purchased by the fifth customer?

(1) 65.6%
(2) 72.9%
(3) 83.1%
(4) 59.4%

12. An expenditure of Rs.96 was supposed to be shared equally by all the students in a class. Since four students didn't contribute, the remaining students had to contribute an additional amount of Rs. 4, each. How many students contributed?

(1) 8 (2) 12
(3) 16 (4) 24

13. While calculating the average of twenty 2-digit numbers, digits of one of the numbers got interchanged because of which the average reduced by 1.8. The difference in the values of the digits of the number that were interchanged is

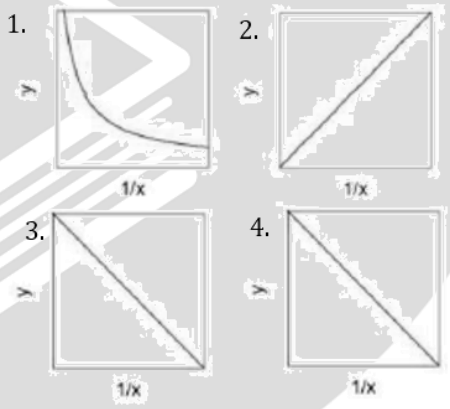
(1) 1 (2) 2
(3) 3 (4) 4

14. Based on the clues given in statements A to D, find the correct 3-digit number.

A. Two of the digits are present in the number 395, but they are not placed correctly.
B. One of the digits is present in the number 718 and is placed correctly.
C. None of the digits is present in the number 148.
D. One of the digits is present in the number 835 and is placed correctly.

(1) 739 (2) 735
(3) 379 (4) 359

15. Which of the following plots represent the function y= x?



16. 1% of the population of a country is suffering from a disease. One person undergoes a diagnostic test which has 98% reliability (i.e.. 98% of people who are sick test positive and 98% of the healthy people test negative). If the person is tested positive, the chances that the person is actually having the disease is, approximately

(1) 98% (2) 50%
(3) 75% (4) 33%

17. A man of height 2 m looks at the top of a 40 m tall building from some distance. The angle of elevation of his line of sight is 45°. When he further moves away from the building by a distance x, the angle of elevation becomes 30°. Then x is approximately

(1) 20 m (2) 12 m
(3) 34 m (4) 28 m

18. In an 800 m wide river, water flows at a speed of 9 km/h. A man can row a boat in still water with a speed of 15 km/h. If the path of the boat is maintained perpendicular to the flow of the water, then how long will the man take to cross it?

(1) 12 min (2) 4 min
(3) 6 min (4) 20 min

19. On large flat surface identical circular coins are placed in the most compact arrangement without overlapping with each other. If the number of coins available is unlimited, then the fraction of the surface area that is not covered by the coins is closest to

(1) $1 - 1\text{-}\pi/(2\sqrt{3})$ (2) $\text{-}\pi(2\sqrt{3})$
(3) $1\text{- -}\pi/(3\sqrt{2})$ (4) $\pi/4$

20. At a book-signing session, there are 5 authors who write only single-author books and another 5 who write only in pairs. Every author signs books that are authored or co-authored by him/her. In order to collect signatures of all 10 authors, in the best possible scenario, the minimum number of books that need to be purchased is

(1) 5 (2) 6
(3) 8 (4) 10

NOVEMBER 2020 GENERAL APTITUDE: CSIR NET LIFE SCIENCES (SHIFT-I)

12. Suppose $a^2 + b^2 = 4(a + 3b - 10)$, where a and b are two real numbers. Then which of the following is true?

(1) $a > b$
(2) $a < b$
(3) $a = b$
(4) From the above equation nothing can be said about the relationship between a and b.

13. If the day after tomorrow is NOT Friday then which of the following day CANNOT be the day before the day before yesterday?

(1) Sunday
(2) Monday
(3) Tuesday
(4) Wednesday

14. Which of the following words can be formed using only the letters of the word "FLOCCINAUCINIHILIPILIFICATION"? When forming a word you can use a letter at most as many times as it appears in the above word.

(1) PHILIPPINES (2) CHINCHILLA
(3) CINCINNATI (4) NATIONALITY

15. A box contains 10 red balls and 12 white balls. Two balls are drawn from the box at random, one by one without replacement. What is the probability that the second ball is red?

(1) 1/2 (2) 5/11
(3) 3/10 (4) 9/16

16. Three containers, namely cylinder, square prims and triangular prism, are given. Which one of the following conditions will ensure that they have identical volume?

(1) Their base areas and heights are identical
(2) Their base areas are identical
(3) Their heights are identical
(4) Their base areas and heights are different

6. An apply is fully cut vertically through its centre 4 times such that successive cuts are spaced at 45° in clockwise direction. How many pieces are made?

(1) 4 (2) 16
(3) 8 (4) 12

7. Bottles are to be placked in boxes. If 4 bottles are packed in a box then 3 boxes are left unused, but if 3 bottles are packed in a box then 3 bottles are left unpakced. The total number of bottles is

(1) 36 (2) 52
(3) 40 (4) 48

8. A tower is 50 m high. When the sun's altitude is 45°, the shadow of the tower is x m shorter compard to the case when the altitude is 30°. The value of x is

(1) $50(\sqrt{3} - 1)$ (2) $50(\sqrt{3} + 1)$
(3) $50/(\sqrt{3})$ (4) $50\sqrt{3}$

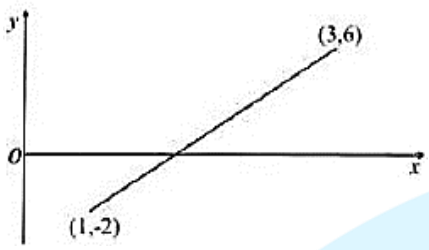
9. The year BP, in the context of radiocarbon dating, is defined as Years (BP) = 1950 – Years (AD) An object from the Harappan site was dated to be 3050 BC. Its age in years (BP) is

(1) -5000
(2) -1100
(3) +1100
(4) +5000

10. Which of the following months in 2021 will have the same calendar (the same days and dates) as that in Sept 2020?

(1) March
(2) April
(3) November
(4) June

11. Find the value of x at which the given straight line crosses the x-axis.

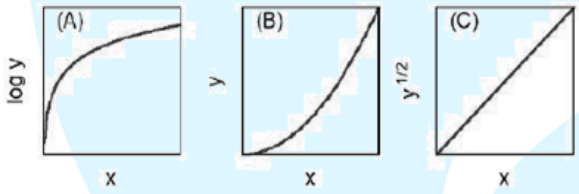


(1) 1.2 (2) 1.5
(3) 2.2 (4) 1.7

12. Five persons A, B, C, D and E form a question. C and E are next to each other. A has one person ahead of him and has at least one person separating him from B. Which of the following statements is certainly true?

(1) A and D are next to each other
(2) A and E are next to each other
(3) D and E are next to each other
(4) B and C are next to each other

13. Which of the following graphs qualitatively show(s) the function $y = x^2$?



(1) B and C but not A (2) A and B but not C
(3) Only B (4) A, B and C

14. Four babies born in the month of April 2019 are randomly selected. The probability that at least two of them will have the same date of birth is,

(1) 81.2% (2) 18.8%
(3) 13.7% (4) 86.3%

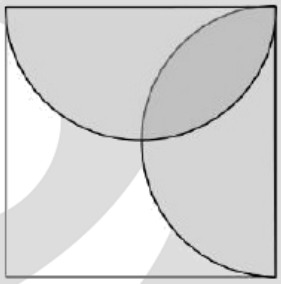
15. A chord AB in a circle subtends an angle of 30° at the circumference. Then the angle subtended at the circumference by a chord of twice the length of AB is

(1) 45° (2) 60°
(3) 91° (4) 120°

16. In a race, the winner beat the second placed by 10 m and the third placed by 100 m. The second placed beat the third placed by 91 m. Assuming that the speeds of the runners remained unchanged throughout the race, the length of the race track was

(1) 1000 m (2) 900 m
(3) 910 m (4) 909 m

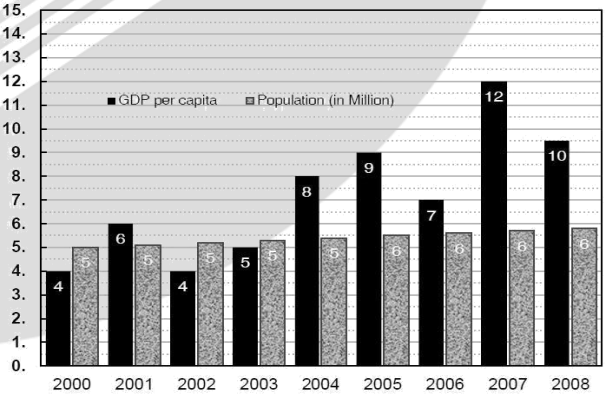
17. A square of side 2 units contains two half circles as shown in the figure.



The are of unshaded region inside the square is

(1) $3 - \pi/2$ (2) $4 - \pi/2$
(3) $3 - \pi/4$ (4) $4 - \pi/4$

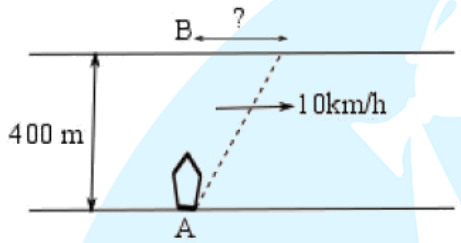
18. The paired bat chat gives the Per Capita GDP and population of a country from year 2000 to 2008. Given that Per Capita GDP = Total GDP/Population



The highest percentage decrease in the total GDP of the country over the previous year was in the year

(1) 2002 (2) 2003
(3) 2006 (4) 2008

19. A 400 m wide river flows at 10 km/h. A man at point A wants to cross the river. In still water he can row a boat at a maximum speed of 20 km/h. Point B is exactly opposite A on the other bank. If he wants to cross the river in the least possible time then how far from B will he land on the other bank?



(1) 200 m.
(2) 100√3 m.
(3) 0 m.
(4) 50 m.

20. In a cycle of spread of the infection, each person infects 3 more people. One third of the newly infected people take precaution and do not infect other people. No infected person dies or gets cured until the end of third cycle of the spread. Starting with one infected person, the number of people newly infected in the third cycle is

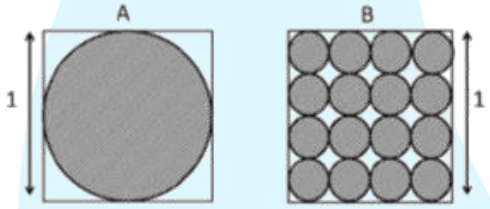
(1) 12
(2) 15
(3) 27
(4) 30

NOVEMBER 2020 GENERAL APTITUDE: CSIR NET LIFE SCIENCES (SHIFT-II)

1. Starting from the same point, two particles move along a circle of radius 10 m in opposite direction with speeds 5 m/s and 8 m/s. At the instant of crossing each other, their speeds are interchanged but not their directions. What would be the difference between their arrival times at the starting point?

(1) 0 S
(2) $\frac{3\pi}{8}$ S
(3) $\frac{13\pi}{8}$ S
(4) $\frac{20}{13\pi}$ S

2. In the given figures shaded areas area circles. Ratio of the unshaded area in the square A to the unshaded area in the square B is

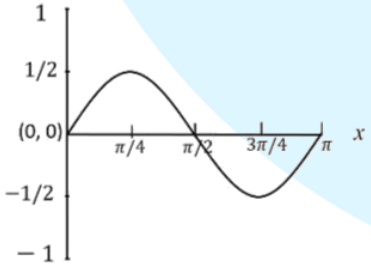


(1) 1:1
(2) 1:16
(3) 1:2
(4) 16:1

3. The equation $x^2 + y^2 + 2x = 0$ represents

(1) a parabola
(2) a circle.
(3) a pair of straight lines
(4) a hyperbola.

4. Which of the following functions is represented by the given graph?



(1) $\sin x$
(2) $\sin 2x$
(3) $\sin x \cos x$
(4) $\sin^2 x$

5. In which of the following options is the amount of gold identical in the two coins? (Pure gold is 24 carat)

(1) 24g coin of 22 carat and 22g coin of 24 carat
(2) 22g coin of 22 carat and 24g coin of 24 carat
(3) 22g coin of 22 carat and 22g coin of 24 carat
(4) 24g coin of 22 carat and 24g coin of 24 carat

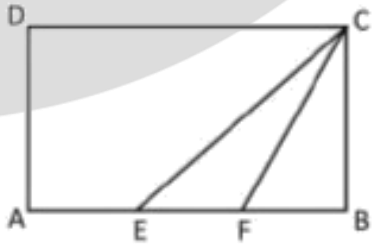
6. The number of persons infected by a particular virus for the first 30 days was equal to the square of the number of days. After 30 days, the number of infected persons doubled every 4 days. At the end of f50 days, 3,800 persons had died and on subtracting their number from the total number of cases, the number of infected persons was found to double every 5 days. After how many days to the onset of the infection, did the number of infected persons become 4 lakh?

(1) 90
(2) 100
(3) 70
(4) 80

7. Of the employees of a company 60 are male and the rest are female. The overall average salary is Rs. 9,000; the average for the female employees is Rs. 12,000 and that of male employees is Rs. 7000. The difference between the numbers of male and female employees is

(1) 30
(2) 10
(3) 20
(4) 40

8. In the given rectangle ABCD, AE=EF=FB. What is the ratio of the area of triangle EFC to the area of rectangle ABCD?



(1) 1:8
(2) 1:6
(3) 1:6
(4) 1:9

9. An explorer starts from a place on the equator of the Earth, travels 1500 km towards the north, 500 km towards the east, then 1500 km towards the south and finally 500 km towards the west. He ends at a place

(1) exactly where he started.
(2) to the east of where he started.
(3) to the south of where he started.
(4) to the west of where he started.

10. The probability that team A wins a match against tea B is 2/3. If teams A and B play 4 matches against each other, what is the probability that team A will win at least one match? (Assume that result of one match does not influence the rest.)

(1) 2/3 (2) 4/9
(3) 1 (4) 80/81

11. Among the children of a family, each boy has as many brothers as sisters but each girl has twice as many brothers as sisters. How many boys and girls are there in the family?

(1) 3 boys, 2 girls
(2) 2 boys, 2 girls
(3) 4 boys, 3 girls
(4) 4 boys, 2 girls

12. A student obtains 59, 60, 69 and 81% mark in 4 courses carrying weights in the proportion 4:3:2:2, respectively. The following table gives conversion of marks to grade points. What will be the Grade Point Average of the student?

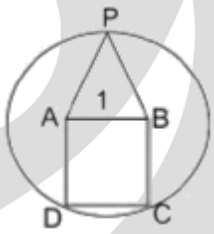
% marks	Grade Point
>89	9
80-89	8
70-79	7
60-69	6
50-59	5
<50	0

(1) 6.0 (2) 6.5
(3) 7.0 (4) 7.5

13. Hollow open-ended cylinders are made in two sizes, 1000 cm3 and 250cm3, using a metal sheet. The amount of material required to make the larger cylinder and the amount required to make four small cylinders.

(1) have to be the same.
(2) are always in the ratio of 1:2
(3) can be the same.
(4) are always in the ratio of 1:4

14. An equilateral triangle APB is constructed on side AB of the square ABCD having a side of 1 unit. What is the radius of the circle passing through points C, P and D?

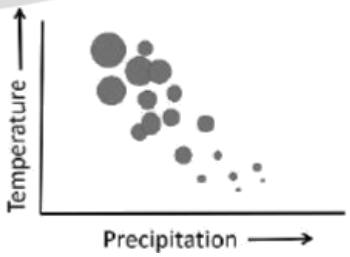


(1) 1 (2) 2
(3) 3 (4) $\sqrt{3}/2$

15. If n is an even number, then the sum of the first n natural numbers is divisible by

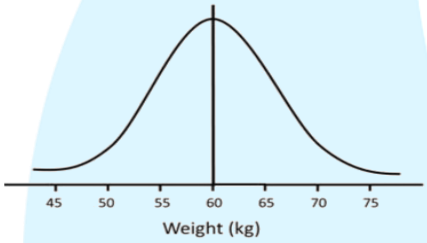
(1) both n and $(n+1)$
(2) n but not $(n+1)$
(3) $(n+1)$ but not n
(4) neither $(n+1)$ nor n

16. The bubble plot shows an effect of temperature and precipitation on annual growth of trees of a certain species. The area of a bubble is proportional to the tree-growth. Based on the plot, the growth of the trees is



(1) directly proportional to both precipitation and temperature.
(2) directly proportional to precipitation but inversely proportional to temperature.
(3) inversely proportional to precipitation but directly proportional to temperature.
(4) inversely proportional to both precipitation and temperature.

17. The probability distribution of weights of a certain population is normal as shown in the figure. What is the probability that the weight of a person picked at random is more than 60 kg?



(1) 1/2 (2) 1
(3) 2/3 (4) 1/3

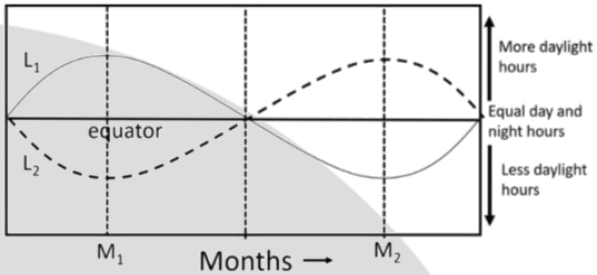
18. A clock takes 7 seconds to announce 7 o'clock by chiming seven times. How many seconds will this clock take to announce 10 o'clock by chiming 10 times?

(1) 10 (2) 9.5
(3) 10.5 (4) 11

19. There are several boulders of three types of rocks A, B and C. Each boulder of A, B and C weights 600 kg, 300 kg and 80 kg, respectively. Each boulder of A is 8 times as valuable as that of C. Each boulder of B is 3 times as valuable as that of C. Which of the following combinations that can be carried using a truck of 4000 kg capacity, would be the most valuable?

(1) 6 boulders of A and 1 boulder each of B and C
(2) 6 boulders of A, none of B and 5 boulders of C
(3) 5 boulders of A, 2 boulders of B and 5 boulders of C
(4) 5 boulders of A, none of B and 12 boulders of C

20. The graph shows daylight hour varations with months at two latitudes L_1 and L_2. Which one of the following can be true?



(1) L_1 is 40° N and M_1 is June
(2) L_1 is 40° S and M_1 is June
(3) L_2 is 40° S and M_2 is June
(4) L_2 is 40° N and M_2 is December

NOVEMBER 2020 GENERAL APTITUDE: CSIR NET CHEMICAL SCIENCES (TN & PC)

5. Single grain density and bulk density of four varieties of grain are given in the table. If we take 1kg of each of these, which one will have the largest volume?

Grain	Single-grain density (g/cm^3)	Bulk density (g/cm^3)
Rice	1.13	0.56
Wheat	1.39	0.80
Millet	1.27	0.77
Maize	0.97	0.68

(1) Rice (2) Wheat
(3) Millet (4) Maize

6. What will be the difference in mass (in g) between two packets each containg 500 sheets of 80 GSM and 70 GSM papers of size 20cm x 30 cm? (GSM=g/m^2)

(1) 200 (2) 2000
(3) 300 (4) 400

7. Suppose there 6 non-stop flights from Chennai to Mumbai in the moring and 4 non-stop flights from Mumbai to goa in the evening. In how many ways can one fly from Chennai to Goa via Mumbai using these flights in days?

(1) 10 (2) 2^4
(3) 4^6 (4) 6^4

8. A pack contains 6 cards numbered 1, 2, 3, 4, 5 and 6. Four cards are drawn one by one at random without replacement. What is the probability that the card numbered 1 is drawn in the selected four cards?

(1) $\frac{4}{6}$ (2) $1-\frac{4}{6}$
(3) $\frac{1}{24}$ (4) $\frac{4}{10}$

9. The present age of a father is square of the age of this son. After six years, the age of the fater would be $3\frac{1}{2}$ times the age of the son. The present age of the father is

(1) 36 (2) 42
(3) 48 (4) 54

1. n an exam the average marks for the class was 60, the average of marks of the students who passed was 70 and those failed was 30. What is the percentage of the students of the class who failed?

(1) 25 (2) 40
(3) 60 (4) 75

2. A bug moves in a straight line from a point A_o to a point A_1 1 cm away. It then turns by an angle of 90° and moves straight another 1 cm to reach a point A_2. Then it moves 1 cm perpendicular to the line joining A, to A_2 to a point A_z. It continues this way as shown, moving 1cm every time till it reaches a point A_{25}. What is the straight line distance from A_0 to A_{25}?

(1) 3 cm
(2) 15 cm
(3) 5 cm
(4) 16 cm

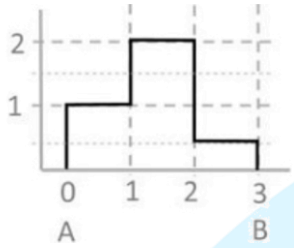
3. A worker is asked to arrange 1000 identical square tiles into a rectangular pattern and paint only the tiles forming the border. What should be the dimension of the rectangular pattern he arranges, in order to use the minimum amount of paint?

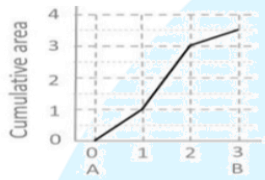
(1) 50 tiles x 20 tiles
(2) 8 tiles x 125 tiles
(3) 200 tiles x 5 tiles
(4) 40 tiles x 25 tiles

4. There are 150 vehicles in a parking place. Each vehicle is either a bike or a car, and is either red or green. Sixty vehicles are red, and 100 vehicles are cars. If there are 20 green bikes, how many red cars are there?

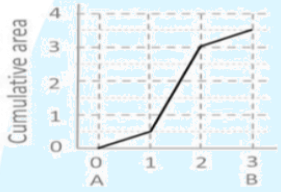
(1) 70 (2) 30
(3) 40 (4) 50

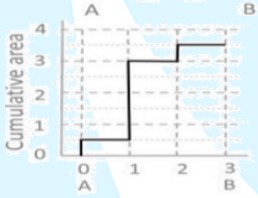
10. Which one of the following graphs represents the cumulative area under the plot



1.


2.

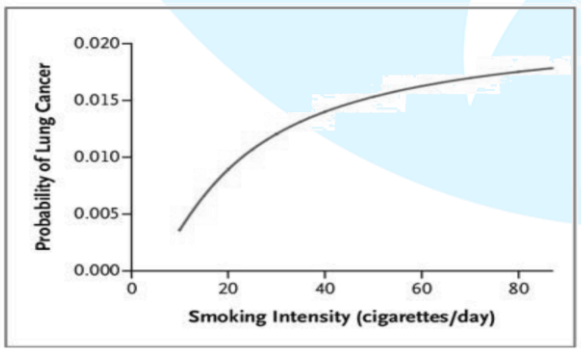

3.


4.


11. The number of times the minute hand and the hour hand, in a clock, are exactly above each other (i.e. angle between them is zero) from 1 am of a day to 1 am on the next day is

(1) 21 (2) 22
(3) 23 (4) 24

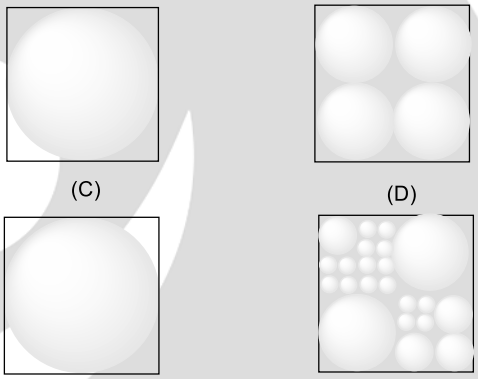
12. The graph shows relationship between smoking intensity and probability of getting lung cancer in a population. Which one of the following inferences is supported by the study?



(1) Smoking always causes lung cancer.
(2) People have healthy lungs if they don't smoke.
(3) Smoking intensity is not directly proportional to the probability of getting lung cancer.
(4) High intensity smokers will get the lung cancer

13. The shaded circle having diameter of 1, 0.5, 0.25 and 0.125 cm are inside square of side 1cm as shown in the figure. The ratio of shaded area in A and B is one:

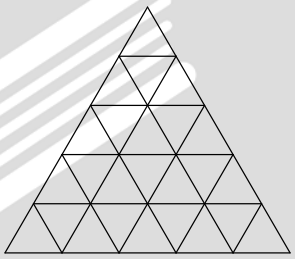
(A) (B)



(C) (D)

(1) 1 (2) 1.25
(3) 1.5 (4) 1.75

14. How many triangles are there in the figure



(1) 35 (2) 38
(3) 39 (4) 48

15. Each person in a group of teachers and students is given the same number of chocolates as the number of students. If 4 more students are added then in order to have the same number of chocolates per person as earlier, 28 more chocolates are needed. The total number of students now is

(1) 7 (2) 11
(3) 13 (4) 5

16. A ball is moving with a constant speed in a circular path in a vertical plane. The system is illuminated from the top so that the shadow of the ball on the ground oscillates. The maximum probability of finding the shadow of the ball is at

(1) the extreme points
(2) the mean point.
(3) half the distance from the mean point.
(4) one third the distance from the mean point.

17. Five concentric, adjacent, semi-circular running tracks, each of mean length 100 m and width 2.5 m are marked on a field. If the angle subtended by inner track is 1.00 rad, the angle subtended by the outermost track is

(1) 0.90 rad
(2) 0.91 rad
(3) 0.88 rad
(4) 0.98 rad

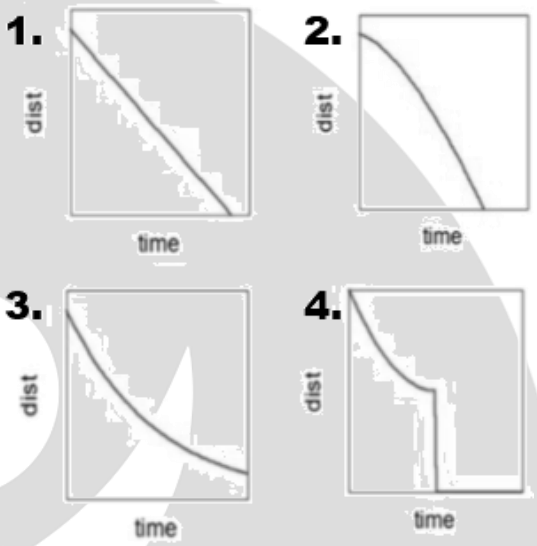
18. In a legislative assembly of 250 members, political parties A, B, C, D and E got 100, 70, 48, 15, 7 seats, respectively, while 10 seats were won by the independents. If parties A, B and C decide not to support each other, what is the minimum number of political parties required to join hands to form a majority government?

(1) One (2) Two
(3) Three (4) Four

19. A heater is used to boil water in a container. The heater supplies heat at a constant rate R. Water boils at 100°C. Assume that the water in the container loses heat to the atmosphere at a rate that is proportional to both, the temperature of the water as well as to the volume of water in the container. If this proportionality constant is k then the maximum volume of water that can be boiled by the heater is

(1) 100/KR (2) K/100R
(3) R/100K (4) KR/100

20. Two trains are approaching each other on the same straight track. One is moving at a constant speed, while the other is decelerating. Which of the graphs shows the correct change in their separation as a function of time?



NOVEMBER 2020

CSIR NET GENERAL APTITUDE

MATHEMATICAL SCIENCES

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

PHYSICAL SCIENCES

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

CHEMICAL SCIENCES

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

LIFE SCIENCES (SHIFT-I)

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

LIFE SCIENCES (SHIFT-II)

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

CHEMICAL SCIENCES (TN & PC)

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

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CSIR UGC NET, GATE & IIT JAM

Our Mission

Democratising Online Education through Personalized Learning.

Our Vision

We are and will remain no. 1 brand for Competitive Examination Preparation, helping the highest number of students to succeed.

Our Values

- Make a positive difference in the lives of our students.
- With every milestone, aim higher and strive to achieve it.
- Innovate the oldest industry and find better ways to do it.
- Grow by investing in people.
- We value our colleagues, our students and hold the utmost regard for everyone.

CSIR NET LIFE SCIENCE

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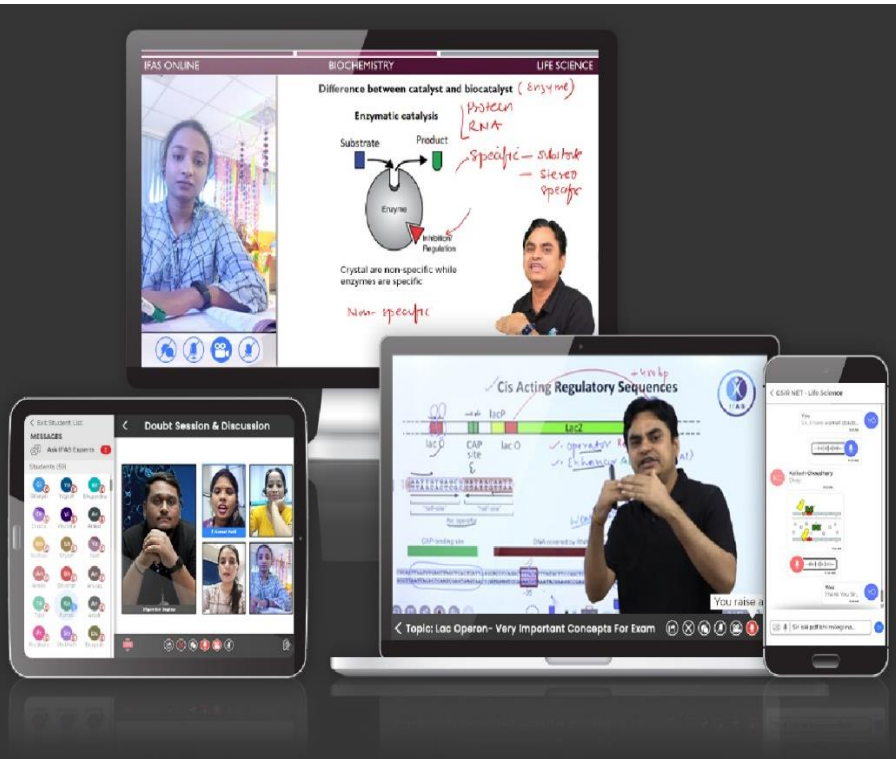

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