Test Information

Test Name	12th COMPLETE	**Total Questions**	43
Test Type	Examination	**Difficulty Level**	Difficult
Total Marks	43	**Duration**	60 minutes

Test Question Language:- ENGLISH

1.

Let there be a triangle PQR being right angled at P and the length of the segments PQ and PR are equal. Let S and T be two points on the segment QR such that QS : ST : TR = 1 : 2 : √3. Then find the angle between segments SP and PT ?

Answer. 45

2. Let a , b be prime numbers such that $v^{3ab} - v$ is a multiple of 3ab for all positive integers v. Find the least possible value of a + b.

Answer. 28

3.

Let T1 be a circle with center O and let AB be a diameter of T1. Let P be a point on the segment OB different from O. Suppose another circle T2 with center P lies in the interior of T1. Tangents are drawn from A and B to the circle T2 intersecting T1 again at V and S respectively such that V and S are on the opposite sides of AB. Given that VB = 5, AS = 15 and OP = 10, find the radius of T1.

Answer. 20

4.

Let there be a triangle RIP in which there is a point M on the segment IP. Let the Incentres of the triangles RIM and RPM be C and A . Let RC and RA meet IP in E and N. If ∠ ICE = 600 what is the measure of ∠ PAN in degrees?

Answer. 30

5.

A book is published in three volumes, the pages being numbered from 1 onwards. The page numbers are continued from the first volume to the second volume to the third. The number of pages in the second volume is 50 more than that in the first volume, and the number pages in the third volume is one and a half times that in the second. The sum of the page numbers on the first pages of the three volumes is 1709. If n is the last page number, what is the largest prime factor of n?

Answer. 17

6.

There is a very posh looking village called Wakanda . Wakanda has a circular wall around it, and the wall has four gates pointing north, south, east and west. A tree stands outside the village, 16 m north of the north gate, and it can be just seen appearing on the horizon from a point 48 m east of the south gate. An intelligent alien wants to know the diameter of the wall that surrounds the village. As you are more intelligent than the alien, can you help him find the diameter?

Answer. 48

7.

Let T be the smallest positive integer which, when divided by 11, 13, 15 leaves remainders in the sets {7, 8, 9}, {1, 2, 3}, {4, 5, 6} respectively. What is the sum of the squares of the digits of T?

Answer. 81

Suppose Tony Stark's house is broken because of the attack of Aldrich Killian. So he calls two teams of workers to build his house .
The Team A do the construction in 12 days to completely build the home and whereas Team B can finish the construction in 36 days alone.
Now Team A starts work and after 4 days Team B joins the work. After 2 more days Team A quits the work because they fear Aldrich Killian.

8. So now, how many more days do Team B need to work to complete the construction of Tony Stark's home ?

Answer. 16

9. Let f(x) = sin (x/3) + cos (3x/10) for all real x. Find the least natural number t such that f (t + x) = f(x) for all real x.

Answer. 60

10.

For every Non-negative integer z, Let the greatest common factor function H(z) of the two numbers z!+1 and (z + 1)!. For z to be less than 100 , find the largest value of H(z).

Answer. 97

$$\int_0^{k(x)} k^{-1}(x).dx - \int_0^{x} (cost - k(t)).dt = 0$$

12th Q.1-2 :
Let 'k' be a differentiable function satisfying $f(0) = 1$

11. The number of solution of the equation $|k|2x|k|x|sinx2|=0$ in $(0,2\pi)$

a. 2

b. 3

c. 4

d. 5

Answer. b

12. The value of $\int_0^{\pi/2} k(x).dx$ lies in the interval

a. $\left(\frac{2}{\pi},1\right)$

b. $\left(1,\frac{\pi}{2}\right)$

c. $\left(\frac{3}{2},\frac{\pi}{2}\right)$

d. $\left(0,\frac{2}{\pi}\right)$

Answer. b

Let $a_x = \sum_{y=1}^{x} (y^2 + x^2)/x^3$
$b_x = \sum_{y=0}^{x-1} (y^2 + x^2)/x^3$

13. For x=1,2,3,..... then

a. $a_x < \frac{4}{3}$

b. $a_x > 1$

c. $b_x > 1.5$

d. $b_x < 1.40$

Answer. b

14.

Let f be a differentiable function such that f(f(x)) = x , Where x∈[0,1] . Also f(0) = 1 ; then the value of $\int_0^1 (x - f(x))^{2018}\, dx = \frac{a}{b}$ (where a and b are co-primes) then $7*\{\frac{b}{7a}\} = ?$ ({.} denotes fractional part)

a. 1

b. 2

c. 3

d. 4

Answer. c

12th Q. 5-6 :
Equation of a plane which is at a distance of 0.2 units from origin and at a distance of 0.8 units from (1,2, 1) is ax by cz = d . The plane also passes through the intersection of the two lines x y z-3=0=2x 2y z-5 and $\frac{x-4}{3} = \frac{y-3}{2} = \frac{z-5}{4}$; (a≠ 0) then

15. Which is the correct option ?

a. a = 3

b. b = 4

c. c = -1

d. d = 0

Answer. a

16. The plane ax+by+cz+d = 0 is **NOT** perpendicular to which of the following plane ?

a. z = 0

b. 4x+3y+2z = 4

c. 4x+3y = 2

d. x-y+z = 2

Answer. d

12th Q. 53-56 :
Urania, the Greek goddess of astronomy has come to Camp Half Blood - where the Greek demigods reside, for a stay. On a chilly evening, she decided to teach and then conduct a quiz for them. She taught them about the movement of the sun and planets and then distributed the quiz paper.
Her lesson is provided here in the form of a paragraph followed by the quiz questions. Attempt it to see if you can ace it.

Directions : Read the following passage and answer the questions as follow:

In a Spin

You have only to watch the daily movement of the sun and the nightly turn of the stars across our sky to realise that the Earth is turning. While you may be standing completely still on the surface of the Earth, that surface is itself turning at a rate of about 1700 km/h. At this rate, our planet takes 23 hours and 56 minutes to make one full rotation on its axis relative to any distant fixed star - a period of time that astronomers call a **sidereal day**. This is a tiny bit shorter than our ordinary **solar day** which is 24 hours long- the time between high noon on two consecutive days. The sidereal and solar days are different lengths because by the time the Earth has made one full rotation on its axis and the distant star is directly overhead again, the Earth has also moved 0.986 degrees further around its nearly ncerthecomit around the sun. As a result, at the end of a sidereal day, the Earth must continue to rotate that extra 0.986 degrees until the sun is overhead to complete a solar day. This extra rotation takes 4 minutes.
There are a number of factors that affect the rate at which a planet turns on its axis. Mercury, the closest planet to the sun, rotates much more slowly than Earth because of the dragging effect of the sun's enormous gravity. A solar day on Mercury is the same length as 58 Earth days! Our own Earth's spin is being slowed down by the tidal effect of the Moon and scientists have found that the Earth solar day is getting longer at a rate of 1 second every

17. Which of the following statements is true?

a. The sun is speeding up the Earth's rate of spin.

b. Our clocks use the solar day as it is more convenient.

c. The sidereal day is longer than the solar day on Earth.

d. All planets in our solar system have the same length of sidereal day.

Answer. b

18. What would happen if the Earth's spin were to slow down?

a. Night-time would be longer than daytime.

b. The solar day would be shorter than the sidereal day.

c. The sidereal day and solar day would both be longer.

d. There would be more hours of daylight than hours of darkness.

Answer. c

19. Venus spins in the opposite direction to that in which it orbits the sun, therefore

a. its sidereal day is longer than its solar day.

b. its solar day is longer than its sidereal day.

c. the length of its sidereal day is constantly changing.

d. the length of its sidereal day and its solar day are the same.

Answer. a

20. Mercury rotates at a speed of 11 km/h. Therefore the circumterence of Mercury is approximately

a. 1550 km.

b. 9200 km.

c. 12100 km.

d. 15600 km.

Answer. d

21.

Percy and Annabeth, two of the best demigods, are on a mission in the underworld. Hades has invited them to a party in the underworld on one of the following 10 days.
January 15,16,19
February 17,18
March 14,16
April 14,15,17
Percy knows the month and Annabeth knows the date. Percy said, "I don't know when the party is but neither does Annabeth."
Annabeth says, "I didn't know earlier. But now I do."
Percy exclaims, "Now I know too!"
When is Hades arranging the party for the people of the underworld?

a. march 14

b. march16

c. april 15

d. april 17

Answer. b

22.

Artemis needs more hunters in her crew so she asks Thalia to find her new and best ones. Thalia has 25 new recruits for the 'Hunters of Artemis'. She wants to know the fastest 3 of them. However, Mt.Olympus has only 5 tracks and Thalia has no stopwatch. How many minimum number of races will she have to conduct to figure out who are the three fastest runners on her team?

a. 5

b. 9

c. 6

d. 7

Answer. d

23.

One fine day, Grover decided to sell some Camp Half Blood merchandise to the newest members of the camp. Young demigods came across his shop and bought some from him for 350 USD. The cost price was 300 USD. Grover was thrilled that he had made a profit of 50 USD on the sale.
However, as they had no cash money with them, they offered to pay in special ambrosia bars which could be encashed. But Grover did not have the provision to use those bars. However, his girlfriend, Juniper did. So Grover took four bars from the demigods, totalling to 400 USD (100 USD each), went to her and got cash in return. He then gave back 50 USD in cash to the demigods.
The next day, Juniper went to encash the bars. However, the bars proved value-less and she naturally demanded the refund of her money. Grover quietly refunded the money and tried to trace the demigods who had given him the bad bars. But they had gone away on a quest!
How much did Grover lose altogether in this unfortunate transaction?

a. 750

b. 400

c. 350

d. 300

Answer. c

24.

On Long Island, where Camp Half Blood is situated, there is an airport. The airport is the homebase of an unlimited number of identical airplanes for demi-gods. Each airplane has a fuel capacity to allow it to fly exactly 1/2 way around the world of the dead, along a great circle. The planes have the ability to refuel in flight without loss of speed or spillage of fuel. Though the fuel is unlimited, the island is the only source of fuel.
What is the fewest number of aircraft necessary to get one plane all the way around the world of the dead assuming that all of the aircraft must return safely to the airport?
Notes:
(a) Each airplane must depart and return to the same airport, and that is the only airport they can land and refuel on ground.
(b) Each airplane must have enough fuel to return to airport.
(c) The time and fuel consumption of refueling can be ignored. (so we can also assume that one airplane can refuel more than one airplanes in air at the same time.)
(d) The amount of fuel airplanes carrying can be zero as long as the other airplane is refueling these airplanes. What is the fewest number of airplanes and number of tanks of fuel needed to accomplish this work? (we only need airplane to go around the world of the dead)

a. 5

b. 3

c. 2

d. 7

Answer. b

12th Q. 9-11 :
PARAGRAPH : Four couples Percy & Annabeth, Ella & Tyson, Grover & Juniper and Clarisse & Chris are having a meeting regarding the last prophecy of the Oracle of Delphi. They are sitting in a circular formation near the lake, equidistant from each other.
Each of the four men and each of the four women wear a Camp Half Blood t-shirt of one of the four colours Red, Blue, Green and Yellow. No two men wear the same coloured T-shirt and no two women wear the same coloured T-shirt. We know the following as well.
1. Percy, Tyson, Grover and Chris are men.
2. No two men sit adjacent to each other.
3. Percy is sitting opposite Chris.
4. No husband is sitting adjacent to his wife.
5. In a couple, the husband and wife don't wear the same coloured T-shirt.
6. Percy does not wear a green coloured T-shirt.
7. No person is wearing the same coloured T-shirt as the person sitting either adjacent or opposite to him/her.
8. Annabeth is not sitting adjacent to Grover.
9. Clarisse and Chris wear Blue and Red colored T-shirts respectively.

25. Which 2 people are sitting adjacent to the man wearing the Blue T-shirt?

a. Clarisse & Ella

b. Ella & Annabeth

c. Annabeth & Juniper

d. Juniper & Clarisse

Answer. c

26. If the person sitting to the immediate right of Grover is wearing a blue colored T-shirt, then that person is:

a. Clarisse

b. Ella

c. Either Clarisse or Ella

d. Either Ella or Juniper

Answer. a

27. Who all are wearing the Yellow colored T-shirts?

a. Clarisse & Tyson

b. Percy & Ella

c. Chris & Juniper

d. Annabeth & Grover

Answer. b

28.

In camp half blood, there are five cabins in a row, each for different Olympian Gods: Athena, Poseidon, Zeus, Apollo and Aphrodite. They are also painted five different colours. Each God drinks a different kind of beverage, smokes a different brand of cigar and keeps a different pet.
1. Athena lives in a red house.
2. Poseidon keeps dogs as pets.
3. Zeus drinks tea.
4. The green house is next to, and on the left of the white house.
5. The owner of the green house drinks coffee.
6. The Olympian who smokes Pall Mall rears birds.
7. The owner of the yellow cabin smokes Dunhill.
8. The Olympian living in the center house drinks milk.
9. Apollo lives in the first house.
10. The Olympian who smokes Blends lives next to the one who keeps cats.
11. The Olympian who keeps horses lives next to the man who smokes Dunhill.
12. The Olympian who smokes Blue Master drinks beer.
13. Aphrodite smokes Prince.
14. Apollo lives next to the blue house.
15. The Blends smoker lives next to the one who drinks water.
Which God/Goddess owns the fish ?

a. Aphrodite

b. Apollo

c. Zeus

d. Poseidon

Answer. a

29.

Dakota and Hazel wanted to try making a new drink. Dakota mixed his signature red Kool-aid with water in a ratio of 6:5. Hazel did not want him going crazy with the high sugar content and replaced 22 litres of the mixture with water. The final ratio stood at 9:13. What was the quantity of water in the watered-down mixture (i.e, after replacement)?

Answer. 52

30.

Mr. D, the director of the camp, has ordered a pizza with a diet coke six-pack. Chiron, the centaur trainer, decided to trap him with a puzzle. He asked Mr. D to make cuts in the pizza such that each slice was equal, with each being a circular sector with no cuts inside of it. Only then could he have his pizza. We know this:
1. The pizza is a perfect circle.
2. There were n premade cuts in the pizza when it was delivered.
3. Each cut is a straight segment connecting the center of the pizza with its boundary.
Let O be the center of the pizza, Pi be the endpoint of the i-th cut lying on the boundary, and R be the point of the boundary straight to the right of O. Then the counterclockwise-measured angle ∠ROPi is equal ai degrees, where ai is an integer between 0 and 359. Note that angles between 0 and 180 angles correspond to Pi in the top half of the pizza, while angles between 180 and 360 angles correspond to the bottom half.
The new cuts will have to be straight segments starting at the center as well. How many new cuts will Mr. D have to make if he wants to eat the pizza?
Given cuts are of angle 14,20,101,110 degrees

a. 115

b. 116

c. 117

d. 118

Answer. b

12th Q. 15-19 :

PARAGRAPH : In the labyrinth, Percy and Annabeth encountered the Sphinx who has challenged them to a game of Answer That Riddle. Annabeth, being the brain of the group, decides to answer. By the end, the sphinx is impressed by her answers and lets her go. Can you guess what were her answers to the puzzles of the sphinx?

A large cube, of total volume 512 cm^3 is made up of smaller 1 cm^3 cubes. The larger cube is made by following these rules:

1. Start from the left hand side, and number the small cubes 1 to 8, from left to right.
2. Place cube no. 9 behind cube no. 1 to start the second row, and proceed all the way to cube no. 64.
3. Start the second layer on top of cube no 1, and build the second layer from left to right, and front to back like the first layer.

31.

On the bottom-most square layer of the cube, consider the surface diagonal that has the square numbered 8, find the sum of all the numbers on the cubes on this surface diagonal on the bottom-most layer.

Answer. 260

32. Find the number in the small cube at the other end of the body diagonal that has the small cube numbered 1.

Answer. 512

33. Find the number on the small cube at the other end of the body diagonal taht has the small cube numbered 57.

Answer. 456

34. Find the sum of all the numbers on the body diagonal that has the small cube numbered 1.

Answer. 2052

35.

On the big cube, there exists a external surface whose four corner cubes have the numbers 8, 64, 456 and 512. Find the sum of all the numbers on the cubes on this surface.

Answer. 16640

36.

Percy is left still. He too will have to answer a few questions before the sphinx lets him go. Not very good in the problem-solving section, he definitely needs your help answering the sphinx.

How does the reflection of SJR9PZE7C18 look like in the water? Choose the right option

a.

b. 

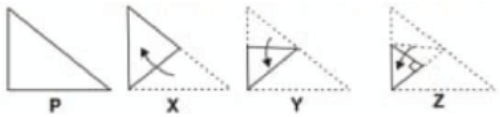
c.

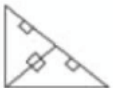
d. 

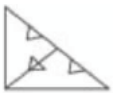
Answer. d

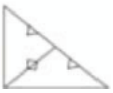
37.

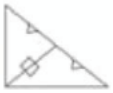
The given question consists of a set of four figures P, X, Y and Z showing a sequence of fold of a piece of paper. Fig. (Z) shows the manner in which the folded paper has been cut. Choose Figure which would most closely resemble the unfolded form of Fig. (Z).



a. 

b. 

c. 

d. 

Answer. a

38.

The demigods have enrolled in the Goode High School to keep away from the monsters. Sadly, this means they too are assigned homework like mortal beings. And chemistry is not a subject they particularly like.

Help the gang submit their homework tomorrow by solving the hardest questions on the assignment. The types of bond present in N_2O_5 are

a. Only covalent

b. Only ionic

c. Ionic and covalent

d. Covalent and coordinate

Answer. d

39.

Evaluate $\Delta S°$ for the reaction below at 25°C.

$CH_4(g) + 2Cl_2(g) \rightarrow CCl_4(\ell) + 2H_2(g)$

Given :

	$CH_4(g)$	$Cl_2(g)$	$CCl_4(l)$	$H_2(g)$
$\Delta H°_f$ (kJ/mol)	–74.81	0	–135.4	0
$\Delta G°_f$ (kJ/mol)	–50.75	0	–65.27	0

a. –360 J/K

b. -66.9 J/K

c. -155 J/K

d. -487 J/K

Answer. c

40. Most sensitive reagent to identify SO_4^{2-} ion :-

a. $MgCl_{2(aq.)}$

b. $CaCl_{2(aq.)}$

c. $SrCl_{2(aq.)}$

d. $BaCl_{2(aq.)}$

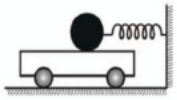
Answer. b

41.

Daedalus was one of the most skilled craftsmen and architects of all time. He even chose his students after rigorous rounds of testing them in the ways of science.

He is now dwelling in the depths of the labyrinth and looking out for anyone who deserves to be his student. Solve the following questions to see if you can make it to his team.

In the figure shown, the mass of the disc as well as that of the trolley is M. The spring is ideal and has stiffness k. The trolley can move horizontally on smooth floor and the disc can roll on the trolley surface without slipping. The spring is compressed and the system released so that the oscillations begin. The



a. acceleration of centre of disc = twice that of trolley

b. acceleration of centre of disc = thrice that of trolley

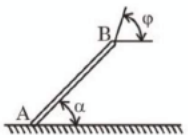
c. acceleration of centre of disc = half that of trolley

d. acceleration of centre of disc = that of trolley

Answer. b

42.

A uniform beam rests on a rough horizontal floor at a point A and is held by a rope at a point B (Fig.). The coefficient of friction is 0.2. The beam forms an angle $\alpha = 45^{\circ}$ with the floor. Determine the angle of inclination of the rope to the horizontal when the beam just starts to slide.
Fill $\tan\Phi$ in the answer.



Answer. 9

43.

A spherical object of mass 1 kg and radius 1m is falling vertically downward inside a viscous liquid in a gravity free space. At a certain instant the velocity of the sphere is 2 m/s. If the coefficient of viscosity of the liquid is 1/18π N-s/m2, then velocity of ball will become 0.5 m/s after a time.

a. ln 4s

b. 2 ln 4s

c. 3 ln 4s

d. 2 ln 2s

Answer. c

Test Question Language:- HINDI

Test Answer

1. (45) R_F:0.0000 R_T:0.0000	**2.** (28) R_F:0.0000 R_T:0.0000	**3.** (20) R_F:0.0000 R_T:0.0000	**4.** (30) R_F:0.0000 R_T:0.0000	**5.** (17) R_F:0.0000 R_T:0.0000	**6.** (48) R_F:0.0000 R_T:0.0000	**7.** (81) R_F:0.0000 R_T:0.0000	**8.** (16) R_F:0.0000 R_T:0.0000	**9.** (60) R_F:0.0000 R_T:0.0000	**10.** (97) R_F:0.0000 R_T:0.0000
11. (b)	**12.** (b)	**13.** (b)	**14.** (c)	**15.** (a)	**16.** (d)	**17.** (b)	**18.** (c)	**19.** (a)	**20.** (d)
21. (b)	**22.** (d)	**23.** (c)	**24.** (b)	**25.** (c)	**26.** (a)	**27.** (b)	**28.** (a)	**29.** (52) R_F:0.0000 R_T:0.0000	**30.** (b)
31. (260) R_F:0.0000 R_T:0.0000	**32.** (512) R_F:0.0000 R_T:0.0000	**33.** (456) R_F:0.0000 R_T:0.0000	**34.** (2052) R_F:0.0000 R_T:0.0000	**35.** (16640) R_F:0.0000 R_T:0.0000	**36.** (d)	**37.** (a)	**38.** (d)	**39.** (c)	**40.** (b)
41. (b)	**42.** (9) R_F:0.0000 R_T:0.0000	**43.** (c)							