

The IITian's Prashikshan Kendra

A Resonance of Brilliant Minds...!

GET-FRESHERS SAMPLE TEST

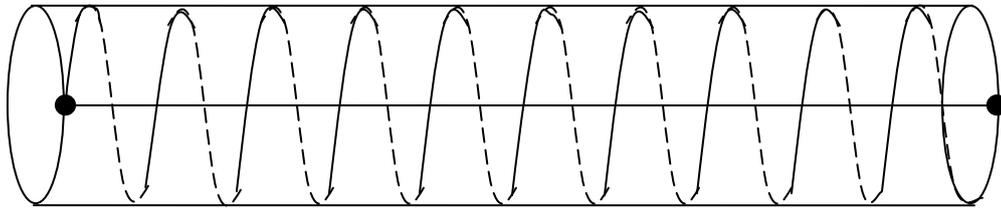
Duration : 120 Minutes

Maximum Marks : 200

SECTION – 1 : QUESTIONS ON MATHEMATICS

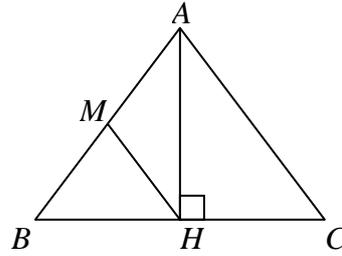
- Q.1** In a group of 55 people, 40 like cricket, 10 like both cricket and tennis. How many like tennis only?
- (a) 15 (b) 25 (c) 35 (d) None of these
- Q.2** Lines $ax + by + d = 0$ and $ax + by + c = 0$ are...
- (a) parallel to each other (b) identical lines
(c) perpendicular lines (d) Parallel to the line $y = x$
- Q.3** The average age of 15 students is 16 years. If teacher's age is included the average increases by 1. Find teacher's age.
- (a) 30 years (b) 32 years (c) 58 years (d) 60 years

Q.4

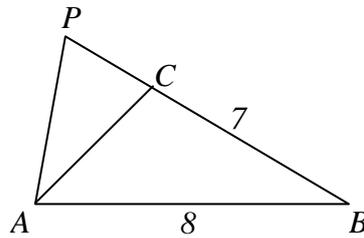


- Ten turns of a wire are helically wrapped around a cylindrical tube with outside circumference 4 inches and length 9 inches. The ends of the wire coincide with ends of the same cylindrical element. Find the length of the wire.
- (a) 41 inches (b) 36 inches (c) 40 inches (d) 90 inches
- Q.5** A series of books was published at seven - year intervals. When the seventh book was issued, the sum of the publication years was 13,524. When was the first book published?
- (a) 1932 (b) 1911 (c) 1918 (d) 1904
- Q.6** If $\cot A = \sqrt{3}$, find the value of cosec A
- (a) 1 (b) -1 (c) -2 (d) 2
- Q.7** The measure of an angle exceeds three times the measure of its supplement by 20° . Find its measure.
- (a) 90° (b) 140° (c) 110° (d) 60°

- Q.8** In $\triangle ABC$, $AB=13$, $BC=14$ and $CA=15$. Also, M is the midpoint of side AB and H is the foot of the altitude from A to BC . The length of HM is



- (a) 6 (b) 6.5 (c) 7 (d) 7.5
- Q.9** If $15x - 17y = 28$ and $17x - 15y = 36$, find (x, y)
- (a) 1, 3 (b) 3, -1 (c) 3, 1 (d) None of these
- Q.10** In $\triangle ABC$, $AB=8$, $BC=7$, $CA=6$ and side BC is extended, as shown in the figure, to a point P so that $\triangle PAB$ is similar to $\triangle PCA$. The length of PC is



- (a) 7 (b) 8 (c) 9 (d) 10
- Q.11** In $\triangle ABC$ if AD is perpendicular to BC and $AD^2 = BD \times DC$ then
- (a) $\angle BAC = 40^\circ$ (b) $\angle BAC = 35^\circ$ (c) $\angle BAC = 90^\circ$ (d) $\angle BAC = 60^\circ$
- Q.12** In a triangle ABC , $AB = 9$, $BC = 10$, $AC = 13$ if G is centroid. The value of line GB is
- (a) 25 (b) 20 (c) $\frac{10}{3}$ (d) $\frac{20}{3}$
- Q.13** The value of $\sqrt{3} \cot 20^\circ - 4 \cos 20^\circ$ is
- (a) 1 (b) -1 (c) 0 (d) none of these
- Q.14** If in a $\triangle ABC$ $\cos A = \frac{\sin B}{2 \sin C}$ then $\triangle ABC$ is
- (a) equilateral (b) isosceles (c) right angled (d) obtuse angled
- Q.15** The value of $\sin \frac{\pi}{10} + \sin \frac{13\pi}{10}$
- (a) $\frac{1}{2}$ (b) $\frac{\sqrt{3}}{2}$ (c) 1 (d) $-\frac{1}{2}$

- Q.16** In how many different orders may 5 students be seated in a row?
 (a) 120 (b) 25 (c) 50 (d) 100
- Q.17** In a meeting after every one had shaken hands with every one else, it was found that 105 handshakes were exchanged. How many members were present at the meeting?
 (a) 12 (b) 13 (c) 14 (d) 15
- Q.18** A man has 7 friends. In how many ways can he invite one or more of them to a party?
 (a) 128 (b) 127 (c) 49 (d) 70
- Q.19** In a quiz program, the ratio of correct answers to incorrect answers is 5 : 2. If 16 incorrect answers are given then the number of correct answers given is
 (a) 80 (b) 40 (c) 20 (d) 30
- Q.20** 10 Men begin to work together on a job, but after some days, 4 of them left the job. As a result the job which could have been completed in 40 days is completed in 50 days. How many days after the commencement of the work did the 4 men leave?
 (a) 25 (b) 30 (c) 10 (d) 15

SECTION – 2 : QUESTIONS ON SCIENCE

- Q.21** A Karate expert breaks a slab with one blow of his bare hand. What is the principle behind this?
 (a) Inertia (b) Impulse-Momentum Principle
 (c) Law of Conservation of Energy (d) Newton's 3rd Law of Motion
- Q.22** A solid ball of metal has a spherical cavity inside it. When the ball is heated, the volume of the cavity _____
 (a) Increases
 (b) Decreases
 (c) Depends on the location of the cavity
 (d) Can't say - Depends on the material properties.
- Q.23** Why is it difficult to walk on Sand ?
 (a) Because Sand is soft and does not oppose motion
 (b) Because Sand is soft and opposes motion
 (c) Because Sand does not yield high Reaction forces required for Walking
 (d) Because Sand yields Reaction forces required for Walking.
- Q.24** Does water expand or contract when heated from 0° to 4°C ?
 (a) Water expands from 0 to 4 degree C
 (b) Water contracts from 0 to 4 degree C
 (c) Water expands till 2 degree C and then contracts from 2 to 4 degree C

(d) Water contracts till 2 degree C and then expands from 2 to 4 degree C.

Q.25 Why does an aeroplane take a race on the land before flying?

- (a) To take the right direction
- (b) To accelerate the speed
- (c) To obtain the needed lift
- (d) To warm up the engines

Q.26 In a cricket match a fielder has to catch a fast moving ball by moving his hand along with the ball. Why?

- (a) In order to reduce the kinetic energy of the ball
- (b) In order to reduce the impact force on the hand by increasing the time for momentum change.
- (c) In order to exhibit the Law of Inertia
- (d) In order to get better grip on the ball.

Q.27 The Physics principle behind spin bowling in cricket is based on

- (a) Conservation of Momentum
- (b) Conservation of Energy
- (c) Bernoulli's Principle
- (d) Torque-Angular Momentum Principle

Q.28 The principle behind the Banana Kick in Football, Swing Bowling in Cricket and the flying of an aeroplane is the same ! It is called as the Magnus Effect ! Which of the following describes this effect most correctly ?

- (a) Pressure difference due to velocity difference of two parts of an extended object.
- (b) Momentum difference due to angular velocity
- (c) Torque effect
- (d) Acceleration of object beyond a critical value.

Q.29 A boat is full of Iron pieces. If some of those iron pieces are put in water, What will happen to the water level of the water body ?

- (a) Remain Same
- (b) Rise up
- (c) Go down
- (d) Depends on the material of the boat

Q.30 If God gave us the power to be invisible, which of our faculties will we lose ?

- (a) We will not be able to hear
- (b) We will not be able to see
- (c) We will not be able to see colors but we will be able see in Black and White.
- (d) We will not lose any faculties.

Q.31 Mother Nature has blessed us with two ears and two eyes. What may be the purpose of two ears and two eyes ?

- (a) Beauty
- (b) To gift sense of clearer listening and colorful vision
- (c) To provide back-up in case of injury to one of them

- (d) To gift sense of directional listening and perception of depth.
- Q.32** At what temperature do the Fahrenheit and Celsius scales given the same reading?
- (a) -40 (b) 100 (c) -273 (d) 0
- Q.33** The gas in a refrigerator causes cooling on expansion because:
- (a) The density of gas goes down
(b) Heat of the gas is lost as work is done by the gas
(c) Work done by the gas is converted into heat
(d) The heat is spread over a larger space
- Q.34** Which of the following is correct for tea?
- (a) Acidic and nicotine (b) Alkaline and caffeine
(c) Alkaline and nicotine (d) Acidic and caffeine
- Q.35** The most abundant organic compound in the world is:
- (a) Cellulose (b) Alkaloids
(c) Methane (d) Chlorophyll
- Q.36** A man has five resistors each of value $\frac{1}{5}\Omega$. What is the maximum resistance he can obtain by connecting them?
- (a) 1Ω (b) 5Ω (c) $\frac{1}{2}\Omega$ (d) $\frac{2}{5}\Omega$
- Q.37** In summer, the pendulum clocks
- (a) becomes slow (b) become fast
(c) gives correct time (d) lose time
- Q.38** An ice cube is floating in a glass of water. What happens to the water level when the ice melts?
- (a) Rises (b) Falls
(c) Remains same (d) First rises and then falls
- Q. 39** A radio active substance of half life period 2 hrs is present in a reactor. At the initial moment the mass of the substance is 50 mg. Six hours later the mass of the radioactive substance would be nearly_____.
- (a) 12.5 mg (b) 100 mg (c) 6.125 mg (d) 25 mg

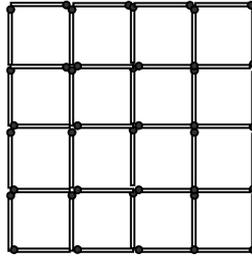
- Q.40** The basis of classification of elements in the Modern Periodic Table has been atomic number. E.g. Hydrogen has atomic number 1 but Oxygen has atomic number = 8. The atomic number is defined as the number of protons in the nucleus which is equal to the number of electrons of an electrically neutral atom. No scientific experiment till date has been able to "see" either an electron or the nucleus of any atom. Scientists have established the concepts of atomic structure largely through indirect evidence from chemical reactivity of elements and their compounds & radiation spectra from where they estimated the number of electrons the element may have. These electrons according to Rutherford's atomic model move in circular orbits around the nucleus. Thus, since the atom is electrically neutral, the number of protons must be equal to the number of electrons and hence the atomic number is determined. Students often find a flaw in the Rutherford's model by stating that the electrons are attracted to the nucleus due to opposite charges and ultimately it will collapse into the nucleus. But this is not known to happen ! Why does the electron in Rutherford's model not collapse ?
- (a) Due to balance of attractive Electrical force and repulsive Centrifugal force.
 - (b) Due to repulsion of Neutrons and Electrons
 - (c) Due to inertia of motion
 - (d) Due to Newton's 3rd Law of Motion.

The answer to the above question has made the wonderful Periodic Table possible and thus all of knowledge in Chemistry too !

SECTION 3 : LOGIC PUZZLES

- Q.41** Every person on earth has shaken a certain number of hands. Then, the number of persons who have shaken an odd number of hands is _____
- (a) Always Even
 - (b) Always Odd
 - (c) Either Even or Odd depending on World Population
 - (d) Always Prime
- Q.42** Two cyclists began a training run simultaneously, one starting from Pune, the other from Mumbai. When the riders were 150 Km apart, a fly took an interest. Starting on one cyclist's shoulder, the fly flew ahead to meet the other cyclist. On reaching the latter, fly at once turned back. The restless fly continued to shuttle back and forth until the pair met; then it settle on the nose of one of the cyclists. The fly's speed was 30 Km per hour. Each cyclist's speed was 15 Km per hour. How many km did the fly travel?
- (a) 300 Km (b) 75 Km (c) 150 Km (d) 45 Km

Q.43



Including the 16 unit squares shown, how many squares are there?

- (a) 29 (b) 30 (c) 16 (d) 17
- Q.44 There are 128 players in an elimination - type singles Wimbledon tennis tournament. How many matches must be played (or defaulted) to determine the winner?
- (a) 64 (b) 128 (c) 127 (d) 256
- Q.45 In 1937 a man stated that he was x years old in the year x^2 . He added, "If the number of my years be added to be added to the number of my month, the result equals the square of the day of the month on which I was born. "When was he born ?"
- (a) May 7, 1892 (b) June 14, 1900
(c) Feb 29, 1936 (d) None of the Above
- Q.46 Numbers 1, 2, 3, 2009 are written in the natural order. Numbers in odd places are stricken off to obtain a new sequence. Numbers in odd places are stricken off from this sequence to obtain another sequence and so on, until only one term a is left. Then find a
- (a) 1004 (b) 1000 (c) 1024 (d) 2008
- Q.47 A teacher of mathematics used an unconventional method to measure time for a test lasting 15 minutes. He used just a sand-glass, which spills in 7 minutes and a second sand-glass, which spills in 11 minutes. During the whole time he turned sand-glasses only n times. Find the minimum value of n .
- (a) 1 (b) 2 (c) 3 (d) 4
- Q.48 "Two days ago, I was 10 years old and will be 13 years old next year". If I am speaking the truth, what is today's date ?
- (a) 28 February (b) 29 February (c) 31 December (d) 1 January



