



QWISSENAIRE'19

Instructions

A. General:

1. This booklet is your Question Paper containing **8 Printed Pages**. Do not open this booklet before being instructed to do so by the invigilators.
2. Blank papers, clipboards, log tables, slide rules, calculators, cameras, cellular phones, pagers and electronic gadgets are NOT allowed inside the examination hall.
3. Write your name and roll number in the space provided below.
4. Use a **black ball point pen/HB pencil** to darken the bubbles on the OMR sheet.

B. Question Paper Format:

The question paper consists of **THREE** sections.

1. **Section 1** contains **15 multiple choice questions of MATHEMATICS**. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.

2. **Section 2** contains **15 multiple choice questions of APTITUDE**. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.

3. **Section 3** contains **4 SUBJECTIVE** questions.

C. Marking Scheme:

1. For each question in **Section 1 & Section-2**, you will be awarded **2 marks** if you darken the bubble corresponding to the correct answer and zero mark if no bubbles are darkened. In all other cases **(-1/2) mark** will be awarded.
2. For each question in **Section 3**, you will be awarded **10 marks**. This section don't have negative marking.

Class: IX

Time: 2 hours

Maximum Marks: 100

Name of the Candidate: _____

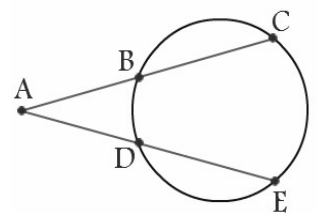
Roll Number: _____

Candidate's Signature: _____

Invigilator's Signature: _____

Section -I

- 1) If $f(x)=px^2+qx+r$ has no real zeros and $p+q+r < 0$ then
 A) $r > 0$ B) $r < 0$ C) $r = 0$ D) none
- 2) Let n be a positive integer and $(n+2)(n+6)$ is an odd number then $(n+1)(n+3)$ must be a multiple of ____
 A) 3 B) 6 C) 8 D) 12
- 3) Ten's digit of 6^{17} is ____
 A) 1 B) 9 C) 3 D) 7
- 4) If the number of elements would increase by 3, the number of permutations without repetition would increase by 56 times the number of permutations of which the number of elements would increase by 1. Then how many elements are present initially.
 A) 5 B) 4 C) 6 D) 3
- 5) Let c be the circle with center at $(1,1)$ and radius $=1$. If T is the circle centered at $(0, y)$ passing through origin and touching the circle C externally, then the radius of T is equal to:
 A) 0.866 B) 0.5 C) 0.25 D) 1.2247
- 6) Given that the radius of the circle is 5 cm, $BC = 5$ cm, $AD = 5\sqrt{2}$ cm, find angle CAD if the arc BD subtends an angle of 50° at the center.
 A) 35° B) 45° C) 55° D) 65°



- 7) $f(x): x = -\sqrt{|y + \sqrt{|y + \sqrt{|y + \dots \infty}}|}$ times $g(x): y = x^2 + x$. $p(x)$ is the functional branch that is common to both $f(x)$ and $g(x)$. Let $p(x): \mathbb{R}^- \rightarrow (\mathbb{R} - \mathbb{R}^-)$
 A) $f: (-\infty, 0] \rightarrow \mathbb{R}$ is surjective function
 B) $p(x)$ is a bijective function
 C) $f: \mathbb{R} \rightarrow [0, \infty)$ is a bijective function
 D) $g: \mathbb{R} \rightarrow \mathbb{R}^+$ is surjective function

- 8) $f(x) = x^{12} - ax^6 - b$. $(x-p)$ is a factor of $f(x)$ and $f(1/x)$. Integral roots exist for $f(\sqrt[3]{x})$ and $f(\sqrt[2]{x})$. $a, b \in \mathbb{Z}$.
- A) $a = -2$ B) b is only a perfect cube C) b is a non-negative integer
D) Number of values of “ p ” are 3
- 9) Given a quadratic equation $ax^2 + bx + 7 = 0$, where a and b are roots of the equation $x^2 + 3x - 70 = 0$, $|a| > |b|$, then select the nature of the first equation
- A) both roots are real.
B) the roots are complex and one root is $\frac{7+i\sqrt{231}}{20}$
C) the roots are $\frac{7 \pm i\sqrt{231}}{14}$
D) one root is real.
- 10) 8 students are to be accommodated in two rooms having 3 beds each and one room consisting of 2 beds. How many ways are possible.
- A) 480 B) 176 C) 264 D) 560
- 11) From the origin of a cartesian plane, a point moves on the positive x axis to a distance of 4 units and then moves along positive y axis to a distance of 3 units, w.r.t to the previously moved line it takes a slight turn of 53° and moves in negative x - y direction to a distance of 3 units, let this point be (x, y) . the distance of origin from this point is:
- A) 1 B) $\sqrt{2}$ C) $2 + \sqrt{2}$ D) $2 - \sqrt{2}$
- 12) The velocity of an object fired up varies as $v = 80 - 32t$ up to its max height, where “ t ” is time in seconds. at what time interval will the velocity will be in the interval of $(32, 64)$.
- A) $2 > t \text{ \& } t < 0$ B) $1 > t > 0.2$
C) $1.75 > t > 0.5$ D) $1.5 > t > 0.5$
- 13) For what value of “ p ”, will the equation $(p^2 - 16)x^2 - (4 + 5p + p^2)x - p^3 - 4p^2 - 4p - 16 = 0$ have real roots?
- A) no value of such “ p ” exists B) 4, -4
C) -4 D) 4, -4, -1

- 14) Out of 7 consonants and 4 vowels, how many words of 3 consonants and 2 vowels can be formed?
A) 24400 B) 21300 C) 210 D) 25200
- 15) Real numbers a_1, a_2, \dots, a_{99} form an A.P, suppose $a_2 + a_5 + \dots + a_{98} = 205$.
Find the value of $\sum_{k=1}^{99} a_k$
A) 700 B) 600 C) 615 D) 805

Space for roughwork



Section -II

- 16) Pointing to a man in a photograph, a woman says, "This man's son's sister is my mother-in-law". How is the woman's husband related to the man in the photograph?
- A) son B) son-in-law C) Grandson D) Nephew
- 17) Find the **BEST POSSIBLE** code for the word PRACTICE.
- A) p o o r v n q m B) o p r n z o t g
C) g r o o t p t v m D) r i p g o a o u
- 18) 4, 8, 6, 5, 15, 10, 10, 20, 15, 17, 15, 16, 18, 14, x.
Find x.
- A) 16 B) 18 C) 20 D) 22
- 19) 6, 24, 60, 120, x.
Find x.
- A) 250 B) 210 C) 220 D) 240
- 20) A tailor had a number of shirt pieces to cut from a roll of fabric. He cut each roll of equal length into 10 pieces. He cut at the rate of 45 cuts a minute. How many rolls would be cut in 24 minutes?
- A) 32 rolls B) 54 rolls C) 108 rolls D) 120 rolls
- 21) Today is varun's birthday. One year, from today he will be twice as old as he was 12 years ago. How old is today?
- A) 20 years B) 22 years C) 25 years D) 27 years
- 22) If $Z=52$ and $ACT=48$, then BAT will be equal to
- A) 39 B) 41 C) 44 D) 46
- 23) A is B's sister. C is B's mother. D is C's father. E is D's mother. Then, how is A related to D?
- A) grandfather B) grandmother
C) daughter D) granddaughter

- 24) The last day of a century cannot be
 A) Monday B) Wednesday
 C) Tuesday D) Friday
- 25) Anu and Vinay are ranked seventh and eleventh respectively from the top in a class of 31 students. What will be their respective ranks from the bottom in the class respectively?
 A) 21st and 25th B) 25th and 21st
 C) 22nd and 26th D) 24th and 20th
- 26) In a group of 80 boys, 60% play chess, 75% play cricket and 55% play both. How many of them do not play any of these two games?
 A) 24 B) 20
 C) 18 D) 16
- 27) There are six persons A, B, C, D, E and F. C is the sister of F. B is the brother of E's husband. D is the father of A and grandfather of F. There are two fathers, three brothers and a mother in the group. Who is the mother?
 A) A B) B C) C D) E
- 28) Seismography: Earthquake --> Taseometer: _____?
 A) Landslides B) Strains
 C) Resistances D) Volcanoes
- 29) In the following question, a matrix of certain characters is given. These characters follow a certain trend, row-wise or column wise. Find out this trend and choose the missing character accordingly.
- | | | |
|---|-----|-----|
| 1 | 7 | 9 |
| 2 | 14 | ? |
| 3 | 105 | 117 |
- A) 26 B) 20
 C) 16 D) 12
- 30) If A=2; Z = 52 and ACT = 48, then BAT will be equal to
 A) 39 B) 41 C) 44 D) 46

Section-3

- 31) 4 criminals agreed to play a game in order to gain freedom. 4 criminals are arranged on the stairs such that they face towards one direction and a wall is present between 3rd and 4th person. So, first person can see 2nd and 3rd person but not 4th person. second person can see 3rd person but not 1st and 4th. third and fourth person cannot see anyone. Now, there are 4 hats of which 2 are of black and two are white. Now, a white hat is placed on first person, black hat on 2nd person, white hat on third person, black on 4th person. Here, none of the persons know which coloured hat they are wearing but they can see others as told before. The person who announces his hat colour correctly first will get freedom. Assume all the criminals are intelligent. Who announces the hat colour first correctly?
- 32) You are travelling down a country lane to a distant village. You reach a fork in the road and find a pair of identical twin sisters standing there.
- One standing on the road to village and the other standing on the road to neverland (of course, you don't know or see where each road leads).
 - One of the sisters always tells the truth and the other always lies (of course, you don't know who is lying).
 - Both sisters know where the roads go.
- If you are allowed to ask only one question to one of the sisters to find the correct road to the village, what is your question?
- 33) There are three switches downstairs. Each corresponds to one of the three light bulbs in the attic. You can turn the switches on and off and leave them in any position. How would you identify which switch corresponds to which light bulb, if you are only allowed one trip upstairs?
- 34) Five pirates have obtained 100 gold coins and have to divide up the loot. The pirates are all extremely intelligent, treacherous and selfish (especially the captain). The captain always proposes a distribution of the loot. All pirates vote on the proposal, and if half the crew or more go "Aye", the loot is divided as proposed, as no pirate would be willing to take on the captain without superior force on their side. If the captain fails to obtain support of at least half his crew (which includes himself), he faces a mutiny, and all pirates will turn against him and make him walk the plank. The pirates start over again with the next senior pirate as captain. What is the maximum number of coins the captain can keep without risking his life?

Space for Rough Work



Wissenaire

Wissenaire is the annual techno-management festival of Indian Institute of Technology Bhubaneswar held in the Argul campus of the prestigious IIT Bhubaneswar. It is one of the most awaited technical festival of East India. It is a three-day long event usually held during first week of February. The word Wissenaire is derived from the German word 'Wissen' meaning knowledge and 'air' meaning free. Thus, it is justified by its tagline **Knowledge Runs Free**. Wissenaire encompasses various sectors of technology, science and management. These including quizzing, coding, designing, robotics, planning and testing the creativity and innovative spirit of young technical minds. With this motive Wissenaire'19 is conducting Qwissenaire'19, the talent Test to ignite minds of 8th, 9th and 10th class student.