



QWISSENNAIRE'17

Class: VIII

Time: 2 hours

Maximum Marks: 100

Instructions

A. General:

1. This booklet is your Question Paper containing **9** 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 **two** sections.

1. **Section 1** contains **20 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 **20 multiple choice questions of APTITUDE**. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE is correct**.

C. Marking Scheme:

1. For each question in **Section 1**, you will be awarded **3 marks** if you darken the bubble corresponding to the correct answer and zero mark if no bubbles are darkened. In all other cases, minus ONE (**-1**) mark will be awarded.
2. For each question in **Section 2**, you will be awarded **2 marks** if you darken all the bubble(s) corresponding to only the correct answer and zero mark if no bubbles are darkened. In all other cases, minus HALF (**-1/2**) mark will be awarded.

Name of the Candidate: _____

Roll Number: _____

Candidate's Signature: _____

Invigilator's Signature: _____

Space for Rough Work



Section-I

1. If the sum of a series S_n is $4n^2 + 3$, where t_n represents n th term of the sequence The given sequence is in

- (a) A.P (b) G.P (c) H.P (d) A.G.P

2. Find the remainder when 3^{40} is divided by 23

- (a) 3 (b) 4 (c) 2 (d) 0

3. The greatest value of x^2y^3 such that $3x+4y=5$ where x, y are positive is

- (a) $3/16$ (b) $576/3125$ (c) $9/16$ (d) $16/25$

4. The root(s) of the equation $(2x-6)^{0.5} + (x+4)^{0.5} = 5$ is (are)

- (a) 5165 (b) 5 (c) 165 (d) none of these

5. Number of integers x in the set $\{1, 2, 3, 4, 5, \dots, 98, 99, 100\}$ such that $x^4 + x^5$ is a perfect square

- (a) 9 (b) 10 (c) 8 (d) 11

6. If a function satisfy the equation $f(x+y) = f(x) + f(y) - 3$ and if $f(1) = 5$. Then $f(5) =$

- (a) 1 (b) 10 (c) 13 (d) 7

7. AB, AC are tangents to a circle where $AB=5$ cm. PQ is also a tangent such that P lies on AB and Q lies on AC. Then the perimeter of triangle APQ is

- (a) 15cm (b) 10cm (c) 12cm (d) 11cm

8. Consider the series $(\frac{4r}{r+21}) + (\frac{4r}{r+21})^2 + (\frac{4r}{r+21})^3 + \dots$

- (a) The series has a definite sum when $r < 7$
(b) The series has a definite sum when $r < -21/5$
(c) The series has a definite sum when $\frac{4r}{r+21} < -1$
(d) Doesn't have a definite sum when $\frac{4r}{r+21} < 4$

9. If the equation $(a^2 - 4a + 3)x^2 + (a - 1)x + a^2 - 1 = 0$ has infinite roots then

- (a) $a = 3$ (b) $a = -1$ (c) $a = 1$
(d) Infinite roots are not possible

10. The number of even factors of 25200 is

- (a) 90 (b) 80 (c) 72 (d) 45

11. PQRS is a rectangle in which $PQ = 2PS$. T, U are midpoints of PS and PQ respectively. QT and US intersect at V. The ratio of area of QRSV and area PQT is

- (a) $5/2$ (b) $8/3$ (c) $16/3$ (d) 5

12. If p, q are the roots of $x^2 + ax - b = 0$ and s, t are the roots of $x^2 + ax + b = 0$

Then $(a - s)(b - t)(a - t)(b - s)$ is equal to

- (a) 0 (b) $-2b$ (c) $2b^2$ (d) $4b^2$

13. If $y = f(x) = (1990 - x^3)^{1/3}$ and $g(y) = (1990 - y^3)^{1/3}$ then $f \circ g$ is

- (a) $f(x)$ (b) $g(x)$ (c) $g \circ f$ (d) x

14. If non negative real numbers satisfy $1/(1+a) + 1/(1+b) + 1/(1+c) = 1$ then the least value of abc is

- (a) 64 (b) $1/8$ (c) 1 (d) 8

15. Given a triangle with ABC and a semicircle inscribed in it with its diameter lying on side c. Then the radius of semicircle is given by (s is the semi perimeter of triangle and a, b, c are the sides)

- (a) $(s(s-a)(s-b)(s-c))^{0.5} / (a+b)$ (b) $c((s-a)(s-b))^{0.5} / (a+b)$
(c) $2c(s(s-c))^{0.5} / (a+b)$ (d) $2(s(s-a)(s-b)(s-c))^{0.5} / (a+b)$

16. How many integers m satisfy both the following properties:

i. $1 \leq m \leq 5000$

ii. $[\text{Square root}(m)] = [\text{Square root}(m+125)]$

Here $[x]$ denotes the largest integer not exceeding x, for any real number x

(a) 66

(b) 68

(c) 70

(d) 72

17. In a trapezium ABCD $BC \parallel AD$ and $AB=CD=8$, $BC=2$, $AD=10$ units. Then the Circumradius of trapezium is

(a) 7

(b) $28^{0.5}$

(c) $3^{0.5}$

(d) $12^{0.5}$

18. The roots of the equation $x^3-3ax^2+bx+18c=0$ forms a non-constant arithmetic progression and the roots of the equation $x^3 +bx^2 +x - c^3 = 0$ forms a non-constant geometric progression.

Given that a, b, c are real numbers, find all positive integral values and b

(a) $(a, b)=(2,6)$

(b) $(a, b)=(2,9)$

(c) $(a, b)=(9,2)$

(d) $(a, b)=(6,2)$

19. $f:\{x,y,z\} \rightarrow \{a,b,c\}$ is a bijection. It is given that exactly one of the following statements are true and remaining two statements are false

S1: $f(x) = a$

S2: $f(y)$ not equal to a

S3: $f(z)$ not equal to b

Let g be the inverse of f. Then image of a under g is

(a) x

(b) y

(c) z

(d) g does not exist

20. In a circle of radius 5cm AB, AC are two chords of length 6cm. The length of chord BC is

(a) 4.8cm

(b) 9.6cm

(c) 6.4cm

(d) Such type of geometrical figure is not possible.

Section-II

1. Father is aged three times more than his son Rohit. After 8 years, he would be two and a half times of Rohit's age. After further 8 years, how many times would he be of Rohit's age?

(A) 2 times

(B) 2.5 times

(C) 2.75 times

(D) 3 times

2. A vessel is filled with liquid, 3 parts of which are water and 5 parts syrup. How much of the mixture must be drawn off and replaced with water so that the mixture may be half water and half syrup?

- (A) $\frac{1}{3}$ (B) $\frac{1}{4}$ (C) $\frac{1}{7}$ (D) $\frac{1}{5}$

3. A, B and C can do a piece of work in 20, 30 and 60 days respectively. In how many days can A do the work if he is assisted by B and C on every third day?

- (A) 12 days (B) 15 days (C) 16 days (D) 18 days

4. The last day of a century cannot be (provided the week starts with Monday)

- (A) Monday (B) Wednesday (C) Tuesday (D) Friday

5. A man started a business investing Rs. 70,000. Rakhi joined him after six months with an amount of Rs.1,05,000 and Sagar joined them with Rs.1.4 lakhs after another six months. The amount of profit earned should be distributed in what ratio among Aman, Rakhi and Sagar respectively, 3 years after Aman started the business?

- (A) 7: 6: 10 (B) 12: 15: 16
(C) 42: 45: 56 (D) cannot be determined

6. At what time between 7 and 8 o'clock will the hands of a clock be in the same straight line but, not together?

- (A) 5 min. past 7 (B) $\frac{57}{11}$ min. past 7
(C) $\frac{58}{11}$ min. past 7 (D) $\frac{60}{11}$ min. past 7

7. If South-East becomes North, North-East becomes west and so on. What will West become?

- (A) North-East (B) North-West (C) South-East (D) South-West

8. Two pipes A and B can fill a tank in 15 minutes and 20 minutes respectively. Both the pipes are opened together but after 4 minutes, pipe A is turned off. What is the total time required to fill the tank?

- (A) 10 min. 20 sec. (B) 11 min. 45 sec.
(C) 12 min. 30 sec. (D) 14 min. 40 sec.

Directions to solve for questions 9 and 10:

Six friends P, Q, R, S, T and U are sitting around the hexagonal table each at one corner and are facing the center of the hexagonal. P is second to the left of U. Q is neighbor of R and S. T is second to the left of S.

9. Which one is sitting opposite to P?

- (A) R (B) Q (C) T (D) S

10. Who is the fourth person to the left of Q?

- (A) P (B) U (C) R (D) Data inadequate

11.

1. A3P means A is the mother of P
2. A4P means A is the brother of P
3. A9P means A is the husband of P
4. A5P means A is the daughter of P

Which of the following means that K is the mother-in-law of M?

- (A) M9N3K4J (B) M9N5K3J (C) K5J9M3N (D) K3J9N4M

12. Here are some words translated from an artificial language.

agnoscrenia means poisonous spider

delanocrenia means poisonous snake

agnosdeery means brown spider

Which word could mean "black widow spider"?

- (A) deeryclostagnos (B) agnosdelano
(C) agnosvitribulunin (D) trymuttiagnos

13. The calendar for the year 2007 will be the same for the year:

- (A) 2014 (B) 2016 (C) 2017 (D) 2018

14. A: All the trees in the park are flowering trees.

B: Some of the trees in the park are dogwoods.

C: All dogwoods in the park are flowering trees.

If the first two statements are true, the third statement is

(A) True (B) False (C) Uncertain (D) none

15. Rahul travels 10 km to the North. He turns to the right and walks 5 km. Then again he turns to his right and moves 10 km forward. How many km away from starting point is he?

(a) 26 km (b) 19 km (c) 13 km (d) 5 km

16. If $12+34=21$, $23+14=25$, $17+11=16$ then $45+14=?$

(a) 36 (b) 40 (c) 44 (d) 45

17. How many 6 are there in the following series which are preceded and followed by an even number?

15973712796153791587901082791456258791372534678645326436746867

(a) 8 (b) 6 (c) 5 (d) 3

18. There are five different houses, A to E in a row. A is to the right of B and E is to the left of C and right of A. B is to the right of D. Which of the houses is in the middle?

(a) A (b) B (c) D (d) E

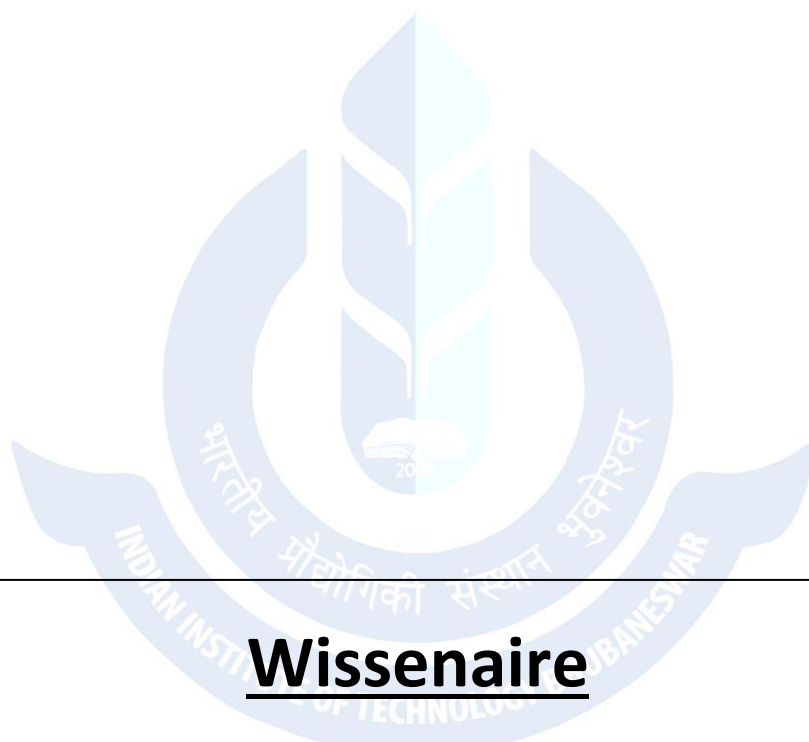
19. If $GOOD = 123$, and $BETTER = 210$. Then $BEST$ will be equal to

(a) 92 (b) 138 (c) 184 (d) 230

20. Given that $ACT \div AT = 11$, find out which of the following does not stand for CAT to fulfill the above equation?

(a) 246 (b) 615 (c) 624 (d) 835

Space for Rough Work



Wissenaire

Wissenaire is the annual techno-management festival of Indian Institute of Technology Bhubaneswar held in the Arugul 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 January. 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'17 is conducting Qwissenaire'17, the Talent Test to ignite minds of 8th, 9th and 10th class students.