QWISSENAIRE'19

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 **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.**section3** contains 4 **SUBJECTIVE** questions.

C. Marking Scheme:

1. For each question in **Section 1 and 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, minus one **(–1/2) mark** will be awarded.

NOTE: **section 3** will be corrected only if you cross the minimum **cut off mark** for the above two sections. For each question in this section, you will be awarded marks according to your explanation. The maximum marks for each question in this section is **4** marks

Class: X **Time: 2 hours** **Maximum Marks: 100**

Name of the Candidate: _____

Roll Number: _____

Candidate's signature: _____ Invigilator's Signature: _____

Section -I

1) Let $xf(x)f(y) + 2yf(x/y) = 44y^4 + 72x^2y^3 - 53xy^2$, then choose the correct option.

A) f(x) is a non-polynomial rational function.
B) The points at which the domain is not defined lies between $0 < x < 1$ & $-2 < x < -1$.
C) f(x) is a polynomial rational and roots doesn't exist in the interval of $-20 < x < 20$
D) For either of the functions there will be no range of f(x) in the interval [-8, 6]

2) $f(x) = |x^2-5|x|+6+2f(x)|$, $f: N \rightarrow N$, then choose the correct answer regarding f(x).

A) Domain of f(x) is $(-\infty, -2) \cup (2, \infty)$
B) Range of f(x) is [0,0.25]
C) f(x) is a surjective function
D) f(x) is one to one and onto function

3) If $\alpha \neq \beta$ but $\alpha^2=5\alpha-3$ and $\beta^2=5\beta-3$, then find the equation having α/β and β/α as its roots are

A) $3x^2-19x+3=0$
B) $3x^2-19x-3=0$
C) $3x^2-19x-3=0$
D) $3x^2-19x-3=0$

4) Consider three lines X+Y=1, X+3Y=6, X=Y, then

A) An acute angled triangle is formed.
B) The length of side of triangle are $\sqrt{2}, \sqrt{10}, \sqrt{8}$
C) A right-angled triangle is formed.
D) None of these are correct.

5) The number of digits of the form XYZ such that $0<X<10$, $0=<Y$, $Z<10$
(i) X, Z<Y & XYZ is a multiple of 3
(ii) X, Z>Y & XYZ is not a multiple of 7

A) (i) 91 (ii) 255
B) (i) 81 (ii) 265
C) (i) 81 (ii) 245
D) (i) 71 (ii) 255

6) If an integer n is divided by 8 the remainder is 3, find the remainder when 6n is divided by 8

A) 3 B)4 C)2 D)5

7) N = 7^{750} x 2^{1024} x (250!). Find Remainder when N is divided by 251.

A) 1 B)-1 C)125 D)126

8) Find the sum of the first 10 terms of the sequence 4, 11, 30, 85, ……

A) 44623 B) 88627 C) 99143 D) 55003

9) Two functions f and g are defined as $f(x) = \sqrt{x+1}$ & g(y)= y^2 -1. Find the range of the composite function fog(x)

A) [0, ∞) B) [1, ∞) C) (1, ∞) D) (-∞, ∞)

10) A college has 10 basketball players, a 5-member team has to be selected and also a captain. How many different selections can be made?

A) 1130 B)1260 C)1320 D)1200

11) A circle is located on XY plane with center (3,3) and radius 5 units. Two tangents, one parallel to y=3x and other is parallel to y= -⅓x are drawn to the circle. Find the area of the region formed by circle and the two tangents.

A) 5(1+π) B)$25(1-\frac{\pi}{4})$ C)$25(1+\frac{\pi}{4})$ D)25

12) Two circles of radius 16 and 9 are touching each other externally, then the maximum radius of the circle that can be placed between the region of the two given circles and one of their direct common tangents is?

A) $\frac{144}{49}$ B) $\frac{12}{5}$ C)25 D) $\frac{49}{5}$

13) An intelligence agency forms a code of two distinct digits selected from 0, 1, 2, …., 9 such that the first digit of the code is nonzero. The code, handwritten on a slip, can however potentially create confusion, when read upside down **[**For example, the code 91 may appear as 16**]**. How many codes are there for which no such confusion can arise?

A) 80 B)78 C)71 D)69

14) Pick the true statement. For k = 1, 2, 3, ….. Let T_k be the k^{th} term of a given series and S_k be the Sum of k terms of the series. N stands for Set of natural numbers.

A) If $T_k = 11^{k+2} + 6^k \times 7k$ then $Sn = 11^3(11^n-1)/3 + (6^{n+1} \times 7n - 42 - 6^3x7x(6^{n-1}-1)/5) /5$

B) If $T_k = 81^{3k+5} + 72^{2k+3} + 27^{5k+2}$ let the distinct possible outcomes of the last digit be a_1, a_2, ……, an. then the L.C.M of the possible n numbers is 24.

C) The value of n is H.C.F of all numbers in the set N~ {1}.

D) The series mentioned in the option A is an AGP series.

15)A manufacturing company started in 1976 produced 800 products in its first year with Rs.1 as its profit for each product, for every 4 years they increased production to 2x+25 **(**where x is the number of products manufactured I previous period of time**)** and for every 6years they increased the price and hence resulting additional profit of Rs.0.5. Choose the right option?

A) In the year 1985, the company got a profit of 3225.

B) In the year 1990, the company manufactured 3275 and got a profit of Rs.8182.5.

C) In the year 1995, the company manufactured 6525 products.

D) In the year 1988, the company got a profit of Rs.8187.

Space for rough work

Section -II

16) WISSENAIRE = WISSEN + AIRE, if WISSEN = VGPOZH then AIRE =?

A) HQAO B) SAIV C) TAIU D) UITS

17) What day of week was 28 th july 2007?

A) Saturday B) Monday C) Friday D) Wednesday

18) Menu: Food:: Catalogue: ____

A) Rack B) Newspaper C) Library D) Books

19) 3,7,14,23,36,49, ____

A)62 B)66 C)63 D)67

20) 1, 2, 3, 10, ___, 9802

A)99 B)199 C)299 D)99

21) A merchant has 1000 kg of sugar, part of which he sells at 8% profit and the rest at 18% profit.

He gains 14% on the whole. The quantity sold at 18% is:

A) 400 kg B) 600 kg C) 650 kg D) 640 kg

22) A and B can do a piece of work in 45 days and 40 days respectively. They began to do the work together but A leaves after some days and then B completed the remaining work in 23 days. The number of days after which A left the work was:

A)6 B)8 C)9 D)1

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) Grand mother
C) Daughter D) Grand daughter

24) If EAMCET is coded as YAMIYJ then how is WISSENAIRE coded

A) JDTTYKADPY
B) KZCCYTAZKY
C) ICWWYNACLY
D) PDFFYGADPY

25) In the following 3 pairs out of 4 pairs are related by a common relationship. Find the fourth pair that is different from the other three?

A) Ammeter :: current
B) Hygrometer :: pressure
C) odometer :: speed
D) Seismograph :: Earthquake

<u>Questions (26-27)</u>: In column I, some letters are given. In column II, their codes are given but they are NOT arranged in the same order in which they are in column I and as well as they are jumbled. study the letters in both columns and find out the code to each letter and answer the following question choosing the BEST POSSIBLE ANSWER.

COLUMN I	COLUMN II
1) WISSENAIRE	i) s q o a q o q
2) TECHNOLOGY	ii) d h a c r a c u h u
3) MANAGEMENT	iii) a r e c o f d t f m
4) KNOWLEDGE	iv) a p p a q n q u c g
5) SUCCESS	v) a b d a c t n f l

26) Find the **BEST POSSIBLE** code for the word **STRENGTH**

A) d g a q e r d c
B) c q c e r d g a
C) a c r e d g r q
D) r e d m g a m q

27) 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

28) If ‘A $ B’ means ‘A is brother of B’, ‘A @ B’ means ‘A is wife of B’, ‘A # B’ means ‘A is daughter of B’ and ‘A ^ B’ means ‘A is father of B’, then which of the following expressions indicate the relationship ‘K is father-in-law of H’?

A) H @ J $ L # P ^ K
B) H @ J $ P ^ L # K

C) H @ J $ L # K ^ P D) Cannot be determined

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.

28	60	48
5	6	7
17	30	7
7	?	16

A) 18 B)23 C)24 D)27

30) i) seven students P, Q, R, S, T, U, V wrote IIT JEE exam.
ii) No two students got similar marks.
iii) V always scores more than P.
iv) P always scores more than Q.
v) Each time Either R scores the highest and T gets lowest OR S scores the highest and U or Q scores the least.

If S is ranked sixth and Q is ranked fifth, choose the possible answer.

A) V is ranked first or fourth B) R is ranked second or third
C) P is ranked second or fifth D) U is ranked third or fourth

Space for rough work

Section -III

31) The owner of an orange plantation has a donkey. He wants to transport his 3000 oranges to the market which is located after the desert. The distance between his orange plantation and the market is about 1000 kilometers.so, he decided to take his donkey to carry the oranges. The donkey can carry maximum of 1000 oranges at a time, and eats one orange for every one kilometer it travels. What is the maximum number of oranges you can bring to the market?

32) You are mixing cement and the recipe calls for five gallons of water. You have a garden hose giving you all the water you need. The problem is that you have only a four-gallon bucket and a seven-gallon bucket and neither of them has graduation marks. find a method to measure five gallons of water?

33) You are the ruler of a medieval empire and you are about to have a celebration tomorrow. The celebration is the most important party you have ever hosted. You've got 1000 bottles of wine you were planning to open for the celebration, but you find out that one of them is poisoned. The poison exhibits no symptoms until death. Death occurs within ten to twenty hours after consuming even the minutest amount of poison. You have just under 24 hours to determine which single bottle is poisoned. You have a handful of prisoners about to be executed, and it would mar your celebration to have anyone else (other than prisoners) killed.

What is the smallest number of prisoners you must allow to drink to absolutely find the Poisoned bottle within 24 hours?

34) You're in a mansion and the power's out. You see a green door and a red door. Pick one (it doesn't matter which.) Now you see a purple door and a orange door. Pick one (again, it doesn't matter which you pick). Now you see a door with a golden handle and a door with a silver handle. Pick one. You finally come to some signs on three doors. One says "Death from drowning," another says "Death from machine guns," and the last one says "Death from electric chair." Then you see a big sign off to the side that says "Or stay in the mansion and starve to death.

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 8^{th}, 9^{th} and 10^{th} class students.