NATIONAL TALENT SEARCH EXAMINATION, 2017-18
(STATE LEVEL-STAGE1)
(FOR STUDENTS STUDYING IN CLASS X)
MENTAL ABILITY TEST (MAT)

Time: 45 Minutes *Full Marks: 50*

INSTRUCTIONS TO CANDIDATES

Read the instructions carefully before you start answering the questions. Answers are to be given on a OMR Answer-Sheet provided.

1. In this Paper you are to answer 50 questions. Each questions carries 1 (one) mark. You are to answer all the questions.

2. Before you proceed to mark in the OMR answer-Sheet, find out the correct answer from the four alternatives (a), (b), (c) and (d) against each question in the Question Booklet. Darken the circle with a Black Ball Point Pen, to the corresponding correct answer for the item in the OMR Answer-Sheet.

   (Here 'b' is the correct answer.)

3. If more than one circle is encoded or darken against a particular answer, it will be treated as a wrong answer.

4. There will be no penalty marks or negative marking for a wrong answer.

5. You are to start recording answers with the 'start' instruction from the Officer-in-Charge of your room/hall.

6. You are to write your Name and Roll No. in the space provided with for this purpose on the OMR Answer-Sheet. You must encode your Roll No. in OMR Answer Sheet.

7. The OMR Answer-Sheet should be handed over to the Invigilator before leaving the Examination Hall. You may take away the used Question Booklet after completion of the examination.

Enrollment No. : | | | | | | | | | | | | **Batch :** _____

Name : _____

Candidate's Signature _____ **Invigilator's Signature:** _____

(Questions 1–10)

DIRECTION: Read the questions carefully and give answer by filling the circle of the letter denoting your selected answer on the O.M.R. Answer-Sheet.

1. If the polynomial $f(x) = 2x^3 + mx^2 + nx - 14$ has $(x - 1)$ and $(x + 2)$ as its factors, find the value of $\frac{m}{n}$

   (a) 27 (b) $\frac{1}{3}$

   (c) 3 (d) $\frac{1}{27}$

2. In how many years the ratio of the principla and its interest at 4% per annum will be 5 : 2?

   (a) 10 (b) 15

   (c) 20 (d) None of the above

3. If $\frac{a^3+3ab^2}{3a^2b+b^3}=\frac{x^3+3xy^2}{3x^2y+y^3}$, then

   (a) $bx = ay$ (b) $by = ax$

   (c) $b^2y = a^2x$ (d) $b^2x = a^2y$

4. The mean of x_1 and x_2 is M_1 and that of x_1, x_2, x_3, x_4 is M_2 then the medan of $ax_1, ax_2, \frac{x_3}{a}, \frac{x_4}{a}$ is

   (a) $\frac{M_1+M_2}{2}$ (b) $\frac{aM_1+\frac{M_2}{a}}{2}$

   (c) $\frac{1}{2a}\left[\left(a^2-1\right)M_1+2M_2\right]$ (d) $\frac{1}{2a}\left[2\left(a^2-1\right)M_1+M_2\right]$

5. If $f(x + 1) = 3x - 9$, then what will be the value of $f(x^2 - 1)$?

   (a) $3x^2 - 9$ (b) $3x^2 - 15$

   (c) $x^2 - 10$ (d) $3x^2 - 10$

6. The area of the whole surface of a certain cube is equal to the area of the curved surface of a certain sphere. The ratio of their volumes is

   (a) $\pi:6$ (b) $\sqrt{\pi}:\sqrt{6}$

   (c) $\sqrt{6}:\sqrt{\pi}$ (d) $6:\pi$

7. If $x \neq y$ and x, y are real numbers, and $A = x^2 + y^2 - xy - x - y + 1$, then

   (a) $A > 0$ (b) $A = 0$

   (c) $A < 0$ (d) $0 < A < 1$

8. If $\sin\alpha$ and $\cos\alpha$ are the roots of the equation $lx^2 + mx + n = 0$, then

   (a) $l^2 + m^2 + 2ln = 0$ (b) $l^2 - m^2 + 2ln = 0$

   (c) $l^2 - m^2 - 2ln = 0$ (d) $l^2 + m^2 - 2ln = 0$

9. PQ is the diametre of a semicircle with radius 4cm and $\angle PRQ$ is the angle on the semicircle. If QR = $2\sqrt{7}$ cm, then length of PR is

   (a) 8 cm (b) 6 cm

   (c) 5 cm (d) $2\sqrt{11}$ cm

10. What must be added to $x^4 + 6x^3 + 19x^2 + 30x$ to make it a perfect square?

    (a) 49 (b) 25

    (c) 10 (d) 36

(Questions 11—20)

DIRECTION: (In each questions 11 to 20 below, there is a number series with one term missing shown by '?'. The term is given as one of the alternatives among four numbers given below it. Find the term and indicate your answer by filling the circle of the corresponding letter of alternatives in the O.M.R. Answer-Sheet.

11. $21\frac{1}{3}, 16, 12, 9, ?$
    (a) 7 (b) 6
    (c) 6.75 (d) 5
12. 21, 34, 55, 89, 144, ?
    (a) 169 (b) 213
    (c) 223 (d) 233
13. 225, 100, 36, 9, 1, ?
    (a) – 7 (b) – 6
    (c) 0 (d) – 1
14. 2, 15, 41, 80, ?
    (a) 111 (b) 120
    (c) 121 (d) 132
15. 462, 420, 380, ?, 306
    (a) 322 (b) 332
    (c) 342 (d) 352
16. 4, 18, ?, 100, 180, 294
    (a) 32 (b) 36
    (c) 48 (d) 40
17. (11, 13), ?, (23, 29), (31, 37), (41, 47)
    (a) (13, 17) (b) (19, 21)
    (c) (17, 19) (d) (13, 18)
18. $\frac{1}{\sqrt{3}}, \frac{2}{3}, ?, \frac{4}{9}, \frac{5}{9\sqrt{3}}$
    (a) $\frac{3}{3\sqrt{3}}$ (b) $\frac{3}{\sqrt{3}}$
    (c) $\frac{1}{2\sqrt{3}}$ (d) $\frac{1}{3}$
19. 121, 126, 141, 166, 201, ?
    (a) 206 (b) 212
    (c) 230 (d) 246
20. 0, 6, 24, 60, ?, 210
    (a) 117 (b) 119
    (c) 120 (d) 126

(Questions 21—30)

DIRECTION: In each of the questions 21 to 30, there are four items, three of which are alike by some means or other while one is out of the class. Find out the odd item and indicate your answer by filling the circle of the corresponding letter on the O.M.R. Answer-Sheet.

21. (a) Jagadish Chandra Bose
    (b) Debendra Mohan Bose
    (c) Satyendra Nath Basu
    (d) Prafulla Chandra Roy

22. (a) Raman Research Institute
(b) Indian Institute of Science
(c) Indian institute of Chemical Biology
(d) International Centre for Theoretical Science
23. (a) Blade
(b) Axe
(c) Scissors
(d) Needle
24. (a) India Today
(b) The Hindu
(c) The Hindustan Times
(d) Times of India
25. (a) Terrence Tao
(b) Maryam Mirzakhari
(c) Rene Thom
(d) Michael Atiyah
26. (a) Patna
(b) Kolkata
(c) Baranasi
(d) Cuttack
27. (a) Metre
(b) Litra
(c) Nautical mile
(d) Light year
28. (a) May Day
(b) Republic Day
(c) Gandhi Jayanti Day
(d) Rabindra Jayanti Day
29. (a) The Mahabharat
(b) The Geeta
(c) The Koran
(d) The Bible
30. (a) Atal Behari Bajpaee
(b) Dr. Manmohan Singh
(c) Dr. A.P.J.Abdul Kalam
(d) Morarji Desai

Questions 31—40)

DIRECTION: In each question below there are two words separated by ':' in the upper row. Below that there are some words on each side of the symbol ':'. Find the relation between two upper words and select one word from the right side of ':' below which have the same relation as above. Fill the circle of the letter denoting your selected answer on the O.M.R. Answer-Sheet.

31. Prashanta Chandra Mahalanobis : Indian Statistical Institute
Dr. Mahendralal Sarkar : ?
(a) Calcutta University (b) Rajabazar Science College
(c) Indian Association for the Cultivation of Science (d) Indian Institute of Science
32. Calendar : Dates
Dictionary : ?
(A) Sentences (B) Language
(C) Words (D) Books

33. 1729 : Rarnanujan
6174 1 : ?
(A) Sir Asutosh Mukhopadhyay (B) Mahan Maharaj
(C) S. Chandrasekhar (D) D. R. Kaprekar

34. 15th August : India
? : Pakistan
(A) 21st February (B) 16th December
(C) 16th August (D) 14th August

35. Coconut: Shell
Letter : ?
(A) Letter-box (B) Envelope
(C) Stamp (D) Mail

36 Rabishankar : Sitar
AmjadA1i Khan: ?
(A) Sitar (B) Sarod
(C) Flute (D) Guiter

37. Prof. Amarthya Sen : Economics
Prof. Ashoke Sen : ?
(A) Economics (B) Physics
(C) Chemistry (D) Biology

38. The Ganges : India
The Nile : ?
(A) Pakistan (B) China
(C) Egypt (D) Nairobi

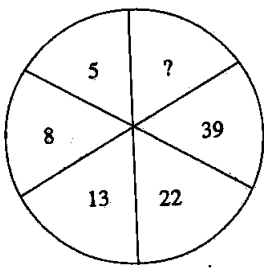
39. Virat Kohil : Cricket
Pankaj Advani : ?
(A) Basket Ball (B) Billiard
(C) Snooker (D) Chess

40. Apparel : Cloth
Footwear : ?
(A) Material (B) Leather
(D) Cobbler (D) Shoes

(Questions 41—50)

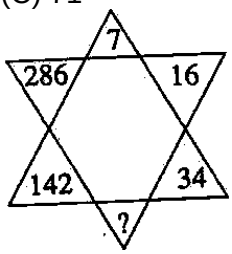
DIRECTION: In each questions 41—50, numbers are placed in figures on the basis of some rules. One place in the figure is indicated by the interrogation sign (?). Find out the correct alternative to replace the question mark and indicate your answer by filling the circle of the corresponding letter of alternatives in the O.M.R. Answer-Sheet.

41.



(A) 66 (B) 72
(C) 71 (D) 78

42.



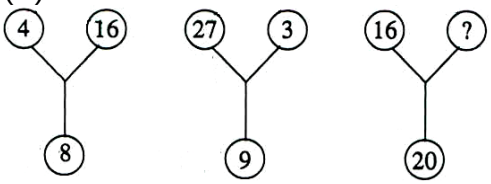
(A) 38 (B) 66
(C) 68 (D) 70

43.

4C	2B	3A
28A	?	45B
7C	8A	15B

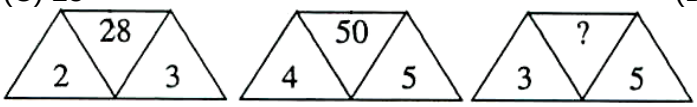
(A) 16C (B) 12C
(C) 13C (D) 7C

44.



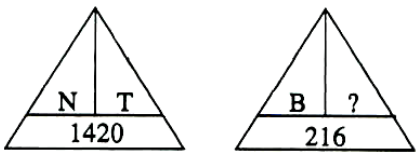
(A) 60 (B) 50
(C) 25 (D) 40

45.



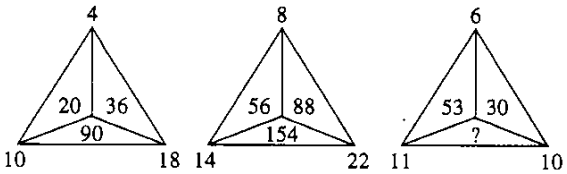
(A) 35 (B) 40
(C) 49 (D) 53

46.



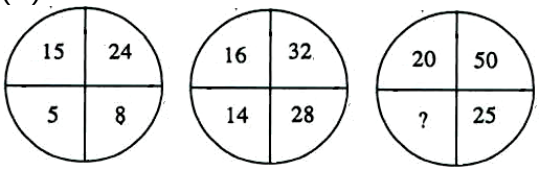
(A) P (B) H
(C) M (D) L

47.



(A) 110 (B) 1
(C) 55 (D) 441

48.



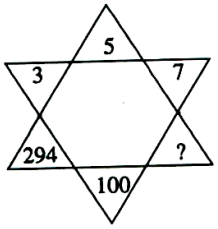
(A) 100 (B) 10
(C) 200 (D) 9

49.

3	5	7	9	15	13
8	26	48	82	?	170

(A) 121 (B) 224
(D) 120 (D) 225

50.



(A) 18 (B) 9
(C) 10 (D) 20