NATIONAL TALENT SEARCH EXAMINATION, 2017-18
(STATE LEVEL-STAGE1)
(FOR STUDENTS STUDYING IN CLASS X)
SAT QUESTION

Time: 1 Hrs. ***Full Marks: 100***

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 100 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:** _____

MATHEMATICS

1. If $ax^2 + bx + c = a(x - p)^2$, the relation among a, b and c is
   (a) abc = 1 (b) 2b = a + c (c) $b^2 = ac$ (d) $b^2 = 4ac$
2. The identity $\sqrt{(x+4)^2} = x + 4$ is possible, when
   (a) $x \le -4$ (b) $x \ge -4$ (c) $x \le -16$ (d) Not possible
3. The number of real roots of the quadratic equation $3x^2 + 4 = 0$
   (a) 0 (b) 2 (c) 1 (d) 4
4. The solution of the equation $9^x + 6^x = 2.4^x$ is
   (a) 0 (b) 1 (c) ± 2 (d) – 1
5. If $f(x) = 2x^2 - 3x + 4$, the value of f(x) + f(-x) is
   (a) 4 (b) 6 (c) 0 (d) 8
6. If $\frac{x^2}{by+cz} = \frac{y^2}{cz+ax} = \frac{z^2}{ax+by} = 2$, the value of $\frac{c}{2c+z} + \frac{b}{2b+y} + \frac{a}{2a+x}$ is
   (a) 2 (b) $\frac{1}{2}$ (c) 4 (d) $\frac{1}{4}$
7. If $\log_4[\log_4\{\log_4(\log_4 x)\}] = 0$, 'x' is equal to
   (a) 256 (b) 4^{16} (c) 2^{512} (d) 256^4
8. If $x^2 + y^2 = z^2$, the value of $\frac{1}{\log_{z-y} x} + \frac{1}{\log_{z+y}}$ is
   (a) x (b) y (c) x + y (d) 2
9. If (x + 2) and (2x – 1)k are factors of $(2x^3 + ax^2 + bx + 10)$, the value of $(a^2 + b^2$ is
   (a) 338 (b) 218 (c) 74 (d) 198
10. If a + b = 2c, the value of $\frac{a}{a-c} + \frac{b}{b-c}$ is
    (a) 0 (b) 1 (c) 2 (d) – 1
11. The compound interest for two years of the amount Rs. 7,500 at the rate of 8% per annum would be
    (a) Rs. 1,248 (b) Rs.1,260 (c) Rs. 1,300 (d) Rs. 1,352
12. A businessman fixed the selling price of an article after increasing the cost price by 40%. The he allowed his customer a discount of 20% and gained Rs. 48. The cost price of the article is
    (a) Rs. 200 (b) Rs. 248 (c) Rs. 400 (d) Rs. 448
13. The curved surface area of a riaght cicular cylinder and that of a sphere are equal. If their radii are equal, the ratio of their volume is
    (a) 3 : 2 (b) 2 : 3 (c) 3 : 4 (d) 4 : 3
14. The sum of the length, breadth and height of a rectangular parallelopiped is 25 cm and its whole surface: area is 264 sq. cm. The area of the square whose sides are equal to the length of the diagonal of that parallelopiped is
    (a) 256 sq. cm. (b) 361 sq. cm (c) 225 sq. cm (d) 324 sq. cm
15. The radii of two circles with centre at A and B are 11 cm and 6 cm respectively. If PQ is the common tangent of the circles and AB = 13 cm, length of PQ is
    (a) 13 cm (b) 12 cm (c) 17 cm (d) 8.5 cm
16. The chords PQ and RS of a circle are extended to meet at the point O. If PQ = 6 cm, OQ = 8 cm, OS = 7 cm, then RS =
    (a) 12 cm (b) 9 cm (c) 10 cm (d) 16 cm
17. ABC is a right angled triangle and AD is perpendicular to the hypotenuse BC. If AC = 2AB, then BC =
    (a) 2BD (b) BD (c) 5 BD (d) 4 BD
18. (x + 2), x and (x – 1) are the frequencies of the numbers 12, 15 and 20 respectively. If the mean of the distribution is 14.5, the value of x is
    (a) 2 (b) 3 (c) 4 (d) 5
19. If two angle of a triangle are $87^\circ\ 24'\ 54''$ and $32^\circ 31' 6''$, the third angle is
    (a) $\frac{\pi}{6}$ (b) $\frac{\pi}{2}$ (c) $\frac{\pi}{3}$ (d) $\frac{\pi}{4}$

20. If $x\sin^3\alpha + y\cos^3\alpha = \sin\alpha\cos\alpha$ and $x\sin\alpha - y\cos\alpha = 0$, the value of $x^2 + y^2$ is

(a) 0 (b) 1 (c) $\frac{1}{2}$ (d) $\frac{1}{3}$

PHYSICS

21. Two particles of masses m_1 and m_2 are allowed to fall freely from height h_1 and h_2. They reach the ground at time t_1 and t_2 respectively. Then,

(a) $\frac{t_1}{t_2} = \sqrt{\frac{h_1}{h_2}}$ (b) $\frac{t_1}{t_2} = \sqrt{\frac{h_2}{h_1}}$ (c) $\frac{t_2}{t_1} = \frac{h_2}{h_1}$ (d) $\frac{t_2}{t_1} = \frac{h_1}{h_2}$

22. Position of a particle moving along x – axis is given by $x = 3t - 4t^2 + t^3$, where x is in metre and t is in second. Find the average velocity of the particle in the time interval from t = 2 second to t = 4 second

(a) 7 m/s (b) 1 m/s (c) 13 m/s (d) 5 m/s

23. A lightwave of certain frequency moves from air to glass, then its

(a) Wavelength does not change
(b) Frequency does not change but wavelength changes
(c) Frequency changes
(d) Frequency and wavelength both change

24. In an atomic reactor, which of the following is used as fuel?

(a) H^1 (b) H^2 (c) D_2O (d) U^{235}

25. The linear momentum p of a body having mass m is given by

(a) $\sqrt{2me}$ (b) $p = \sqrt{\frac{E-}{2m}}$ (c) $p = \sqrt{\frac{2m}{E}}$ (d) $p = \sqrt{\frac{E^2}{2m}}$

26. What is the equivalent resistance between any two opposite comer points of a quadrilateral, if the sides of the quadrilateral are of equal resistance R?

(a) 3 R (b) 2 R
(c) R (d) $\frac{2\sqrt{R}}{3}$

27. Two electrodes are maintained at a potential difference of 50V. An electron moving from cathode to anode gains kinetic energy equal to

(a) 50×10^{-19} erg (b) 50 Joule
(c) 80×10^{-19} Joule (d) 80 erg

28. What will be the power consumed by a 50Ω wire if it is kept across a potential difference of 200 V?

(a) 0.8 KW (b) 80 KW
(c) 400 W (d) 0.4 KW

29. The $Th\frac{232}{90}$ atom undergoes successive α and β decays to the end product $Pb\frac{208}{82}$.The number of α and β particles emitted in the process respectively are

(a) 4,6 (b) 4,4
(c) 6,6 (d) 6,4

30. A particle is executing simple harmonic motion. If its amplitude of vibration increases by 20%, what will be the increase of its total mechanical energy?

(a) 44% (b) 21%
(c) 20% (d) 10%

31. When a body is orbiting near the surface of the earth, what will be the ratio of its orbital velocity to the escape velocity from earth?
(a) $1:\sqrt{2}$ (b) $\sqrt{2}:1$
(c) $2:1$ (d) $1:2$

32. How many times is the root mean square velocity of hydrogen gas molecules compared to the root mean square velocity of oxygen molecules? [Conditions remaining same]
(a) 16 (b) 8
(c) 4 (d) 2

33. For a definite colour of light, absolute refractive index of water is 4/3 and absolute refractive index of glass is 3/2, then what will be the refractive index of glass with respect to water ?
(a) 1.125 (b) 1.33
(c) 1.56 (d) 2

CHEMISTRY

34. Chlorine atom does not differ from the Chloride ion in which of the following context?
(a) Electron (b) Volume (c) Proton (d) Chemical reactivity

35. Which one of the following statements is applicable regarding the number of bonds and the nature of bonds between two carbon atoms in CaC_2 compound?
(a) One Sigma (σ) bond and one Pi (π) bond.
(b) One Sigma (σ) bond and two Pi (π) bonds.
(c) One Sigma (σ) bond and one and half Pi (π) bonds.
(d) One Sigma bond.

36. 10^{-3} mole of KOH is added to 10 litres of pure water at 25°C. The pH will change by (assume no change in volume occurs)
(a) 3 (b) 4 (c) 7 (d) 11

37. Formula of a metallic oxide is M_2O_3. Upon reduction with hydrogen the metallic oxide gives pure metal and water. 0.112 gm metal is produced by 6 mg of hydrogen after complete reduction. Atomic mass of the metal is
(a) 28 (b) 160 (c) 56 (d) 8

38. Which of the following group below represents a set of isoeletronic species
(a) N^{3-}, F^-,Na^+ (b) Na^+, Ca^{2+}, Mg^{2+} (c) Be, Al^{3+}, Cl^- (d) K^+ , Na^+ , Al

39. Concentrated aqueous solution of sodium hydroxide is used for separation of pairs of radicals
(a) Al^{3+} and Sn^{2+} (b) Al^{3+} and Fe^{3+} (c) Al^{3+} and Zn^{2+} (d) Mg^{2+} and Pb^{2+}

40. 10 ml of an aqueous solution contains 222 mg dissolved $CaCl_2$ (molecular weight = 111). What will be the concentration of chloride ion in the resulting solution when it is diluted to 100 ml?
(a) 0.02 Mole/Lit (b) 0.01 Mole/Lit (c) 0.04 Mole/Lit (d) 2.0 Mole/Lit

41. Among Ethanol, Dimethyl ether, Methanol and Propanal the isomers are
(a) Ethanol, Dimethyl ether, Methanol and Propanal
(b) Ethanol and Methanol
(c) Ethanol and Dimethyl ether
(d) Ethanol and Propanal

42. Which molecule of the following compounds contain formyl radical?
(a) Acetone (b) Acetaldehyde (c) Acetic Acid (d) Acetic anhydribe

43. The quantity of oxygen required for complete combustion of 1 mole of an organic compound $C_XH_YO_Z$ is

(a) $\left(X+\frac{Y}{2}\right)$ moles (b) $\left(X+\frac{Y}{4}\right)$ moles

(c) $\left(X+\frac{Y}{4}-\frac{Z}{2}\right)$ moles (d) (X + Y + Z) moles

44. Which of the following pairs have identical values of e/m ?

(a) A proton and a neutron (b) A deuterium and an α particle

(c) An electron and γ rays (d) A proton and a deuterium

45. $CH \equiv CH + H_2 \xrightarrow{A} CH_2 = CH_2$ 'A' in this reaction

(a) Ni/250ºC (b) Raney Ni/Normal temperature

(c) Pd/$BaSO_4$ Quinoline (d) Pd/Normal temperature

46. Container made of Copper metal on exposure to air longtime turns green. The green layer is due to

(a) CuO (b) $CuCO_3$, $Cu(OH)_2$

(c) $CuSO_4$, $3Cu(OH)_2$ (d) All of the above

BIOLOGY

47. During ventricular systole

(a) Atrial systole occur

(b) The atrio-ventricular valves are closed

(c) The pressure inside the ventricles is less then atria

(d) The mitral valve is closed

48 Match the words in column I with those which are most appropriate in column II.

	Column – I		Column – II
(a)	Karyokinesis	1.	Meiocytes
(b)	Cytokinesis	2.	Plant cell
(c)	Meiosis	3.	Nuclear division
(d)	Cell plate	4.	Cytoplasmic division

(a) a = 1, b = 2, c = 3, d = 4 (b) a = 2, b = 1 , c = 4 , d = 3

(c) a = 3, b = 4, c = 1, d = 2 (d) a = 4, b = 3 , c = 2 , d = 1

49. Exine and intine are the parts of

(a) Stigma (b) Seed (c) Embryo sac (d) Pollen grain

50. Transpiration will be fastest when the day is

(a) cool, windy and humid (b) hot, humid and windy

(c) hot, dry and windy (d) hot, humid and still wind

51. A basket of vegetables contains carrot, potato, tomato and radish. Which of them represent the correct homologous structures?

(a) carrot and radish (b) carrot and tomato

(c) tomato and radish (d) potato and tomato

52. What type of teeth are: absent in case of baby?

(a) Incisor (b) Canine (c) Pre-molar (d) Molar

53. Then ATP is converted into ADP, it releases

(a) Hormone (b) Secretion (c) Enzyme (d) Energy

54. Which stage of Plasmodium is present in the salivary gland of female mosquito?
(a) Sporozoite (b) Merozoite (c) Gametocyte (d) Ookinete

55. In a plant, red fruit (R) is dominant over yellow fruit (r) and tallness (T) is dominant over dwarf (t). If a plant with RRTt is crossed with a plant with rrtt, then
(a) 75% will be tall with red fruit (b) 100% will be tall with red fruit
(c) 25% will be tall with red fruit (d) 50% will be tall with red fruit

56. Match the words in column I with those which are most appropriate in column II.

Column – I	Column – II
(a) Hydra	1. Binary fission
(b) Amoebe	2. Spore
(c) Mucor	3. Building
(d) Planaria	4. Regeneration

(a) a = 4, b = 1, c = 3, d = 2 (b) a = 3, b = 1 , c = 2 , d = 4
(c) a = 2, b = 3, c = 4, d = 1 (d) a = 1, b = 4 , c = 3 , d = 2

57. A person has damaged central nervous system due to continuous intake of metal contaminated water, the metal is
(a) Mercury (b) Calcium
(c) Sodium (d) Lead

58. Difference between DNA and RNA by
(a) Nitrogen bas and sugar
(b) Nitrogen bas and phosphate group
(c) Number of carbon atom in sugar
(d) Sugar and Phosphate

59. The middle layer of three layers of meninges is
(a) Dura matter (b) Pia matter
(c) Arachnoid membrane (d) Sub-arachnoid space

60. Which one of the following hormones is not produce from anterior lobe of pituitary gland?
(a) GH (b) ADH (c) ACTH (d) TSH

HISTORY

61. "Imperialism : The Highest stage of Capitalism" was written by
(a) Lenin (b) Stalin (c) Karl Marx (d) Rousseau

62. 24th October, 1929 was marked as "Black Thursday" in U.S.A. because
(a) Terrorist Attack (b) Natural Calamity
(c) Great Depression (d) Change in Political aspect

63. During the period of Russian Revolution the Russian rules was
(a) Czar Alexander – I (b) Czar Alexander – II
(c) Czar Nicholas - I (d) Czar Nicholas – II

64. "Flying Shuttle" was invented by
(a) James Hargraves (b) Edmund Cartwright
(c) James Watt (d) John Kay

65. "Mein Kampf" was written by
(a) Hitler (b) Mussolini (c) Lenin (d) Stalin

66. The country which did not join the League of Nations :
(a) America (b) France (c) Italy (d) Japan

67. Present name of General Assembly's Institution is
(a) Hindu School (b) Scottish Church College
(c) Loreto House (d) St. Xavier's College

68. The first Chancellor of Calcutta University was
(a) Lord Canning (b) Lord Dalhousie
(c) James William Colvile (d) Sir Ashutosh Mukherjee

69. Saedar Ballavbhai Patel was known as
(a) Saviour of India (b) Modern Man of India
(c) Iron Man of India (d) Mechiavelli of India

70. 'Communal Awards' (1932) in India was declared by
(a) Lord Irwin (b) Ramsay Macdonald
(c) Md. Ali Zinnah (d) Lord Mountbatten

71. Pahartali Europene Club was attacked in 1932 by
(a) Kalpona Dutta (b) Bina Das
(c) Pritilata Waddedar (d) Lila Nag

72. "All India Trade Union Congress" (AITUC) was formed in
(a) 1915 AD (b) 1920 AD (c) 1922 AD (d) 1928 AD

GEOGRAPHY

73. Augite metamorphosed to
(a) Horn blande (b) Pyroclastic (c) Brecia (d) Pegmatite

74. 'Busket of Egg topography' is a common feature of
(a) River deposition (b) Wind deposition (c) Glacial erosion (d) Glacial deposition

75. Widest waterfall of world is
(a) Khone waterfall of Laos (b) Salto Angel of Veneguela
(c) Niagra of U.S.A. (d) Stanly waterfall of Congo

76. 'Cyclone' or 'Anti-cyclone' is a
(a) Trade wind (b) Periodical wind (c) Sudden wind (d) Local wind

77. Benguela Current flows along the coast of
(a) California (b) South-West Africa
(c) Peru (d) East Greenland

78. Coromandel coastal plain is located at
(a) Kerala state (b) Karnataka state (c) Tamilnadu state (d) Maharashtra state

79. Among these region _____ is under Tropical Monsoon climate.
(a) Canada (b) India (c) Guinea (d) Argentina

80. UNESCO has registered Sundarban as 'World Heritage Site' in the year
(a) 1978 (b) 1979 (c) 1986 (d) 1987

81. In which state of India ranks first as per hectre rice production?
(a) Punjab (b) West Bengal (c) Uttar Pradesh (d) Andhra Pradesh

82. 'White Revolution' is related with
(a) Milk production (b) Paper production
(c) Egg production (d) Non-Conventional energy sources

83. In India the Metro Rail starts for the first time in
(a) Delhi (b) Mumbai (c) Kolkata (d) Bangaluru

84. Which of the following satellites are launched from India ?
(a) LANDSAT (b) SPOT (c) GOMs (d) IRS

POLITICAL SCIENCE

85. "Political Science begins and ends with the State", is stated by
(a) Gettel (b) Garner (c) Seeley (d) Aristotle

86. How many members in the Lok Sabha can be nominated by the President of India?
(a) 2 (b) 3 (c) 4 (d) 5

87. Joint Session of the India Parliament is presided over by the
(a) Vice-President (b) Speaker (c) Governor (d) President

88. In Indian Parliamentary system of government the Council of Ministers is responsible to
(a) President (b) Prime Minister (c) Parliament (d) Supreme Court

89. In modern times Direct Democracy is existed in
(a) India (b) Britain (c) France (d) Switzerland

90. The world Trade Organization was established in the year
(a) 1990 (b) 1991 (c) 1994 (d) 1995

91. The number of permanent members of the Security Council of United Nations are
(a) 5 (b) 7 (c) 8 (d) 10

92. The United Nations Organisation was established in
(a) 1945 (b) 1941 (c) 1947 (d) 1950

ECONOMICS

93. If national income increases at a higher rate than population the per capita income
(a) increases (b) decreases
(c) remains same (d) may increase or decrease.

94. To control the situation of deflation it is necessary to
(a) increase the demand for bank loan
(b) decrease the demand for bank loan
(c) decrease the purchasing power of the people
(d) increase national saving

95. Economic rent is that: price paid for the use of
(a) land only (b) scarce resources
(b) machinery only (d) building only

96. Which of the following is not a factor of production?
(a) Money (b) Land (c) Labour (d) Capital

97. The main aim of _____ programme was to provide employment of 100 days per year to one member of a rural family.
(a) TRYSEM (b) IRDP (c) NREGS (d) JGSY

98. The expenditure of government for payment of government employees expenditure on _____ account
(a) revenue (b) capital (c) development (d) investment

99. Which of the following is not public goods?
(a) Roads and bridges (b) Administration (c) Food products (d) Defense

100. If the value of domestic currency falls in terms of foreign currency then
(a) Import payment will increase and export earnings will also increase.
(b) Import payment will fall and export earning will also fall
(c) Import payment will increase and export earnings will fall
(d) Import payment will fall and export earning will increase.

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NATIONAL TALENT SEARCH EXAMINATION, 2017-18
(STATE LEVEL-STAGE1)
(FOR STUDENTS STUDYING IN CLASS X)
SAT – ANSWER KEY

1	**D**	11	**A**	21	**A**	31	**A**	41	**C**
2	**B**	12	**C**	22	**A**	32	**C**	42	**B**
3	**A**	13	**A**	23	**B**	33	**A**	43	**C**
4	**A**	14	**B**	24	**D**	34	**C**	44	**B**
5	**D**	15	**B**	25	**A**	35	**B**	45	**C**
6	**B**	16	**B**	26	**C**	36	**A**	46	**B**
7	**C**	17	**A**	27	**C**	37	**C**	47	**B**
8	**D**	18	**B**	28	**A**	38	**A**	48	**C**
9	**A**	19	**C**	29	**D**	39	**B**	49	**D**
10	**B**	20	**B**	30	**A**	40	**C**	50	**C**

51	**A**	61	**A**	71	**C**	81	**A or D**	91	**A**
52	**C**	62	**C**	72	**B**	82	**A**	92	**A**
53	**D**	63	**D**	73	**A**	83	**C**	93	**A**
54	**A**	64	**D**	74	**D**	84	**D**	94	**A**
55	**D**	65	**A**	75	**C**	85	**B**	95	**A**
56	**B**	66	**A**	76	**C**	86	**A**	96	**A**
57	**A**	67	**B**	77	**B**	87	**B**	97	**C**
58	**A**	68	**A**	78	**C**	88	**C**	98	**A**
59	**C**	69	**C**	79	**B**	89	**D**	99	**C**
60	**B**	70	**B**	80	**D**	90	**D**	100	**A**