SAT-2

Roll No.

झारखण्ड अधिविद्य परिषद्, राँची, झारखण्ड

राष्ट्रीय प्रतिभा खोज परीक्षा (Stage-I) 2019-20

PAPER - II

शैक्षिक योग्यता परीक्षा

समय : 120 मिनट   पूर्णांक : 100

दृष्टि बाधित परीक्षार्थियों के लिए समय : 150 मिनट

परीक्षार्थियों के लिए निर्देश

प्रश्नों के उत्तर देने के पहले निम्नलिखित निर्देशों को ध्यान से पढ़िए। उत्तर एक अलग ओ.एम.आर. उत्तर-पत्रक पर देने हैं।

1. अपना रौल नम्बर, जैसा कि आपके प्रवेश-पत्र में दिया गया है, स्पष्ट (एक Box में केवल एक अंक) लिखिए। यह ध्यान रखें कि कोई Box रिक्त न रह जाए, यहाँ तक कि आपके रौल नम्बर में आने वाले शून्य के अंक भी इस पुस्तिका तथा ओ.एम.आर. उत्तर-पत्रक पर सही Box में स्थानांतरित किए जाएँ। उदाहरण के लिए एक विद्यार्थी जो राँची केन्द्र से जिसका रौल नं. 21198899999 है, इस प्रकार Box में प्रविष्टियाँ करेगा :

Roll No.	2	1	1	9	8	8	9	9	9	9	9

आगे के सभी कार्यों के लिए आपके रौल नम्बर वही रहेंगे, जोकि आपके प्रश्न-पत्र पर दिए गए हैं।

2. इस प्रश्न पत्र में 100 बहुविकल्पीय प्रश्न हैं।

3. सभी प्रश्नों में से प्रत्येक के लिए 1 अंक निर्धारित है।

4. प्रत्येक विषय के अन्त में रफ (Rough) कार्य के लिए एक खाली पृष्ठ दिया गया है।

5. याद रखिए कि आपको अपने उत्तरों के चिह्न एक अलग ओ.एम.आर. उत्तर-पत्रक पर दिए गए निर्देशों के अनुसार लगाने हैं।

6. प्रत्येक प्रश्न का उत्तर ओ.एम.आर. उत्तर-पत्रक पर उसी प्रश्न के सामने दिए गए विकल्पों में से सबसे उपयुक्त विकल्प वाला गोला को सिर्फ नीले या काले बॉल पेन से ही काला करना है। पेंसिल का प्रयोग वर्जित है।

7. अनुवादित विवरण में अन्तर से उठे किसी भी विवाद की स्थिति में, प्रश्न पत्र के अंग्रेजी विवरण को निर्णायक माना जाएगा।

नोट : रौल नम्बर लिखने के अतिरिक्त कहीं कुछ नहीं लिखिए।

शैक्षिक योग्यता परीक्षा

समय : 120 मिनट   पूर्णांक : 100

निर्देश

शैक्षिक योग्यता परीक्षा के विषय निम्नवत् तीन समूहों में विभक्त हैं :

क्र.सं.	समूह का नाम	समूह के अंतर्गत समाहित विषय	पूर्णांक	प्रश्नों की संख्या	प्रत्येक प्रश्न का मान
(i)	विज्ञान	भौतिकी, रसायन एवं जीव विज्ञान	40	40	1 (एक) अंक
(ii)	गणित	गणित	20	20	1 (एक) अंक
(iii)	सामाजिक विज्ञान एवं मानविकी विषय	इतिहास, भूगोल, नागरिकशास्त्र एवं अर्थशास्त्र	40	40	1 (एक) अंक

कृपया पत्रा उलटें और अपना कार्य आरम्भ करें।

Scholastic Aptitude Test

Time : 120 Minutes   Full Marks : 100

DIRECTION

The subjects of Scholastic Aptitude Test are divided into three groups, as given below :

Sl. No.	Title of the group	Subjects covered under the group	Full marks	No. of questions	Marks allotted to each question
(i)	Science	Physics, Chemistry and Biology	40	40	1 (one)
(ii)	Mathematics	Mathematics	20	20	1 (one)
(iii)	Social Sciences and Humanities	History, Geography, Civics and Economics	40	40	1 (one)

Please Turn over the Page and Start Your Work.

SCHOLASTIC APTITUDE TEST 2019-20

(PHYSICS)

1. Which of the following terms does not represent electrical power in a circuit ?
    (A) I^2R
    (B) IR^2
    (C) VI
    (D) V^2/R

2. For a steady current I, the amount of heat H produced in time t is
    (A) IR^2t
    (B) IRt^2
    (C) I^2Rt
    (D) I^2R^2t

3. What phenomenon of light causes the blue colour of the sky and the redding of the sun at sunrise or sunset?
    (A) Reflection
    (B) Refraction
    (C) Scattering
    (D) total internal reflection

4. The power of a lens is −2.5D. Its focal length is
    (A) − 2.5cm
    (B) −4D
    (C) − 40cm
    (D) − 66.6cm

5. At focus F and between F and 2F, a concave mirror always forms a
    (A) real, inverted and magnified image
    (B) virtual, erect and magnified image
    (C) virtual, inverted and diminished image
    (D) real, erect and diminished image

6. What is the magnitude of force F on a charge q moving with a velocity v in a perpendicular magnetic field B?
    (A) $\dfrac{qB}{v}$
    (B) $\dfrac{vB}{q}$
    (C) qvB
    (D) $\dfrac{qv}{B}$

7. Which of the following is most suitable for the core of electromagnets?
    (A) Air
    (B) Soft iron
    (C) Steel
    (D) Cu-Ni alloy

8. Magnetic fields do not interact with
    (A) electric charges at rest
    (B) electric charges in motion
    (C) permanent magnets at rest
    (D) permanent magnets in motion

9. Which of the following is correct?
    (A) Joule = Coulomb × Volt
    (B) Joule = Coulomb / Volt
    (C) Joule = Volt/ Ampere
    (D) Joule = Ampere/ volt

10. A body can be negatively charged by
    (A) giving some protons to it
    (B) removing some neutrons from it
    (C) giving electrons to it
    (D) removing some electrons from it

11. The resistances R_1 and R_2 are connected in parallel. The equivalent resistance of the combination is
(A) $R_1 + R_2$
(B) $R_1 - R_2$
(C) $\dfrac{R_1 R_2}{R_1 + R_2}$
(D) $\dfrac{R_1 + R_2}{R_1 R_2}$

12. One ampere is synonymous with
(A) Cs^{-1}
(B) JC
(C) JC^{-1}
(D) NC^{-1}

13. The ratio of the focal length of spherical mirror to its radius of curvature is
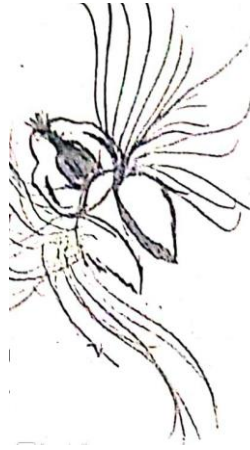(A) 0.5
(B) 1
(C) 2
(D) 3

(CHEMISTRY)

14. $Fe_2O_3 + 2Al \rightarrow Al_2O_3 + 2Fe$
The above reaction is an example of a
(A) combination reaction
(B) double displacement reaction
(C) decomposition reaction
(D) displacement reaction

15. Select the mineral acid from the following
(A) Acetic Acid
(B) Citric acid
(C) Hydrochloric acid
(D) Lactic acid

16. Which of the following indicators is not an acid- base indicator ?
(A) Phenolphthalein
(B) Vanilla
(C) Litmus
(D) Methyl orange

17. Which of the following methods is used to obtain chlorine and hydrogen from sodium chloride?
(A) Electrolysis
(B) Thermal heating
(C) Evaporation
(D) Electroplating

18. Which of the following metals does not react with dilute hydrochloric acid to liberate hydrogen gas?
(A) Calcium
(B) Zinc
(C) Iron
(D) Silver

19. Which of the following reaction is not a redox reaction ?
(A) $Mg + Cl_2 \rightarrow Cu + Cl_2$
(B) $CuO + H_2 \rightarrow Cu + H_2O$
(C) $AgNO_3 + NaCl \rightarrow AgCl + NaNO_3$
(D) $MnO_2 + 4HCl \rightarrow MnCl_2 + 2H_2O + 2Cl_2$

20. In Aqua regia the ratio of concentrated HCl to concentrated HNO_3 is
(A) 1 : 3
(B) 3 : 1
(C) 1 : 2
(D) 2 : 1

21. Ethane, with the molecular formula C_2H_6 has
(A) 6 covalent bonds
(B) 7 covalent bonds
(C) 8 covalent bonds
(D) 9 covalent bonds

22. Glacial acetic acid is
(A) An aqueous solution of alcohol
(B) Vinegar
(C) an aqueous solution of acetic acid
(D) 100% pure – ethanoic acid

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Ranchi (SOP, Doranda): Samriddhi Complex, Ground Floor, Near St. Xavier's School, South Office Para Doranda, Ranchi.
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23. Which of the following is a non- metal and also a solid?
    (A) Iodine   (B) Mercury
    (C) Boron   (D) Hydrogen

24. Propane has
    (A) 8 covalent bonds   (B) 9 covalent bonds
    (C) 10 covalent bonds   (D) 11 covalent bonds

25. An element has electronic configuration 2, 8, 8, 1. Which statement is not correct about the element ?
    (A) It is present in group 3   (B) Its valency is one negative
    (C) It is present in group 1   (D) It is present in 4th period

26. The property by which a large number of atoms of the same element get linked through covalent bonds forming long chains is called
    (A) catenation   (B) polymerization
    (C) allotropy   (D) addition reaction

(BIOLOGY)

27. Saliva contains an enzyme called
    (A) Amylase   (B) Lypase
    (C) Pepsin   (D) Tripsin

28. Regulation of respiration is under the control of
    (A) Cerebrum   (B) cerebellum
    (C) Medula oblongata   (D) Pons

29. Embryo sac is found in
    (A) endosperm   (B) embryo
    (C) ovule   (D) seed

30. A pair of contrasting characters is called
    (A) Phenotype   (B) genotype
    (C) allele   (D) gene

31. Which of the following is not used as biomass?
    (A) Plant waste   (B) Wood
    (C) Animal waste   (D) Human excreta

32. The green plants in a terrestrial ecosystem capture the energy of the sun about
    (A) 90%   (B) 80%
    (C) 70 %   (D) 10%

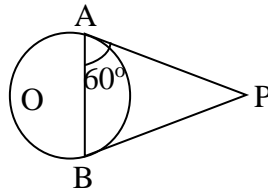33. The presence of which microorganism in Ganga water indicates contamination ?

(A) Lactobacillus bacteria   (B) Amoeba
(C) Coliform bacteria   (D) Mucor spores

34. In which part of the alimentary canal digested food is absorbed ?
(A) Stomach   (B) Appendix
(C) Large intestine   (D) Small intestine

35. Which of the following is a plant hormone ?
(A) Insulin   (B) Thyroxine
(C) Oestrogen   (D) Cytokinin

36. Pollen grains are produced by
(A) Ovary   (B) Petal
(C) Seed   (D) another

37. Chromosomcs are made up of
(A) Proteins   (B) DNA
(C) Both (A) and (B)   (D) RNA

38. The non- renewable source of energy amongst the following is
(A) Coal energy   (B) nuclear energy
(C) wood   (D) wind energy

39. The structure formed by the union of male and female gametes is termed as
(A) embryo   (B) morula
(C) zygote   (D) placenta

40. The three R's to save the environment are
(A) Reserve, Reduce, Recycle   (B) Reuse, Reserve, Reduce
(C) Reserve, Reuse, Reduce   (D) Reduce, Recycle, Reuse
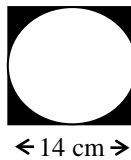
(MATHEMATICS)

41. π is
    (A) an irrational number
    (B) a rational number
    (C) a prime number
    (D) a composite number

42. The value of $p(x) = x^2 - 3x - 4$ at $x = -1$ is
    (A) 1   (B) -4
    (C) 0   (D) -3

43. The solution of the equations $\dfrac{x}{a} + \dfrac{y}{b} = 2$

    $ax - by = a^2 - b^2$ is
    (A) $x = a,\ y = b$ (B) $x = -a,\ y = -b$
    (C) $x = a;\ y = -b$ (D) $x = -a,\ y = b$

44. The height of an equilateral triangle of side a is
    (A) $\dfrac{a}{2}$ (B) $a\sqrt{3}$

    (C) $\dfrac{a\sqrt{3}}{2}$ (D) $\dfrac{a\sqrt{3}}{4}$

45. If $\sec\theta + \tan\theta = m$ and $\sec\theta - \tan\theta = n$, then the value of mn is
    (A) 2   (B) 1
    (C) ±1 (D) ±2

46. The mean of first ten odd natural numbers is
    (A) 5   (B) 10
    (C) 20   (D) 19

47. The solution of the pair of equations
    $x + y = 14$
    $x - y = 4$ is
    (A) $x = 9,\ y = 5$ (B) $x = 5,\ y = 9$
    (C) $x = 9,\ y = 9$ (D) $x = 5,\ y = 5$

48. Sum of the first n terms of the series $\sqrt{2} + \sqrt{8} + \sqrt{18} + ...$ is
    (A) $\dfrac{n(n+1)}{2}$ (B) $\sqrt{2}n$

    (C) $\dfrac{n(n+1)}{\sqrt{2}}$ (D) 1

49. The area of the triangle whose vertices are $(0,0), (a,0)$ and $(0,b)$ is

    (A) ab   (B) $\dfrac{1}{2}ab$

    (C) $a + b$ (D) $a^2 + b^2$

50. If the shadow of 10 m high tree is $10\sqrt{3}\ m,$ then the angle of elevation of sun is
    (A) 60° (B) 90°
    (C) 45° (D) 30°

51. In the following figure, the measure of $\angle PBA$ is

    (A) 60° (B) 30°
    (C) 45° (D) none of these

52. A segment AB is divided at a point P such that $\dfrac{PB}{AB} = \dfrac{3}{7}$, then the ratio of AP : PB is
    (A) $4 : 7$ (B) $7 : 4$
    (C) $7 : 3$ (D) $4 : 3$

53. A square is circumscribing a circle. The side of the square is 14 cm. The area of the square not included in the circle is

    $\leftarrow 14\ cm \rightarrow$

    (A) $21\ cm^2$ (B) $42\ cm^2$
    (C) $48\ cm^2$ (D) $196\ cm^2$

54. By melting a solid sphere of radius 5 cm a solid right circular cone of the same circular base is made. The height of the cone is
    (A) 20 cm   (B) 10 cm
    (C) 5 cm   (D) 12 cm

55. Two friends were born in the year 2000. The probability that they have the same birth date is
    (A) $\dfrac{1}{2000}$ (B) $\dfrac{2}{365}$
    (C) $\dfrac{1}{365}$ (D) $\dfrac{1}{366}$

56. If $3x + y = 10\ and\ y = 4$, then the value of x is
    (A) 0   (B) 1
    (C) 2   (D) 3

57. $\dfrac{\sin\theta}{1+\cos\theta}$ is
    (A) $\dfrac{\cos\theta}{1-\sin\theta}$ (B) $\dfrac{1-\cos\theta}{\sin\theta}$
    (C) $\dfrac{1-\sin\theta}{\cos\theta}$ (D) $\dfrac{1-\cos\theta}{1+\cos\theta}$

58.   The area swept out by a horse tied in a rectangular grass field with a rope 8 m long is
       (A) $16\,\pi\,m^2$ (B) $64\,\pi\,m^2$
       (C) $48\,\pi\,m^2$ (D) $32\,\pi\,m^2$

59.   A tree breaks into two parts due to heavy wind such that the upper part makes an angle of 30°
       with plane. The place where the upper part of the tree touches the ground is at a distance of 10
       m from the base point of the tree. The height of the tree is
       (A) $10\sqrt{3}\ m$ (B) $10\sqrt{2}\ m$
       (C) $\dfrac{10}{\sqrt{3}}\ m$ (D) $5\sqrt{2}\ m$

60.   If the perimeter and the area of a circle are equal numerically, then the diameter of the circle is
       (A) 2 units   (B) π units
       (C) 4 units   (D) 7 units

SOCIAL STUDIES

61.   Who was responsible for the unification of Germany?
       (A) Bismarck   (B) Garibaldi
       (C) Cavour   (D) Mazzini

62.   Printing press first came to India with
       (A) the English   (B) the French
       (C) the Dutch   (D) Portuguese missionaries

63.   Champaran Satyagraha (1916) was launched by Gandhiji against
       (A) high revenue demands   (B) indigo planters
       (C) mill owners   (D) salt tax

64.   Which of the following emerged as the centre of world trade in the 18ᵗʰ century?
       (A) Europe   (B) India
       (C) China   (D) America

65.   Which of the following ports lost its importance under colonial rule?
       (A) Calcutta   (B) Bombay
       (C) Surat   (D) Madras

66.   The first Factories Act, to help keep children out of industrial work was passed in
       (A) 1870   (B) 1902
       (C) 1906   (D) 1912

67.   For which of the following reasons was the Simon Commissions boycotted?
       (A) It supported the Muslim League
       (B) It did not recognize Congress as a party
       (C) There was no Indian in the Commission
       (D) There were differences among the members

68.   Munshi Premchand wrote on which of the following themes?
       (A) Religious and Mythological
       (B) Oppression in society
       (C) Historical
       (D) Detective and mystery

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69. Akbar's court poet was
    (A) Tulsidas
    (B) Abdur Rahim Khan Khana
    (C) Amir Khusro
    (D) Tukaram

70. Which of the following was the reason for calling off the Non-Cooperation Movement by Gandhiji?
    (A) High pressure from the British government
    (B) Round Table Conference
    (C) Gandhiji's arrest
    (D) The Chauri Chaura incident

71. Which Sikh guru was executed by Aurangzeb?
    (A) Tegh Bahadur   (B) Arjun Dev
    (C) Hargobind   (D) Govind Singh

72. Where was the first Cotton Mill set up in India?
    (A) Ahmedabad   (B) Kanpur
    (C) Mumbai   (D) Madras

73. Which Mughal king died by a sudden fall from the staircase?
    (A) Babur   (B) Akbar
    (C) Jahangir   (D) Humayun

74. Which of the following newspapers was started by Bal Gangadhar Tilak?
    (A) Kesari   (B) Jansatta
    (C) The Statesman   (D) Amrita Bazar Patrika

75. Which king started the organization of Kumbh fair at Allahabad?
    (A) Harshavardhana   (B) Dhruvasena II
    (C) Narsimhavarnam   (D) Akbar

76. What per cent area of the whole country does mountain occupy?
    (A) 27%   (B) 43%
    (C) 30%   (D) 50%

77. Which wildlife is protected by the villagers of Bishnoi village in Rajasthan?
    (A) Chinkara   (B) Elephant
    (C) Tiger   (D) Lion

78. The system of agriculture when a single crop is grown on a large area is termed as
    (A) shifting agriculture (B) horticulture
    (C) intensive agriculture (D) plantation agriculture

79. Which is called the 'Queen of Arabian Sea'?
    (A) Venice   (B) Kochin
    (C) Surat   (D) Lakshadwip

80. Which one of the following agencies markets steel for the public sector plants?
    (A) HAIL   (B) TATA steel
    (C) SAIL   (D) MNCC

81. Which two of the following extreme locations are connected by the cast-west corridor?
    (A) Mumbai and Kolkata   (B) Mumbai and Nagpur
    (C) Nagpur and Siliguri   (D) Silchar and Porbandar

82. Which is not the soil conservation method?
    (A) Contour planning   (B) Strip cropping
    (C) Terracing of slopes   (D) Shelter belts

83. Species found in isolated places only are called
    (A) normal species   (B) endemic species
    (C) vulnerable species   (D) rare species

84. Which of the following is not the purpose that modern dams serve?
    (A) Generation of hydroelectricity
    (B) Industrial use
    (C) Irrigation
    (D) Inland navigation

85. Rearing of silkworms for production of silk fibre is called
    (A) interculture   (B) sericulture
    (C) horticulture   (D) pisciculture

86. Which one of the following minerals is formed due to evaporation?
    (A) Chalk   (B) Silica
    (C) Petroleum   (D) Gypsum

87. Which one of the following minerals is not used in making cement?
    (A) Coal   (B) Silica
    (C) Aluminum   (D) Copper

88. Which one of the following countries imports iron ore from India?
    (A) USA   (B) Japan
    (C) Russia   (D) China

89. Which one of the following is a riverine port?
    (A) Kolkata   (B) Mumbai
    (C) Kandla   (D) Vishakhapatnam

90. The place of India in respect of rice cultivation is
    (A) first   (B) second
    (C) third   (D) fourth

91. Which of the following are the two Ethnic groups in Sri Lanka?
    (A) Hindus and Muslims   (B) Sinhalese and Tamils
    (C) Muslims and Cristians   (D) Christans and Tamils

92. the number of subjects given in Union List is
    (A) 47   (B) 66
    (C) 85   (D) 97

93. The policy of 'Apartheid' was adopted by the government of
    (A) U.S.A   (B) South Africa
    (C) India   (D) England

94. Untouchability has been abolished in India by which of the following articles of the constitution of India?
    (A) Article 14   (B) Article 15
    (C) Article 16   (D) Article 17

95. Democarcy was re-established in Nepal in
    (A) 2005   (B) 2006
    (C) 2007   (D) 2008

96. Average income is
    (A) Total national income/ population of the country
    (B) Per capita income/ total national income
    (C) national wealth/ Per person of the country
    (D) National Capital/ National Budget

97. Tertiary sector has become an important part of Indian economy on account of
    (A) development of agriculture and industry
    (B) rise in levels of income
    (C) both A and B
    (D) None of these

98. The main function of Reverse Bank of India is
    (A) providing loans   (B) credit control
    (C) dealing with World bank   (D) none of these

99. MNC is a company
    (A) that owns or controls production in more than one nation
    (B) that owns or controls production in one nation
    (C) that owns or controls production outside the nation
    (D) all of these

100. Which of the following does not fall under consumer rights?
     (A) Right to be informed
     (B) Right to choose
     (C) Right to seek government help
     (D) Right to represent in the consumer courts