

# GOVERNMENT OF WEST BENGAL

DIRECTORATE OF SCHOOL EDUCATION

NATIONAL TALENT SEARCH EXAMINATION, 2013

(STATE LEVEL)

(FOR STUDENTS STUDYING IN CLASS X)

Scholastic Aptitude Test

প্রজ্ঞাসূচক পরীক্ষা

Class-X Code	State Code	Year Code	Centre Code	Serial No.
2	2 3	1 3	1 1 0 1	1 6 4

Roll No.

Full Marks : 90

Time: 90 minutes (1-00 PM to 2-30 PM)

পূর্ণমান : ৯০

সময় : ৯০ মিনিট (বিকাল ১-০০টা থেকে বিকাল ২-৩০ মিনিট)

## Instructions to Candidates

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

1. In this Paper you are to answer 90 questions. Each question carries one mark.

2. Find out the correct answer to an item given in the test booklet out of alternatives (a), (b), (c) and (d) and put a cross-mark inside the circle  surrounding the corresponding correct answer to the item in the Answer-Sheet.

Example : (a), , (c), (d)  
(Here 'b' is the correct answer.)

3. It may be presumed that the answer given by you in the first attempt is incorrect and you want to revise your answer. Blacken the circle completely and then put a cross-mark afresh inside the circle you think right. You are not, however, permitted to revise your answer more than once in each case.

4. However, there will be no penalty marks for a wrong answer.

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

6. You are to write your name and Roll No. in the space provided for this purpose on the Answer-Sheet and Roll No. only on the cover-page of the Question Booklet. Do not write your name in any part of the Question Booklet.

## পরীক্ষার্থীদের প্রতি নির্দেশাবলী

প্রশ্নের উত্তর দেওয়ার পূর্বে নিম্নোক্ত নির্দেশগুলি মন দিয়ে পড়।  
উত্তরগুলি ভিন্ন উত্তরপত্রে দিতে হবে।

১। এই পত্রে মোট ৯০টি প্রশ্নের উত্তর লিখতে হবে। প্রতিটি প্রশ্নের উত্তরের মান ১ (এক)।

২। প্রশ্নপত্রে দেওয়া একটি পদের (a), (b), (c) এবং (d) বিকল্প উত্তরগুলির মধ্যে থেকে সঠিক উত্তরটি বেছে নাও এবং উত্তরপত্রে ঐ পদের নির্দিষ্ট সঠিক উত্তরটিকে ঘিরে ছোট বৃত্তটির মধ্যে একটি ক্রস চিহ্ন  দাও।

উদাহরণ : (a), , (c), (d)  
(এখানে 'b' হল সঠিক উত্তর।)

৩। কোনও উত্তর দেওয়ার পর যদি তোমার মনে হয় যে ভুল হয়েছে, এবং সঠিক উত্তরটি অন্য; তবে সংশোধন করতে চাইলে ভুল উত্তরটিকে সম্পূর্ণভাবে কালি দিয়ে কালো করে দাও এবং যে উত্তরটি তোমার সঠিক মনে হবে সেটির মধ্যে ক্রস চিহ্ন  দাও। এই সুযোগ প্রতি প্রশ্নের ক্ষেত্রে একবারের বেশী দেওয়া হবে না।

৪। ভুল উত্তরের জন্য সঠিক উত্তর বাবদ প্রদত্ত মান থেকে দণ্ডমূলক কোন মান বিয়োজিত হবে না।

৫। পরীক্ষা-কক্ষের ভারপ্রাপ্ত আধিকারিক 'start' বলা মাত্র উত্তর দেওয়া শুরু কর।

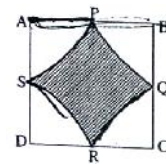
৬। প্রবেশপত্রে উল্লিখিত নাম ও ক্রমিক সংখ্যা উত্তরপত্রের নির্দিষ্ট অংশে দিতে হবে। প্রশ্নপত্রের কোন অংশে নাম লেখা যাবে না। প্রশ্নপত্রে কেবলমাত্র ক্রমিক সংখ্যা দিতে হবে।

**MATHEMATICS**

1. If,  $x + \frac{1}{y} = 1$  and  $y - \frac{1}{z} = 1$ , then the value of  $xyz$  is
- (a) 1 (b) -1  
(c) 0 (d) -2
2. The difference between a discount of 40% of Rs,1000 and two successive discount of 30% and 10% on the same amount is
- (a) 0 (b) 20  
(c) 30 (d) 40
3. Each side of an equilateral triangle is a cm. Find out the ratio of areas of the circumcircle and the incircle of the triangle
- (a) 1 : 2 (b) 2 : 1  
(c) 4 : 1 (d) 1 : 4
4. If the measures of sides of a triangle are  $(x^2 - 1)$  cm,  $(x^2 + 1)$ cm, and  $2x$  cm, then the triangle will be
- (a) right angled (b) obtuse angled  
(c) equilateral (d) isosceles
5. '+' means '÷', '÷' means '×', '×' means '-' and '-' means '+'; what will be the value of  $20 \div 5 \times 6 + 2 - 10$  ?
- (a) 107 (b) 100  
(c) 92 (d) 114
6. Find out the value of  $\sqrt{\sec^2 \theta + \operatorname{cosec}^2 \theta}$
- (a)  $\tan \theta + \cot \theta$  (b)  $\sec \theta + \operatorname{cosec} \theta$   
(c)  $\frac{\sec^2 \theta}{\cos^2 \theta}$  (d)  $\tan \theta - \sec \theta$
7. A copper wire of certain length is turned into a square first and then into a circle. Which one of them is larger?
- (a) square (b) circle  
(c) both of them are equal (d) none of the above

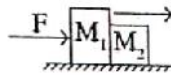
8. The greatest angle of a cyclic quadrilateral ABCD in which  $\angle A = (2x-1)^\circ$ ,  $\angle B = (y+5)^\circ$ ,  $\angle C = (2y+5)^\circ$  and  $\angle D = (4x+7)^\circ$  is
- (a)  $115^\circ$  (b)  $120^\circ$   
(c)  $125^\circ$  (d)  $130^\circ$
9. The height of a cone is 30 cm. A small cone is cut off by a plane parallel to its base. If its volume be  $\frac{1}{27}$ th of the volume of the given cone, at what height above the base is the section cut?
- (a) 21 cm (b) 20.5 cm  
(c) 18 cm (d) 20 cm
10. Price of a piece of diamond is Rs.2000. It is broken into two equal pieces. If price of diamond  $\propto$  square of its weight, then the amount of loss for breaking into two pieces is
- (a) Rs.1120 (b) Rs.1050  
(c) Rs.2000 (d) Rs.1000
11. A person borrows a certain amount of money at 5% simple interest and he lends that amount to another person at 10% compound interest, after three years his profit is Rs.905. Find out the amount of Rs. He borrowed.
- (a) Rs.2000 (b) Rs.3000  
(c) Rs.5000 (d) Rs.8000
12. Circumference of a circle is S cm. and its area is A sq.cm. which one of the following relations is true?
- (a)  $f S^2 > 4A$  (b)  $S^2 < 2f A$   
(c)  $S = 4f A$  (d)  $S^2 = 4f A$
13. If,  $\tan \theta = \frac{x}{y}$  then, the value of  $\frac{\sec^2 \theta}{1 + \cot^2 \theta}$  is
- (a)  $\frac{x^3}{y^3}$  (b)  $\frac{x^4}{y^4}$   
(c)  $\frac{x^5}{y^5}$  (d)  $\frac{y^2}{x^2}$

14. If  $x^2 + y^2 + 10 = (2\sqrt{2}x + 4\sqrt{2}y)$  then the value of  $(x + y)$  is
- (a)  $4\sqrt{2}$  (b)  $3\sqrt{2}$   
(c)  $6\sqrt{2}$  (d)  $9\sqrt{2}$
15. If  $x^2 - 6x + 5 < 0$ , then real values of  $x$  satisfies
- (a)  $1 < x < 5$  (b)  $3 < x < 7$   
(c)  $4 < x < 5$  (d)  $7 < x < 10$
16. A greedy businessman cheats both the seller and buyer by 20%. His real profit is
- (a) 43% (b) 45%  
(c) 44% (d) 40%
17. If sum of the digits of any integer in between 100 and 1000 is subtracted from that integer, then the result is always divisible by
- (a) 7 (b) 6  
(c) 5 (d) 9
18. By eliminating  $\theta$  from  $x = a\cos^2 \theta$ ,  $y = a\sin^2 \theta$ , the expression is
- (a)  $\sqrt{x} + \sqrt{y} = \sqrt{a}$  (b)  $x^2 + y^2 = a^2$   
(c)  $x^{\frac{2}{3}} + y^{\frac{2}{3}} = a^{\frac{2}{3}}$  (d) none of the above
19. In the figure ABCD is a square whose sides are of length 2 cm. The midpoints of sides AB, BC, CD and DA are respectively P, Q, R and S. Four arcs are drawn with A, B, C and D as centres and AP as radius. Area of line marked space is
- (a)  $\left(4 - \frac{f}{3}\right)$  sq.cm (b)  $(4 - f)$  sq.cm  
(c)  $\left(2 - \frac{f}{2}\right)$  sq.cm (d)  $\left(3 - \frac{f}{7}\right)$  sq.cm
20. If  $A = \sin^2 \theta + \cos^4 \theta$ , then for all real values of  $\theta$ ,
- (a)  $1 \leq A \leq 2$  (b)  $\frac{3}{4} \leq A \leq 1$   
(c)  $\frac{13}{16} \leq A \leq 1$  (d)  $\frac{3}{4} \leq A \leq \frac{13}{16}$



## PHYSICS

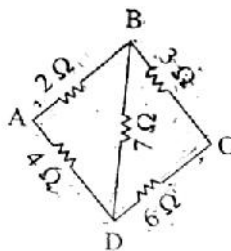
21. Dimension of power is
- (a)  $[M^2 L^2 T^{-2}]$
- (b)  $[M^2 L^2 T^{-3}]$
- (c)  $[M^2 L T^{-2}]$
- (d)  $[M L T^{-2}]$
22. In which case of a moving body force is not needed?
- (a) To increase the speed of the body
- (b) To decrease the momentum of the body
- (c) To change the direction of motion
- (d) To keep the body in uniform velocity
23. The mass of two bodies are 1 kg and 2 kg respectively and their kinetic energy are 1J and 2J respectively. The ratio of their momentum is given by
- (a) 1 : 1
- (b) 1 : 4
- (c) 4 : 1
- (d) 1 : 2
24. A single horizontal force  $F$  is applied to a block of mass  $M_1$  which is in contact with another block of mass  $M_2$  as shown in the figure. If the surfaces are frictionless, the force between the block is



- (a)  $\frac{M_1 F}{M_2}$
- (b)  $\frac{M_1 M_2 F}{M_1 + M_2}$
- (c)  $\frac{M_2 F}{M_1 + M_2}$
- (d)  $\frac{M_2 F}{M_1}$

25. At what temperature will the Fahrenheit scale have the double reading as that of Celcius?
- (a) 260 °C
  - (b) 240 °C
  - (c) 160 °C
  - (d) 370 °C
26. Which of the following principles has been followed to propagate light waves through an optical fibre?
- (a) Diffraction
  - (b) Interference
  - (c) Total internal reflection
  - (d) Scattering
27. The minimum distance between an object and its real image in a convex lens is ( f = focal length of the lens)
- (a) 2.5 f
  - (b) 2 f
  - (c) 4 f
  - (d) f
28. The frequency of light of wave length 5000 Å as
- (a)  $1.5 \times 10^5$  Hz
  - (b)  $6 \times 10^8$  Hz
  - (c)  $6 \times 10^{14}$  Hz
  - (d)  $7.5 \times 10^{15}$  Hz
29. The ratio of electric field intensity at distance 5 cm to that at 10 cm from a point charge 5Q in air is
- (a) 2 : 1
  - (b) 1 : 2
  - (c) 1: 4
  - (d) 4 : 1

30. Five resistances are joined as shown in the figure. The equivalence resistance between the points A and C is



- (a)  $\frac{10}{3} \Omega$
- (b)  $22 \Omega$
- (c)  $15 \Omega$
- (d)  $10.6 \Omega$
31. The solar energy is due to the reactions
- (a) Nuclear fusion
- (b) Nuclear fission
- (c) Combination of nuclear fusion and fission
- (d) Chemical
32. If the decay constant of radioactive radium is  $4.28 \times 10^{-4} \text{ year}^{-1}$ , its half life will be
- (a) 2000 years
- (b) 1240 years
- (c) 63 years
- (d) 1620 years

## CHEMISTRY

33. 2 litre of hydrogen and 1.2 litre chlorine are mixed and exploded. The composition by volume of the resultant mixture will be
- (a) 0.8 litre of hydrogen and 2.24 litre of chlorine
- (b) 0.8 litre of hydrogen and 2.24 litre of hydrogen chloride
- (c) 2.24 litre of hydrogen chloride
- (d) 0.8 litre of chlorine and 22.4 litre of hydrogen chloride

34. The correct order of increasing acidic nature of  $SO_2$ ,  $SiO_2$ ,  $P_2O_3$  and  $Al_2O_3$  is
- (a)  $SO_2 < P_2O_3 < SiO_2 < Al_2O_3$
  - (b)  $Al_2O_3 < SiO_2 < SO_2 < P_2O_3$
  - (c)  $Al_2O_3 < SiO_2 < P_2O_3 < SO_2$
  - (d)  $SiO_2 < SO_2 < Al_2O_3 < P_2O_3$
35. 1.35 gm 'X' element is completely converted to 1.88 gm compound 'XO'. What is the atomic weight of 'X'?
- (a) 20.32
  - (b) 40.75
  - (c) 16.25
  - (d) 56.10
36. Among the following compounds which one is used for cooling refrigerator
- (a)  $NH_4Cl$
  - (b)  $CO_2$
  - (c)  $NH_4OH$
  - (d) liquid  $NH_3$
37. One drop of methyl orange solution when added to the solution obtained after electrolysis of a concentrated solution of NaCl with P+ electrodes, the colour of the solution will turn
- (a) Orange
  - (b) Pink
  - (c) Yellow
  - (d) Colourless
38. From the following metals whose nitrate produces  $NO_2$  gas on heating
- (a) Na
  - (b) K
  - (c) Pb
  - (d) None of the above



39. How many isomers are possible for an alkane having molecular formula  $C_6H_{14}$
- (a) 3
  - (b) 4
  - (c) 5
  - (d) 6
40. Which of the following can not be used to extract a metal from its ore
- (a) Electrolytic reduction
  - (b) Carbon reduction
  - (c) Reaction with oxygen
  - (d) Reaction with a more electropositive metal
41. Which one among the following is not a periodic property
- (a) Electro negativity
  - (b) Atomic volume
  - (c) Ionization potential
  - (d) Radioactivity
42. Which test can be used to distinguish between acetylene and ethylene gasses?
- (a) Reaction with  $Br_2$  in  $CCl_4$  solvent
  - (b) Conc.  $H_2SO_4$
  - (c) Ammoniacal cuprous chloride solution
  - (d) Hydrogen gas in presence of Pt.
43. The light producing gas in the lamp of the hawkers is
- (a) Butane
  - (b) Ethylene
  - (c) Acetylene
  - (d) Methane

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## BIOLOGY

44. Chromosome consists of
- (a) DNA only
  - (b) DNA and histoneprotein
  - (c) DNA, histone protein and non histones proteins
  - (d) DNA and non-histones protein
45. Darwin was most influenced by Research work of
- (a) Alfred Russel Wallace
  - (b) Herbart Spencer
  - (c) Mal Thus
  - (d) Weismann
46. Which one is more permanent ecosystem?
- (a) Forest
  - (b) Mountain
  - (c) Desert
  - (d) Sea
47. In photosynthesis maximum amount of starch are produce at which part?
- (a) Spongy parenchyma
  - (b) Pallisade parenchyma
  - (c) Guard cell
  - (d) Vascular Bundle
48. Which one is anti transpirant hormones?
- (a) Auxin
  - (b) Cytokinin
  - (c) Abscisic Acid
  - (d) Gibberellin

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49. Which reaction take place in Mitochondria?
- (a) Oxidative phosphorylation
  - (b) Photolysis
  - (c) Phtophosphorylation
  - (d) Starch synthesis
50. Which one is the most poisonous excretory substance
- (a) Uric Acid
  - (b) Urea
  - (c) Ammonia
  - (d) Hippuric Acid
51. The stage of interphase in which the number of cell organelle increases in
- (a)  $G_1$
  - (b) S
  - (c)  $G_2$
  - (d)  $G_0$
52. Corpus callosum present in
- (a) Medulla Oblongata
  - (b) Pons
  - (c) Cerebreum
  - (d) Cerebellum
53. Isogamy, Aniosogamy and Oogamy types of sexual reproduces occur in
- (a) Muncor Sp
  - (b) Monocystis Sp
  - (c) Spirogyra Sp
  - (d) Chlamydomonous Sp

54. Which Vector Spread the yellow fever disease?
- (a) Musca Sp
  - (b) Anopheles Sp
  - (c) Culex Sp
  - (d) Ades aegypti
55. Which of the following is not directly formed from DNA
- (a) DNA
  - (b) Protein
  - (c) m RNA
  - (d) t RNA

## HISTORY

56. Harappa is situated in
- (a) Punjab
  - (b) Sindh
  - (c) Baluchistan
  - (d) Gujrat
57. 'Chaitanya Charitarnrito' was composed by
- (a) Brindavan Das
  - (b) Krishnadas Kabiraj
  - (c) Maladhar Basu
  - (d) Poet Chandidas
58. The famine of Seventysix in Bengal occurred in
- (a) 1768 A.D.
  - (b) 1770 A.D.
  - (c) 1772 A.D.
  - (d) 1774 A.D.

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- 59.** The name of first newspaper published in India –
- (a) Digdarshan
  - (b) Samachar Darpan
  - (c) Bengal Gazette
  - (d) Sambad Koumudi
- 60.** ‘Mitra Mela’ was later on renamed as
- (a) Anusilan Samiti
  - (b) Abinava Bharat
  - (c) Jugantar
  - (d) Hindu Mela
- 61.** Not as a member of ‘Hindustan Socialist Republican Association’.
- (a) Sukdev
  - (b) Bhagat Singh
  - (c) Rajguru
  - (d) Lala Lajpat Rai
- 62.** ‘Indian Penal Code’ was prepared during the time of
- (a) Lord Cornwallis
  - (b) Lord William Bentinck
  - (c) Lord Dalhousie
  - (d) Lord Canning
- 63.** The first Vice-Chancellor of Calcutta University was
- (a) Michael Sadlar
  - (b) Sir Ashutosh Mukhopadhyay
  - (c) Sir James William Colville
  - (d) Sir Charles Wood

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- 64.** 'Reichstag' is a Parliamentary House of a State mentioned below
- (a) Japan
  - (b) Russia
  - (c) Switzerland
  - (d) Germany
- 65.** In which session of the Muslim League was the resolution for a Separate Muslim State adopted?
- (a) Delhi Session
  - (b) Karachi Session
  - (c) Lahore Session
  - (d) Lucknow Session

## **GEOGRAPHY**

- 66.** The city located on the equator is
- (a) Quito
  - (b) New Orleans
  - (c) Kuala Lumpur
  - (d) Addis Ababa
- 67.** The father of modern Geography are
- (a) Ptolemy and Layman
  - (b) X.Le. Pichon and Wegner
  - (c) Alexander Von Humbolt and Carl Ritter
  - (d) Park and Thornbury
- 68.** The earth's crust is mainly composed of
- (a) granite and conglomerate rocks
  - (b) mudstone and sandstone rocks
  - (c) gneiss and marble rocks
  - (d) granite and basalt rocks

- 69.** The process of removal of rocks on the earth surface is called
- (a) gradation
  - (b) denudation
  - (c) weathering
  - (d) erosion
- 70.** One problem of the economic exploitation of equatorial ever green forest is
- (a) heavy rainfall
  - (b) heterogenous growth of vegetation
  - (c) homogenous growth of vegetation
  - (d) the trees are not suitable for economic utilisation
- 71.** A river builds delta when it
- (a) carries huge water
  - (b) carries enough load
  - (c) passes a very long distance
  - (d) cannot carry its load
- 72.** 'Eutrofication' is related to
- (a) water pollution
  - (b) air pollution
  - (c) land pollution
  - (d) cultural pollution
- 73.** The main route of communication between Srinagar and Leh is
- (a) Shipkila
  - (b) Banihal
  - (c) Zojila
  - (d) Nathula

74. The mother of all industries is
- (a) Petrochemical industry
  - (b) Automobile industry
  - (c) Iron and Steel industry
  - (d) Information technology industry
75. Cold wall is
- (a) a line between warm cold ocean current
  - (b) a two dimensional plane between cold and warm ocean current
  - (c) a three dimensional plane between warm and cold ocean current
  - (d) multi dimensional plane between warm and cold ocean current

## **POLITICAL SCIENCE**

76. Who is the Supreme Commander of the Indian Armed Forces?
- (a) The President of India
  - (b) The Prime Minister of India
  - (c) The Defence Minister of India
  - (d) The Parliament of India
77. Who appoints the Chief Minister of any State in India?
- (a) The Prime Minister of India
  - (b) The Home Minister of India
  - (c) The Governor of the State
  - (d) the Chief Justice of the High Court of the State
78. Who presides over the joint session of the Indian parliament?
- (a) The Prime Minister of India
  - (b) the President of India
  - (c) The Chairman of the Rajya Sabha
  - (d) The Speaker of the Lok Sabha



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- 79.** The Right to Property lost its place among the Fundamental Rights and became just a statutory right in the year.
- (a) 1975
  - (b) 1976
  - (c) 1977
  - (d) 1978
- 80.** 'Politics' was written by
- (a) Plato
  - (b) Aristotle
  - (c) Hegel
  - (d) Marx
- 81.** The total number of members in the Security Council of the United Nations Organisation is
- (a) 10
  - (b) 15
  - (c) 18
  - (d) 20
- 82.** Which of the following thinkers may be called the proponent of the principle of popular sovereignty?
- (a) Hobbes
  - (b) Locke
  - (c) Rousseau
  - (d) Hegel
- 83.** The words 'socialist' and 'secular' were included in the preamble to the Indian Constitution by which Amendment Act
- (a) 42<sup>nd</sup>
  - (b) 44<sup>th</sup>
  - (c) 62<sup>nd</sup>
  - (d) 73<sup>rd</sup>

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- 84.** The Government of which country is Unitary in form?
- (a) The United States of America
  - (b) Britain
  - (c) India
  - (d) Switzerland
- 85.** How many times has Financial Emergency (art.360) been declared in India?
- (a) Once
  - (b) Twice
  - (c) Thrice
  - (d) Never

## **ECONOMICS**

- 86.** The natural resources used in production are
- (a) renewable resources
  - (b) non-renewable resources
  - (c) renewable and non-renewable resources
  - (d) none of the above
- 87.** Human Development Index (HDI) is prepared on the basis of
- (a) 2 basic indicators
  - (b) 3 basic indicators
  - (c) 4 basic indicators
  - (d) 5 basic indicators

- 88.** When market supply remains unchanged and demand increases, then equilibrium price
- (a) increases
  - (b) decreases
  - (c) remains unchanged
  - (d) none of the above
- 89.** The term 'Globalisation' refers to
- (a) integration among the economy of different countries
  - (b) decreasing government control over different sectors
  - (c) free trade among the different countries
  - (d) all of the above
- 90.** The Consumer Protection Act, 1986 ensures which of the following as rights which every consumer in India should possess
- (a) right to choice
  - (b) right to information
  - (c) right to redressal
  - (d) all of the above