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**SONI COLLEGE**  
**SOLAPUR**



### Question Paper Batch -I

**Date: 07.12.2025**

**Maximum Marks: 300**

**Std. X**

#### **SYLLABUS**

**MATHS** :Linear equations in two variables, Quadratic equations, Arithmetic Progression, Similarity, Circle, Co-ordinate geometry

**SCIENCE** :Effects of Electric Current, Periodic Classification of elements, Chemical reaction & Equation, Heredity & Evolution, Life processes in Living Organisms – II, Environmental management

**LOGICAL & REASONING**

#### **INSTRUCTIONS TO CANDIDATE**

##### **GENERAL:**

- 1. This Question paper consists of 3 - sections. Containing 75 Questions.**
- 2. Section-I = Mathematics (Q.1 - Q.30)**
- 3. Section-II = Science.** This session consists of 30 questions from Chemistry, Physics and Biology **(Q. 31 - Q. 60)**
- 4. Section - III = Logic and Reasoning (Q. 61 - Q. 75)**
- 5. There is Negative Marking.**

##### **MARKING SCHEME:**

- 1. Each Question has four options, from which only one option is correct.**
- 2. For each correct option '4' marks will be given.**
- 3. There is (-1) for every wrong answer**

**Std. X**  
**SECTION - 1 - MATHS**

1. The value of  $\sqrt{6 + \sqrt{6 + \sqrt{6 + \dots}}}$  is -----.  
a) 4                                      b) 3                                      c) -2                                      d) 3.5
2. If one root of the equation  $ax^2 + bx + c = 0$  is three times the other, then  $b^2 : ac = ?$   
a) 3 : 1                                      b) 3 : 16                                      c) 16 : 3                                      d) 16 : 1
3. If the equation  $ax^2 + 2x + a = 0$  has two distinct roots, if  
a)  $a = \pm 1$                                       b)  $a = 0$                                       c)  $a = 0, 1$                                       d)  $a = -1, 0$
4. The father's age is six times his son's age four years hence, the age of the father will be four times his son's age. The present ages, in years, of the son & the father are respectively -----  
a) 4 & 24                                      b) 5 & 30                                      c) 6 & 36                                      d) 3 & 24
5. If the system of equations  $2x + 3y = 7$  and  $(a + b)x + (2a - b)y = 21$  has infinitely many solutions, then  
a)  $a = 1, b = 5$                                       b)  $a = 5, b = 1$                                       c)  $a = -1, b = 5$                                       d)  $a = 5, b = -1$
6. If  $217x + 131y = 913$ ,  $131x + 217y = 827$ , then  $x + y$  is equal to  
a) 5                                      b) 6                                      c) 7                                      d) 8
7. Which of the following quadratic equations has sum of its roots as 4?  
a)  $2x^2 - 4x + 8 = 0$                                       b)  $-x^2 + 4x + 4 = 0$   
c)  $\sqrt{2}x^2 - \frac{4}{\sqrt{2}}x + 1 = 0$                                       d)  $4x^2 - 4x + 4 = 0$
8. If the sum of the roots of the equation  $x^2 - (k + 6)x + 2(2k - 1) = 0$  is equal to half of their product, then  $k = ?$   
a) 6                                      b) 7                                      c) 1                                      d) 5
9. It can take 12 hours to fill a swimming pool using two pipes. If the pipe of larger diameter is used for 4 hours and the pipe of smaller diameter for 9 hours, only half the pool can be filled. How long would it take for each pipe to fill the pool separately?  
a) 30 and 50 hours                                      b) 40 and 50 hours                                      c) 20 and 40 hours                                      d) 20 and 30 hours

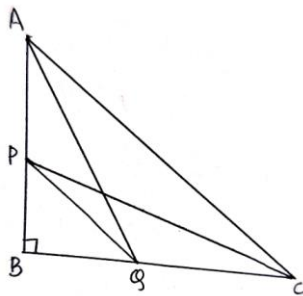
10. If  $2x - 3y = 7$  and  $(a + b)x - (a + b - 3)y = 4a + b$  represent coincident lines, then a and b satisfy the equation

- a)  $a + 5b = 0$                       b)  $5a + b = 0$                       c)  $a - 5b = 0$                       d)  $5a - b = 0$

11. If four numbers in A.P. are such that their sum is 50 and the greatest number is 4 times the least, then the numbers are ----.

- a) 5,10,15,20                      b) 4,10,16,22                      c) 3,7,11,15                      d) None of these

12. In a right triangle ABC right angled at B, if P and Q are points on the sides AB and AC respectively, then -----.

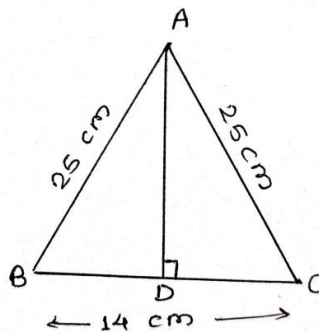


- a)  $AQ^2 + CP^2 = 2(AC^2 + PQ^2)$   
 b)  $2(AQ^2 + CP^2) = AC^2 + PQ^2$   
 c)  $AQ^2 + CP^2 = AC^2 + PQ^2$   
 d)  $AQ + CP = \frac{1}{2}(AC + PQ)$

13. The first and last terms of an A.p. are 1 and 11. If the sum of its terms is 36, then the number of terms will be -----.

- a) 5                                      b) 6                                      c) 7                                      d) 8

14. In an isosceles  $\Delta ABC$ , if  $AB = AC = 25\text{cm}$  &  $BC = 14\text{cm}$  then the measure of altitude from A on BC is



- a) 20 cm                              b) 22 cm  
 c) 18 cm                              d) 24cm

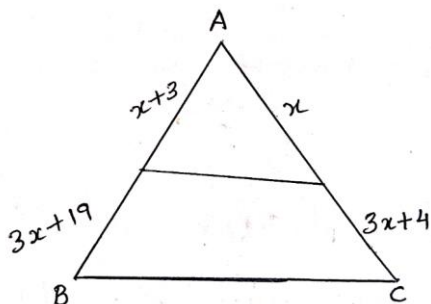
15. The areas of two similar triangles  $\Delta ABC$  and  $\Delta DEF$  are  $144\text{cm}^2$  and  $81\text{cm}^2$  respectively. If the longest side of larger  $\Delta ABC$  be  $36\text{cm}$  then the longest side of the similar  $\Delta DEF$  is -----.

- a) 20cm                              b) 26cm                              c) 27cm                              d) 30cm

16. The common difference of A.P.  $\frac{1}{2b}, \frac{1-6b}{2b}, \frac{1-12b}{2b}$  is -----.

- a)  $2b$                                       b)  $-2b$                                       c)  $3$                                       d)  $-3$

17. In the figure, the value of  $x$  for which  $DE \parallel AB$  is \_\_\_\_.



- a)  $4$                                       b)  $1$   
 c)  $3$                                       d)  $2$

18. If  $\frac{1}{x+2}, \frac{1}{x+3}, \frac{1}{x+5}$  are in A.P. Then  $x =$  -----.

- a)  $5$                                       b)  $3$                                       c)  $1$                                       d)  $2$

19. If  $\triangle ABC$  is an equilateral triangle such that  $AD \perp BC$ , then  $AD^2 =$  ---.

- a)  $\frac{3}{2} DC^2$                                       b)  $2DC^2$                                       c)  $3CD^2$                                       d)  $4DC^2$

20. The 9<sup>th</sup> term of an A.P is 449 and 449<sup>th</sup> term is 9. The term which is equal to zero is -

- a) 501<sup>th</sup>                                      b) 502<sup>th</sup>                                      c) 508<sup>th</sup>                                      d) None of these

21. The fourth vertex D of a Parallelogram ABCD whose three vertices are A  $(-2, 3)$ , B  $(6, 7)$  and C  $(8, 3)$  ---.

- a)  $(0, 1)$                                       b)  $(0, -1)$                                       c)  $(-1, 0)$                                       d)  $(1, 0)$

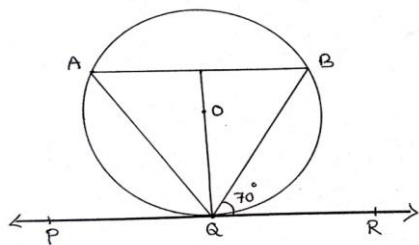
22. From a point P which is at a distance of 13cm from the centre O of a circle of radius 5cm, the pair of tangents PQ and PR to the circle are drawn. Then the area of the quadrilateral is -----.

- a)  $60\text{cm}^2$                                       b)  $65\text{cm}^2$                                       c)  $30\text{cm}^2$                                       d)  $32.5\text{cm}^2$

23. If the distance between the points  $(4, P)$  and  $(1, 0)$  is 5, then the value of P is ----.

- a) 4 only                                      b)  $\pm 4$                                       c)  $-4$  only                                      d) 0

24. In figure, If  $\triangle PQR$  is the tangent to a circle at Q whose centre is O, AB is chord parallel to PR and  $\angle BQR = 70^\circ$  then  $\angle AQB = ?$

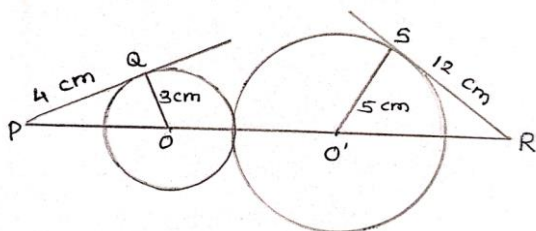


- a)  $20^\circ$       b)  $40^\circ$   
 c)  $35^\circ$       d)  $45^\circ$

25. The perimeter of a triangle formed by the points  $(0, 0)$ ,  $(1, 0)$  and  $(0, 1)$  is -----.

- a)  $1 + \sqrt{2}$       b)  $\sqrt{2} + 1$       c) 3      d)  $2 + \sqrt{2}$

26. In the figure,  $PR =$

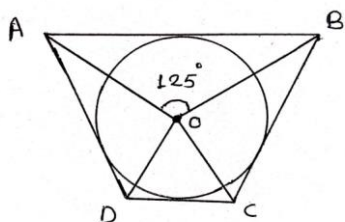


- a) 20 cm      b) 26 cm  
 c) 24 cm      d) 28 cm

27. The line segment joining points  $(-3, -4)$  and  $(1, -2)$  is divided by  $y$  - axis in the ratio

- a) 1 : 3      b) 2 : 3      c) 3 : 1      d) 2 : 3

28. In figure, if  $\angle AOB = 125^\circ$ , then  $\angle COD$  is equal to ----.



- a)  $62.5^\circ$       b)  $45^\circ$   
 c)  $35^\circ$       d)  $55^\circ$

29. The distance between the points  $(a \cos \theta + b \sin \theta, 0)$  and  $(0, a \sin \theta - b \cos \theta)$  is

- a)  $a^2 + b^2$       b)  $a + b$       c)  $a^2 - b^2$       d)  $\sqrt{a^2 + b^2}$

30. If four sides of a quadrilateral ABCD are tangential to a circle then -----.

- a)  $AC + AD = BD + CD$       b)  $AB + CD = BC + AD$   
 c)  $AB + CD = AC + BC$       d)  $AC + AD = BC + DB$

## SECTION -2 - SCIENCE

31. The element A, B, C, D, and E have atomic number 9, 11, 17, 12 and 13 respectively which pair of elements belong to the same group?
- a) A and B                      b) B and D                      c) A and C                      d) D and E
32. Which of the following is the resistance of a superconductor?
- a) Zero                              b) Infinite                              c) 1 Ohm                              d) 10 Ohm
33. The resistivity does not change if ----.
- a) the material is changed  
b) the temperature is changed  
c) the shape of the resistor is changed  
d) both material and temperature are changed
34. Which of the following are the characteristics of isotopes of an elements?
- i) Isotopes of an elements have same atomic masses  
ii) Isotopes of an element have same atomic number  
iii) Isotopes of an element show same physical properties  
iv) Isotopes of an element show same chemical properties
- a) i, ii and iv                      b) ii, iii and iv                      c) ii and iii                      d) ii and iv
35. In an electrical circuit two resistors of  $2\ \Omega$  and  $4\ \Omega$  respectively are connected in series to a 6V battery. The heat dissipated by the  $4\ \Omega$  resistor in 5s will be---.
- a) 5 J                              b) 10 J                              c) 20 J                              d) 30 J
36. Arrange the following elements in the order of their increasing non metallic character Li, O, C, Be, F
- a)  $F < O < C < Be < Li$                               b)  $Li < Be < C < O < F$   
c)  $F < O < C < Li < Be$                               d)  $F < O < Be < C < Li$
37. A cylindrical conductor of length  $l$  and uniform area of cross section A has resistance R. Another conductor of length  $2l$  and resistance R of the same material has area of cross section ---.
- a)  $A/2$                               b)  $3A/2$                               c)  $2A$                               d)  $3A$
38. Which of the following elements does not lose an electron easily?

a) Na

b) F

c) Mg

d) Al

39. What is the relationship between resistance and current?

a) They are directly related to each other

b) They are inversely related to each other

c) The resistance has a greater magnitude than the current

d) The current has a greater magnitude than the resistance

40. Which one of the following elements exhibit maximum number of valence electrons?

a) Na

b) Al

c) Si

d) P

41. Alternative forms of a gene are called

a) loci

b) multiples

c) Chromosomes

d) Alleles

42. Which of the following gases can be used for storage of fresh sample of an oil for a long time?

a) Carbon dioxide or oxygen

b) Nitrogen or Oxygen

c) Carbon dioxide or helium

d) Helium or nitrogen

43. Which of the following are homologous organs?

a) Nails of human being and claws in animals

b) Wings of bird and hands of human

c) Wings of bird and wings of insect

d) Wings of bat and wings of cockroach

44. The chemical formula of quick lime is

a)  $\text{Ca(OH)}_2$

b)  $\text{CaCO}_3$

c)  $\text{CaO}$

d)  $\text{CaCl}_2$

45. Two Pea Plants one with round green seeds (RRYY) and another with wrinkled Yellow (rryy) seeds produce F1 progeny that have round Yellow (RrYy) seeds. When F1 plants are selfed, the F2 progeny will have new combination of characters. Choose the new combination from the following.

i) Round, Yellow      ii) Round, green

iii) wrinkled yellow      iv) wrinkled green

a) i and ii

b) i and iv

c) ii and iii

d) i and iii

46. Electrolysis of water is a decomposition reaction. The mole ratio of hydrogen and oxygen gases liberated during electrolysis of water is

a) 1 : 1

b) 2 : 1

c) 4 : 1

d) 1 : 2

47. In peas, a pure tall plant (TT) is crossed with a short plant (tt). The ratio of pure tall plants to short plants in F2 is

a) 1 : 3

b) 3 : 1

c) 1 : 1

d) 2 : 1

48. Which among the following statements is (are) true? Exposure of silver chloride to sunlight for a long duration turns grey due to

i) the formation of silver by decomposition of silver chloride

ii) sublimation of silver chloride

iii) decomposition of chlorine gas from silver chloride

iv) oxidation of silver chloride

a) i only

b) i and iii

c) ii and iii

d) iv only

49. Select the group which shares maximum number of common characters

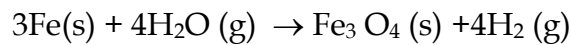
a) two individuals of a species

b) two species of a genus

c) two genera of a family

d) two genera of two families

50. Which of the following statements about the given reaction are correct?



i) Iron metal is getting oxidised

ii) Water is getting reduced

iii) Water is acting as reducing agent

iv) Water is acting as oxidising agent

a) i, ii and iii

b) iii and iv

c) i, ii and iv

d) ii and iv

51. In human females, an event that reflects onset of reproductive phase is:

a) growth of body

b) changes in hair pattern

c) change in voice

d) menstruation

52. Disposable plastic plates should not be used because

a) they are made of materials with light weight

b) they are made of toxic materials

c) they are made of biodegradable materials

d) they are made of non-biodegradable materials

53. Which among the following is not the function of tests at puberty?

i) Formation of germ cells

ii) Secretion of testosterone

iii) development of placenta

iv) secretion of estrogen

a) i and ii

b) ii and iii

c) iii and iv

d) i and iv

54. The percentage of solar radiation absorbed by all the green plants for the process of photosynthesis is about
- a) 1%                      b) 5%                      c) 8%                      d) 10%
55. Length of Pollen tube depends on the distance between
- a) pollen grain and upper surface of stigma  
b) pollen grain on upper surface of stigma and ovule  
c) pollen grain in anther and upper surface of stigma  
d) upper surface of stigma and lower part of style
56. Which of the following limits the number of trophic levels in a food chain
- a) Decrease in energy at higher trophic levels                      b) Sufficient food supply  
c) Polluted air                      d) Water
57. In Rhizopus, tubular thread like structures bearing sporangia at their tips are called\_\_\_\_\_.
- a) Filaments                      b) Hyphae                      c) Rhizoids                      d) roots
58. Organisms of a higher trophic level which feed on several types of organisms belonging to a lower trophic level constitute
- a) food web                      b) ecological pyramid  
c) ecosystem                      d) food chain
59. Which of the following is the correct sequence of events of sexual reproduction in a flower?
- a) pollination, fertilisation, seeding, embryo  
b) seeding , embryo, fertilisation, pollination  
c) pollination, fertilisation, embryo, seeding  
d) embryo , seeding, pollination, fertilisation
60. In the given food chain, suppose the amount of energy at fourth trophic level is 5KJ, what will be the energy available at the producer level?  
Grass → Grasshopper → Frog → Snake → Hawk
- a) 5 KJ                      b) 50 KJ                      c) 500 KJ                      d) 5000 KJ

### SECTION - 3 - LOGICAL REASONING

61. Six girls are sitting in a circle facing to the centre of the circle. They are P, Q, R, S, T and V. T is not between Q and S but some other one. P is next to the left of V. R is 4<sup>th</sup> to the right of P.

Which of the following statement is not true ?

- a) S is just next to the right to R      b) T is just next to the right of V  
c) R is second to the left of T      d) P is second to the right of R

62. Bhaskar is son of Chellam and is brother of Deepan. Milind is son of Deepan and Zoya is sister of Milind's grandfather's son. If Raji is sister of Milind then how is Zoya related to Raji ?

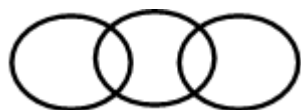
- a) Mother      b) Niece      c) Aunt      d) None of these

63. Greece : Athens :: Kenya : ?

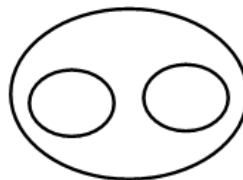
- a) London      b) Nairobi      c) Amsterdam      d) Prague

64. Which of the following figures correctly represents the relation between Europa, Venus and Canopus?

a)



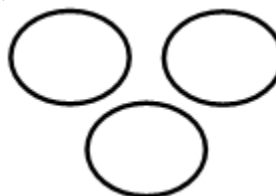
b)



c)



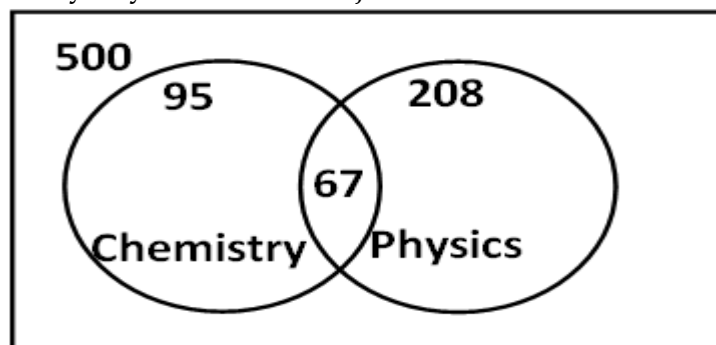
d)



65. Identify the wrong number in the series. 21, 34, 55, 89, 144, 234, 377?

- a) 89      b) 55      c) 234      d) 377

66. From the figure given below, determine the number of students who did not study any of the two subjects.



- a) 175      b) 295      c) 264      d) 135

67. Q, W, E, R, T, Y, U and O are members of a family consisting of two children, one of whom is T is a boy. Q and R are brothers and Q is an engineer. O is a doctor married to one of the brothers. W is married to R and Y is their child. If U is father of Q then how is U related to R?

- a) Father                      b) Son                      c) Nephew                      d) Brother

68. If 'A+B' means A is brother of B, 'A\*B' means A is sister of B, 'A-B' means A is mother of B then which of the following is correct about G-R\*N+E?

- a) N is mother of G                      b) R is daughter of G  
c) E is brother of N                      d) R is sister of G

69. Find the odd one out.

- a) 65 : 29                      b) 34 : 11                      c) 76 : 41                      d) 27 : 15

70. **Statements:** All cups are books. All books are shirts.

**Conclusions:**

Some cups are not shirts.

Some shirts are cups.

- a) Only (2) conclusion follows                      b) Only (1) conclusion follows  
c) Neither (1) nor (2) follows                      d) Both (1) and (2) follow

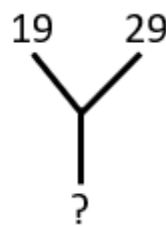
71. Rasik walked 20 m towards north. Then he turned right and walks 30 m. Then he turns right and walks 35 m. Then he turns left and walks 15 m. finally he turns left and walks 15 m. In which direction and how many metres is he from the starting position?

- a) 15 m West                      b) 30 m East                      c) 30 m West                      d) 45 m East

72. Find the next number in the series: 63, 124, 215, 342, 511, .... ?

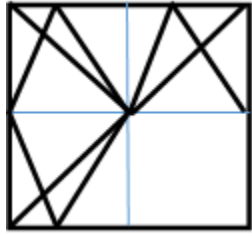
- a) 824                      b) 728                      c) 951                      d) 693





73. Find the correct alternative which will replace the question mark?



- a) 7403                      b) 4621                      c) 2341                      d) 3412

74. Identify the figure which completes the pattern.



- a)  b)  c)  d) 

75. In a certain code "DHRUVA" is written as "BWVSIE". Which of the following words can be written as "BWSBIUB"?

- a) ACHARYA    b) MERCURY    c) ATHARVA    d) ANTARTA

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