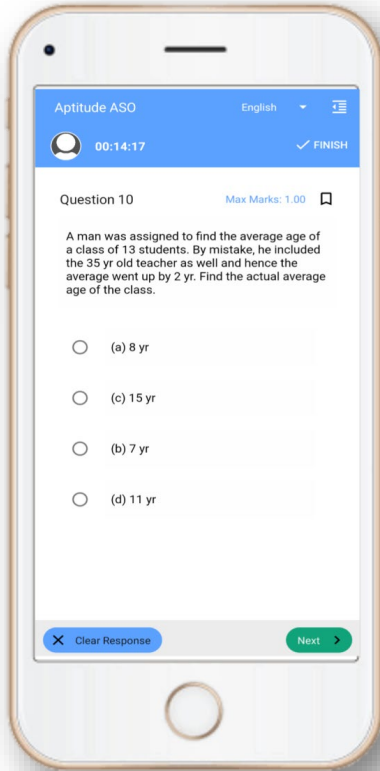


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Test Booklet Series

Serial No.

**A**

**TEST BOOKLET**  
**RECRUITMENT OF A. S. O.**  
**MATHEMATICS**

Time Allowed : 1 (one) Hour

Maximum Marks : 100

**: INSTRUCTIONS TO CANDIDATES :**

1. IMMEDIATELY AFTER THE COMMENCEMENT OF THE EXAMINATION, YOU SHOULD CHECK THAT THIS TEST BOOKLET DOES NOT HAVE ANY UNPRINTED OR TORN OR MISSING PAGES OR ITEMS ETC. IF SO, GET IT REPLACED BY A COMPLETE TEST BOOKLET OF THE SAME SERIES ISSUED TO YOU.
2. Please note that it is the candidate's responsibility to encode and fill in the Roll Number and Test Booklet Series A, B, C or D carefully using BALL POINT PEN (with BLUE OR BLACK INK) and without any omission or discrepancy at the appropriate places in the OMR Answer Sheet. Any omission/discrepancy will render the Answer Sheet liable for rejection.
3. You have to enter your Roll No. on the Test Booklet in the Box provided alongside. DO NOT write anything else on the Test Booklet.
4. This Test Booklet contains 50 items (questions). Each item (question) comprises four responses (answers). You have to select the correct response (answer) which you want to mark (darken) on the Answer Sheet. In case, you feel that there is more than one correct response (answer), you should mark (darken) the response (answer) which you consider the best. In any case, choose **ONLY ONE** response (answer) for each item (question).
5. You have to mark (darken) all your responses (answers) **ONLY** on the separate Answer Sheet provided, by using BALL POINT PEN (with BLUE OR BLACK INK). See instructions in the Answer Sheet.
6. (i) All items (questions) carry equal marks. All items (questions) are compulsory. Your total marks will depend only on the number of correct responses (answers) marked by you in the Answer Sheet.  
(ii) There will be no negative marking for wrong response (answer).  
(iii) If candidates give more than one response (answer), it will be treated as a wrong response (answer) even if one of the given responses (answers) happens to be correct.
7. Before you proceed to mark (darken) in the Answer Sheet the responses (answers) to various items (questions) in the Test Booklet, you have to fill in some particulars in the Answer Sheet as per the instructions in your Admission Certificate.
8. After you have completed filling in all your responses (answers) on the Answer Sheet and after conclusion of the examination, you should hand over to the Invigilator the Answer Sheet. You are permitted to take with you the candidate's copy/second page of the Answer Sheet along with the Test Booklet, after completion of the examination, for your reference.
9. Sheets for rough work are appended in the Test Booklet at the end.

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1. The decimal expansion of  $\frac{23}{2^3 \cdot 5^2}$  will terminate after :
- (A) One-decimal place  
(B) Two-decimal place  
(C) Three-decimal place  
(D) Four-decimal place
2.  $3 + 2\sqrt{5}$  is :
- (A) An irrational number  
(B) A rational number  
(C) Neither rational nor irrational number  
(D) Whole number
3. For  $a$  and  $b$  being co-prime, then  $a^2$  and  $b^2$  are :
- (A) May or may not be co-prime  
(B) Never co-prime  
(C) Always co-prime  
(D) None of the above
4. The least number that is divisible by all the numbers from 1 to 10 (both inclusive) is :
- (A) 10  
(B) 252  
(C) 504  
(D) 2520
5. In Euclid's Division Lemma,  $a = bq + r$ ,  $0 \leq r < b$ , the numbers ' $a$ ' and ' $r$ ' are the :
- (A) Divisor and Dividend  
(B) Dividend and Remainder  
(C) Quotient and Divisor  
(D) Remainder and Quotient
6. If ' $a$ ' and ' $b$ ' be two odd prime numbers, then  $(a^2 - b^2)$  is :
- (A) An even prime  
(B) An odd prime  
(C) Prime  
(D) Composite

7. If two positive integers  $p$  and  $q$  can be expressed as  $p = ab^2$  and  $q = a^3b$ , ( $a$  and  $b$  being prime numbers), then LCM ( $p, q$ ) is :
- (A)  $a^3b^3$   
(B)  $a^2b^2$   
(C)  $a^3b^2$   
(D)  $ab$
8. A rational number ( $x = p/q$ ) have a terminating decimal expansion if :
- (A) The prime factorization of  $q$  is not of the form  $2^n \cdot 5^m$ , where  $n$  and  $m$  are non-negative integers  
(B) The prime factorization of  $q$  is not of the form  $2^n \cdot 5^m$ , where  $n$  and  $m$  are integers  
(C) The prime factorization of  $q$  is of the form  $2^n \cdot 5^m$ , where  $n$  and  $m$  are non-negative integers  
(D) The prime factorization of  $q$  is of the form  $2^n \cdot 5^m$ , where  $n$  and  $m$  are integers
9. A rational number of  $1.\overline{16}$  in the simplest form is :
- (A)  $\frac{10}{9}$   
(B)  $\frac{100}{99}$   
(C)  $\frac{115}{99}$   
(D)  $\frac{116}{99}$
10. The highest power of the variable in a polynomial is called its :
- (A) Solution  
(B) Zero  
(C) Degree  
(D) None of the above
11. If  $\alpha$  and  $\beta$  are zeroes of a quadratic polynomial  $ax^2 + bx + c$ , then  $\alpha + \beta$  is equal to :
- (A)  $\frac{b}{a}$

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- (B)  $-\frac{b}{a}$
- (C)  $\frac{a}{b}$
- (D)  $-\frac{a}{b}$
12. If a zero of the quadratic polynomial  $x^2 + 3x + k$  is 2, then the value of  $k$  is :
- (A) 5
- (B) -5
- (C) 10
- (D) -10
13. If  $\alpha$ ,  $\beta$  and  $\gamma$  are the zeroes of a cubic polynomial  $ax^3 + bx^2 + cx + d$ , then  $\alpha\beta\gamma$  is equal to :
- (A)  $-\frac{b}{a}$
- (B)  $-\frac{d}{a}$
- (C)  $-\frac{a}{b}$
- (D)  $-\frac{a}{d}$
14. If one of the zeroes of the cubic polynomial  $x^3 + ax^2 + bx + c$  is  $-1$ , then the product of the other two zeroes is :
- (A)  $a - b + 1$
- (B)  $a - b - 1$
- (C)  $b - a + 1$
- (D)  $b - a - 1$
15. If one of the zeroes of the quadratic polynomial  $(k - 1)x^2 + kx + 1$  is  $-3$ , then the value of  $k$  is :
- (A)  $\frac{2}{3}$
- (B)  $-\frac{2}{3}$
- (C)  $-\frac{4}{3}$
- (D)  $\frac{4}{3}$
16. If an  $n^{\text{th}}$  degree polynomial is divided by a  $m^{\text{th}}$  degree polynomial, then the possible degree of the quotient is :
- (A)  $m - n$

- (B)  $m+n$
- (C)  $mn$
- (D)  $n-m$
17. If  $\alpha$  and  $\beta$  are the zeroes of a quadratic polynomial  $x^2 + x - 2$  then the value of  $\left(\frac{1}{\alpha} - \frac{1}{\beta}\right)$  is:
- (A)  $\frac{2}{3}$  or  $\frac{-2}{3}$
- (B)  $\frac{3}{2}$  or  $\frac{-3}{2}$
- (C)  $\frac{5}{3}$  or  $\frac{-5}{3}$
- (D)  $\frac{3}{5}$  or  $\frac{-3}{5}$
18. The system of linear equations  $kx + y + 1 = 0$  and  $x + ky + 2 = 0$  has unique solution if:
- (A)  $k = -1$
- (B)  $k = 1$
- (C)  $k = 2$
- (D) None of the above
19. Which of the following will have no solution?
- (A) A system of consistent equations
- (B) A system of inconsistent equations
- (C) A system of dependent equations
- (D) All of the above
20. The value of  $c$ , for which the pair of equations  $cx - y = 2$  and  $6x - 2y - 4 = 0$  will have infinitely many solution, is:
- (A) 3
- (B) -3
- (C) -12
- (D) 12
21. In a cyclic quadrilateral PQRS,  $\angle P = (2x + 4)^\circ$ ,  $\angle Q = (y + 3)^\circ$ ,  $\angle R = (2y + 10)^\circ$  and  $\angle S = (4x - 5)^\circ$ . Then:
- (A)  $\angle P = 70^\circ$ ,  $\angle Q = 53^\circ$ ,  $\angle R = 110^\circ$ ,  $\angle S = 127^\circ$

- (B)  $\angle P = 70^\circ, \angle Q = 55^\circ, \angle R = 110^\circ,$   
 $\angle S = 125^\circ$
- (C)  $\angle P = 65^\circ, \angle Q = 53^\circ, \angle R = 115^\circ,$   
 $\angle S = 127^\circ$
- (D)  $\angle P = 65^\circ, \angle Q = 55^\circ, \angle R = 113^\circ,$   
 $\angle S = 127^\circ$
2. The quadratic equation  $ax^2 + bx + c = 0$  will have real and distinct roots if :
- (A)  $b^2 - 4ac < 0$
- (B)  $b^2 - 4ac > 0$
- (C)  $b^2 - 4ac = 0$
- (D) All of the above
3. The 5th term of an A. P. is 1 and the 11th term is  $-17$ . Which term of the A. P. is  $-77$  ?
- (A) 22<sup>nd</sup>
- (B) 31<sup>st</sup>
- (C) 44<sup>th</sup>
- (D) None of the above
24. Which of the following are in A. P. ?
- (A)  $2a - b, 2a, a + b, \dots$
- (B)  $a - b, a, a + b, \dots$
- (C)  $a - 2b, b, a + 2b, \dots$
- (D)  $a - b, 2a, a + b, \dots$
25. For what value of  $n$  are the  $n^{\text{th}}$  terms of two A. P.'s  $63, 65, 67, \dots$  and  $3, 10, 17, \dots$  equal ?
- (A) 11
- (B) 12
- (C) 13
- (D) 14
26. In an A. P., the first term is 22,  $n^{\text{th}}$  term is  $-11$  and sum of first  $n$  terms is 66. Then the common difference  $d$  is :
- (A)  $-1$
- (B)  $-2$
- (C)  $-3$
- (D)  $-4$

## T E C H O F W O R L D . I N I

27. A steel wire is in the form of a square. The same wire is bent in the form of a circle. Which of the following is correct ?
- (A) Area of the square = Area of the circle
- (B) Area of the square is less than the area of the circle
- (C) Area of the square is more than the area of the circle
- (D) None of the above
28. A steel wire is in the form of a circle of radius 28 cm. It is bent in the form of a square. The length of the side of the square is :  
 (take  $\pi = \frac{22}{7}$ )
- (A) 44 cm
- (B) 11 cm
- (C) 28 cm
- (D) None of the above
29. The perimeter of semi-circle of radius r unit is :
- (A)  $\pi r + r$
- (B)  $\pi r + 2r$
- (C)  $2\pi r + r$
- (D)  $2\pi r + 2r$
30. If an arc of a circle makes an angle of  $\theta < 180^\circ$  at the centre of a circle of radius r, then the length of the arc is :
- (A)  $\frac{2\pi r\theta}{360^\circ}$
- (B)  $\frac{\pi r^2\theta}{360^\circ}$
- (C)  $\frac{1}{2}r^2 \sin\theta$
- (D) None of the above
31. Area of the largest triangle that can be inscribed in a semi-circle of radius r unit is :
- (A)  $\frac{1}{2} r^2$  sq. unit



- (B)  $r^2$  sq. unit
- (C)  $2r^2$  sq. unit
- (D)  $\sqrt{2}r^2$  sq. unit
32. If  $r_1$  and  $r_2$  be radii of the two bases of a frustum of a cone of height 'h' and ' $\ell$ ' be its slant height, then its volume is :
- (A)  $\pi\ell(r_1 + r_2)h + \pi r_1^2 + \pi r_2^2$
- (B)  $\pi(r_1 + r_2)h \times \ell$
- (C)  $\frac{1}{3}\pi h(r_1^2 + r_2^2 + r_1 r_2)$
- (D)  $\frac{1}{3}\pi h(r_1^2 - r_2^2 - r_1 r_2)$
33. A cylindrical pencil sharpened at one edge is a combination of :
- (A) A hemisphere and a cylinder
- (B) A cone and a cylinder
- (C) A frustum of a cone and a cylinder
- (D) Two cylinders
34. A shuttle cock used for playing badminton has the shape, the combination of :
- (A) A sphere and a cone
- (B) A cylinder and a sphere
- (C) A frustum of a cone and a hemisphere
- (D) A cylinder and a hemisphere
35. In a circular cone, the cross-section made by a plane parallel to the base is a :
- (A) Frustum of a cone
- (B) Sphere
- (C) Circle
- (D) Hemisphere
36. The length of the side of largest cube that can be inscribed in a sphere of diameter 'd' is :
- (A)  $3d$
- (B)  $d/\sqrt{3}$

(C)  $d / \sqrt{2}$

(D)  $2d$

37. How many spherical lead shots each having diameter 3 cm can be made from a cuboidal solid of dimensions 9 cm × 11 cm × 12 cm ?

(take  $\pi = \frac{22}{7}$ )

(A) 81

(B) 82

(C) 83

(D) 84

38. If the mean of the distribution is 2.6 then the value of p is :

| x | f |
|---|---|
| 1 | 4 |
| 2 | 5 |
| 3 | 8 |
| 4 | p |
| 5 | 2 |

(A) 1

(B) 3

(C) 7

(D) 6

39. Which of the following is not a measure of central tendency ?

(A) Standard deviation

(B) Median

(C) Mean

(D) Mode

40. The cumulative frequency test is useful in finding the :

(A) Mean

(B) Mode

(C) Median

(D) None of the above

41. The formula  $\bar{x} = a + h \left[ \frac{\sum f_i x_i}{\sum f_i} \right]$  is

used to determine :

(A) Mean

- (B) Mode  
(C) Median  
(D) All of the above

42. Find the mode of the data :

| Marks   | No. of Students |
|---------|-----------------|
| 0 – 10  | 3               |
| 10 – 20 | 12              |
| 20 – 30 | 32              |
| 30 – 40 | 20              |
| 40 – 50 | 6               |

- (A) 24.25  
(B) 25.25  
(C) 26.25  
(D) 27.25

43. Which of the following cannot be the probability of an event ?

- (A)  $\frac{2}{3}$

- (B)  $-1.5$   
(C) 15%  
(D) 0.7

44. For an event if 'p' be the probability of the happening of the event and 'q' be the probability of not happening the event, then which one of the following is true ?

- (A) p is always greater than q  
(B)  $p + q = 1$   
(C) p is always less than q  
(D)  $p + q = 0$

45. When a die is thrown, the probability of getting an odd number less than 5 is :

- (A)  $\frac{1}{2}$   
(B)  $\frac{1}{3}$   
(C)  $\frac{2}{3}$   
(D)  $\frac{1}{6}$

46. A letter is chosen at random from English alphabet. Then the probability that the letter chosen precedes 'g' is :
- (A)  $\frac{1}{26}$
- (B)  $\frac{3}{13}$
- (C)  $\frac{5}{26}$
- (D)  $\frac{7}{26}$
47. What is the probability that two different friends have different birthdays ?  
(Ignoring leap year)
- (A)  $\frac{1}{365}$
- (B)  $\frac{2}{365}$
- (C)  $\frac{364}{365}$
- (D) 1
48. A box contains 3 blue, 2 white and 4 red marbles. If a marble is drawn at random from the box, what is the probability that it will not be a white marble ?
- (A)  $\frac{2}{9}$
- (B)  $\frac{7}{9}$
- (C)  $\frac{3}{9}$
- (D)  $\frac{4}{9}$
49. Two dice are thrown at the same time. What is the probability of getting different numbers on the dice ?
- (A)  $\frac{1}{36}$
- (B)  $\frac{1}{6}$
- (C)  $\frac{5}{6}$
- (D)  $\frac{35}{36}$



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50. From a group of 2 boys and 3 girls, two children are selected at random. Then the probability, such that at least one boy is selected, is :

(A)  $\frac{1}{5}$

(B)  $\frac{3}{5}$

(C)  $\frac{7}{10}$

(D)  $\frac{3}{10}$