Sample Paper- Mathematics

MM:75
Time:90 Min.

General Instructions

I. **All questions are compulsory and carry equal marks.**
II. **There will be negative marking for incorrect answer. One fourth marks will be deducted from the total marks scored.**
III. **There is only one correct answer, hence mark one choice only.**
IV. **Use of calculator is not permitted.**
V. **Total number of questions is 75.**
VI. **Answers are to be marked on OMR sheets only.**
VII. **Please remember, this is a compulsory exam so do not cheat or permit anybody to do so.**

1. **Which of the following has a non-terminating decimal expansion?**
(a) 77/210
(b) 23/8
(c) 17/8
(d) 35/50
2. **HCF of 84 and 270 is**
(a) 8
(b) 6
(c) 4
(d) 2
3. **If HCF if 60 and 168 is 12, what is the LCM**
(a) 480
(b) 240
(c) 420
(d) 840
4. **A rational number can be expressed as a terminating decimal if the denominator has factors**
(a) 2, 3 or 5
(b) 2 or 3
(c) 3 or 5
(d) 2 or 5
5. **Let x = p/q be a rational number such that prime factorization of q is NOT in the form of 2^n5^m, where m and n are non-negative integers. Then x has a decimal representation which is:**
(a) terminating
(b) Non-terminating, repeating
(c) Non-terminating, non-repeating
(d) None of these
6. **Which of the following is not an irrational number ?**
(a) $5 - \sqrt{3}$
(b) $5 + \sqrt{3}$
(c) $4 + \sqrt{2}$
(d) $5 + \sqrt{9}$
7. **The mathematician who gave the term '*algorithm*'?**
(a) Euclid
(b) Gold Bach
(c) Khwarizmi
(d) Gauss

8. **If cot A=12/5, then the value of (sin A + cos A) × cosec A is :**
   (a) 13/5
   (b) 17/5
   (c) 14/5
   (d) 1
9. **If sin θ = cos θ, then value of θ is**
   (a) 0°
   (b) 45°
   (c) 30°
   (d) 90°
10. **sin θ = 4/3 for some angle θ, is :**
   (a) true
   (b) false
   (c) may be true for certain cases
   (d) none of these
11. **The value of sin18°/cos72° is :**
   (a) 1
   (b) 0
   (c) –1
   (d) ½
12. **If sec θ + tan θ = x, then tan θ is:**
   (a) $(x^2 + 1)/x$
   (b) $(x^2 - 1)/x$
   (c) $(x^2 + 1)/2x$
   (d) $(x^2 - 1)/2x$
13. **$9\sec^2\theta - 9\tan^2\theta$ is equal to :**
   (a) 1
   (b) –1
   (c) 9
   (d) –9
14. **The value of [(cos A/cot A) + sin A] is:**
   (a) cot A
   (b) 2 sin A
   (c) 2 cos A
   (d) sec A
15. **if 5 tan θ = 4, then value of (5 sin θ - 4 cos θ)/(5 sin θ + 4 cos θ) is:**
   (a) 5/3
   (b) 0
   (c) 5/6
   (d) 1/6
16. **In sin 3θ = cos (θ – 26°), where 3θ and (θ – 26°) are acute angles, then value of θ is :**
   (a) 30°
   (b) 29°
   (c) 27°
   (d) 26°
17. **When a point is observed, the angle formed by the line of sight with the horizontal level where the point being viewed is above the horizontal plane is known as:**
   (a) angle of triangle
   (b) angle of depression
   (c) angle of elevation
   (d) none of these

18. When we lower our hand to look at the object, the angle formed by the line of sight with horizontal is known as:

(a) obtuse angle
(b) angle of elevation
(c) angle of depression
(d) acute angle

19. A pole 10 m high casts a shadow 10 m long on the ground, then the sun's elevation is?

(a) 60°
(b) 45°
(c) 30°
(d) 90°

20. A ladder is 10 m long. It touches a wall at height of 5 m. The angle θ made by it with the horizontal is:

(a) 90°
(b) 60°
(c) 45°
(d) 30°

21. The ratio of the length of a rod and its shadow is 1 :√3. The altitude of the sun is:

(a) 30°
(b) 45°
(c) 60°
(d) 90°

22. Find the zeroes of the quadratic polynomial $x^2 + 7x + 12$

a) 3, 4
b) -2, -5
c) -3, -4
d) 2, 5

23. Find a quadratic polynomial, the sum and product of whose zeroes are -7 and -2

a) $x^2 - 7x - 2$
b) $x^2 - 7x + 2$
c) $x^2 + 7x - 2$
d) $x^2 + 2x - 7$

24. Find a quadratic polynomial, the sum and product of whose zeroes are $-\frac{1}{4}, \frac{1}{4}$

a) $4x^2 - x + 1$
b) $4x^2 + x - 1$
c) $4x^2 + x + 1$
d) none of these

25. Find the quotient and remainder when the polynomial $x^4 - 3x^2 + 4x + 5$ is divided by $x^2 - x + 1$

a) $x^2 + x - 3$, 8
b) $x^2 - x + 3$, 7
c) $x^2 - x - 3$, 4
d) $x^2 + 2x + 3$, 6

26. Find P and q, if the zeroes of the polynomial $x^3 - 3x^2 + x + 1$ are p-q, p, p + q

a) $p = \pm\sqrt{2}, q = 1$
b) $p = \sqrt{2}, q = 2$
c) $p = 2, q = \sqrt{2}$
d) $p = 1, q = \pm\sqrt{2}$

27. If the quotient and remainder were 3y - 5 and 9y + 10, on dividing $3y^3 + y^2 + 2y + 5$ by g (y). Find g (y)

a) $y^2 - 2y + 1$
b) $y^2 + 2y + 1$
c) $y^2 - 2y - 1$
d) $2y^2 - 2y - 1$

28. **If two of the zeroes are $2+\sqrt{3}$ and $2-\sqrt{3}$. Find the other zeroes of $t^4 - 6t^3 - 26t^2 + 138t - 35$**
   a) 7 and 5
   b) 7 and - 5
   c) (-6, 7)
   d) (-5 and -7)
29. **Roots of the quadratic equation $3x^2 - 2\sqrt{6}x + 2 = 0$**
   a) $\sqrt{2/3}, \sqrt{2/3}$
   b) $\sqrt{3/2}, \sqrt{3/2}$
   c) $\sqrt{1/3}, \sqrt{1/3}$
   d) $\sqrt{4/3}, \sqrt{4/3}$
30. **Find two numbers whose sum is 24 and product is 143**
   a) 13, 11
   b) 12, 12
   c) 8, 16
   d) none of these
31. **Solve for x $\frac{x}{x+1} + \frac{x+1}{x} = \frac{34}{15}$**
   a) $3/2, -\frac{7}{2}$
   b) $9, 4/2$
   c) 4, 7
   d) $3/2, -5/2$
32. **Find the roots of the equation $\frac{1}{x+4} - \frac{1}{x-7} = \frac{11}{30}$, x - 4, 7**
   a) 1,2
   b) 2, 3
   c) 4, 7
   d) 1, 6
33. **Solve for x $\frac{4}{x} - 3 = \frac{5}{2x+3}$, x 0, - 3/2**
   a) 1,-2
   b) 1,2
   c) 4,3
   d) 4,6
34. **A motor boat whose speed is 18 km/hr in still water takes 1 hr more to go 24 km upstream than to return down stream to the same spot. Find the speed of the stream**
   a) 4 Km/hr
   b) 5 Km/hr
   c) 6 Km/hr
   d) 8 Km/hr
35. **Find the numbers such that their sum is 15 and sum of their reciprocal 3/10**
   a) 8,7
   b) 6,9
   c) 10,5
   d) 4,11
36. **An aeroplane takes 1 hour less for a journey of 1200 km if its speed increased by 100 km/hr from its usual speed. Find its usual speed**
   a) 280 Km/hr
   b) 290 Km/hr
   c) 270 Km/hr
   d) 300 Km/hr

37. The distance between Delhi and Aligarh is 192 km. Travelling by Kalka mail, it takes 48 minutes less than other train. Calculate the speed of Kalka mail if the speed of the two trains differ by 20 km/hr

a) 60 Km/hr
b) 80 Km/hr
c) 90 Km/hr
d) 100 Km/hr

38. One side of a rectangle exceeds its other side by 2 cm. If its area is 195 cm^2, determine the side of the rectangle

a) 13,15
b) 14,14
c) 20,8
d) 12,16

39. The diameter of a protractor is 14 cm. Its perimeter is

a) 29 cm
b) 22 cm
c) 36 cm
d) 58 cm

40. The minute hand of a clock is 21 cm. The distance travelled by tip of hour hand in 1 hour is = ___ cm.

a) 33
b) 22
c) 11
d) 132

41. If circumference of a circle increases from л to 4л then its area becomes _________

a) 4 times
b) 8 times
c) 16 times
d) 2 times

42. Perimeter a circle = perimeter of square. Ratio of their areas is

a) 22:7
b) 14:11
c) 7:22
d) 11:14

43. The radii of 2 circles are 7 cm and 14 cm respectively. The radius of a circle whose circumference is equal to circumferences of 2 given circles is

a) 28
b) 21
c) 14
d) 7

44. The middle term of an A.P. 1, 8, 15, 22, ..., 505 is:

a) 153
b) 252
c) 353
d) 453

45. If 5 times the 5^{th}term of an A.P. is equal to 10 times the 10^{th}term. Then, the 15^{th}term is:

a) 5
b) 10
c) 15
d) 0

46. The sum of all odd numbers between 0 and 100 is

a) 250
b) 2500
c) 50
d) 2550

47. For an A.P. if $a_{25} – a_{15}$= 170, then d =

a) 17
b) –17
c) 10
d) 34

48. The 18th and 11th terms of an A.P. are in ratio 3:2, then ratio 21st and 7th terms is

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

49. The distance of point P(– 3, – 4) from x axis is

a) 5
b) 4
c) 3
d) None of these

50. The value of r for which A(-5, 1), B(1, r) and C(4, -2) are collinear is

a) – 2
b) 2
c) 1
d) – a = b

51. The area of triangle formed by points A(2a, 0), O(0, 0) and C(0, 2b) is

a) 2ab
b) Ab
c) a^2
d) b^2

52. POQR is a rectangle whose three vertices are P(0, 12), O(0, 0) and Q(5, 0)

a) 13
b) 12
c) 5
d) 17

53. If points (1, 1), (r, 0) and (0,s) are collinear then 1/r+1/s =

a) – 1
b) 0
c) 1
d) 2

54. A number is chosen at random from numbers 1 to 15. The probability it is odd is

a) $\frac{8}{15}$
b) $\frac{7}{15}$
c) $\frac{2}{5}$
d) $\frac{8}{15}$

55. Three coins are tossed simultaneously. The probability of getting at most 2 heads is

a) $\frac{7}{8}$
b) $\frac{5}{8}$
c) $\frac{3}{8}$
d) $\frac{5}{6}$

56. From the letters of the word BATHINDA, a letter is chosen at random. The probability that letter chosen is a vowel is

a. $\frac{3}{8}$

b. $\frac{1}{8}$

c. $\frac{3}{7}$

d. $\frac{2}{7}$

57. In a throw of pair of dice, the probability of getting a doublet is

a) 1/6
b) 1/36
c) 5/36
d) 7/36

58. A card is drawn at random from a well shuffled deck of 52 playing cards. The probability of getting a king or a diamond is

a) $\frac{3}{13}$

b) $\frac{7}{26}$

c) $\frac{4}{13}$

d) $\frac{17}{52}$

59. The roots of quadratic equation $5x^2 - 4x + 5 = 0$ are

a) Real & Equal
b) Real & Unequal
c) Not Real
d) Real & Equal

60. The product of two successive positive integral multiples of 5 is 300. Then the numbers are

a) 25, 30
b) 10, 15
c) 30, 35
d) 15, 20

61. If one root of the equation $ax^2 + bx + c = 0$ is three times the other, then b^2: ac =

a) 16:1
b) 16:3
c) 3:16
d) 3:1

62. If sin θ and cos θ are the roots of the equation $ax^2 + bx + cx = 0$, then b^2

a) $a^2 - ac$
b) $a^2 - 2ac$
c) $a^2 + ac$
d) $a^2 + 2ac$

63. If $x^2(a^2 + b^2) + 2x\,(ac + bd) + (c^2 + d^2) = 0$ has no real root, then

a) ad = bc
b) ac = bd
c) ab = cd
d) ad ≠bc

64. Total surface area of a cube is 600 cm^2. Its volume is

a) 100cm^2
b) 1000cm^2
c) 400cm^2
d) 2000cm^2

65. **Surface area of a sphere is 5544 cm^2. Its diameter is ____ cm**
    a) 42
    b) 63
    c) 126
    d) 21
66. **A cone, cylinder and hemisphere stand on same base and have equal heights. The ratio of their volumes is**
    a) 1:2:3
    b) 1:3:2
    c) 2:1:3
    d) 2:3:1
67. **A right triangle with sides 3 cm, 4 cm and 5 cm is revolved along 3 cm side. The volume of solid generated is**
    a) 12л cm^2
    b) 8л cm^2
    c) 4л cm^2
    d) 16л cm^2
68. **A right circular cone is cut through a plane parallel parallel to its base and the upper part is removed. The left over part is called ______**
    a) Cone
    b) frustum of cone
    c) hemi sphere
    d) cylinder
69. **TP is tangent of length 12 cm from an external point T to a circle with r.If TO = 13 cm then r = ___ cm**
    a) 1
    b) 25
    c) 5
    d) 10
70. **The distance of point A(3, 4) from origin is**
    a) 3
    b) 4
    c) 5
    d) None of these
71. **A rhombus which is not a ______ cannot be inscribed in a circle.**
    a) Square
    b) Rectangle
    c) Parallelogram
    d) isosceles triangle
72. **The probability of 53 Sundays in a leap year is**
    a) 53/365
    b) 53/366
    c) 1/7
    d) 2/7
73. **Which of the following cannot be determined graphically**
    a) Mean
    b) Median
    c) Mode
    d) None of these
74. **If the mean of first N natural number is 15, then N is**
    a) 15
    b) 30
    c) 14
    d) 29

75. If the mode of a series exceeds its mean by 12, then mode exceeds the median by

a) 4
b) 8
c) 6
d) 10