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. **The decimal expansion of 141/120 will terminate after how many places of decimals ?**
   (a) 1
   (b) 2
   (c) 3
   (d) will not terminate
2. **If p, q are two consecutive natural numbers, then HCF(p, q) is:**
   (a) q
   (b) p
   (c) 1
   (d) pq
3. **How many prime factors are there in prime factorisation of 5005 ?**
   (a) 2
   (b) 4
   (c) 6
   (d) 7
4. **If p, q are two prime numbers, then LCM(p, q) is :**
   (a) 1
   (b) p
   (c) q
   (d) pq
5. **Euclid's division lemma states that for any two positive integer 'a' and 'b' there exists unique integers q and r such that a=bq+r where r must satisfy:**
   (a) $1 \leq r < b$
   (b) $0 < r \leq b$
   (c) $0 \leq r < b$
   (d) $0 < r < b$
6. **Which of the following numbers has terminating decimal expansion?**
   (a) 37/45
   (b) $21/(2^3 5^6)$
   (c) 17/49
   (d) $89/(2^2 3^2)$
7. **The decimal expansion of π**
   (a) is terminating.
   (b) is non-terminating and repeating
   (c) is non-terminating and non-repeating
   (d) None of these

8. **cos 1° × cos 2° × cos 3° × ... × cos 180° is equal to :**
   (a)1
   (b) 0
   (c) 1/2
   (d) –1
9. **Which of the following is correct some θ such that 0° ≤ θ < 90°**
   (a) 1/secθ > 1
   (b) 1/secθ < 1
   (c) secθ = 0
   (d) 1/cosθ < 1
10. **If sin θ = cos θ, then the value of cosec θ is :**
   (a) 2
   (b) 1
   (c) 2/√3
   (d) √2
11. **Given that sin A=1/2 and cos B=1/√2 then the value of (A + B) is:**
   (a) 30°
   (b) 45°
   (c) 75°
   (d) 15°
12. **If sec θ – tan θ = 1/3, the value of (sec θ + tan θ)**
   (a) 1
   (b) 2
   (c) 3
   (d) 4
13. **The value of tan 1°.tan 2°.tan 3° ... tan 89° is :**
   (a) 0
   (b) 1
   (c) 2
   (d) ½
14. **If tan 2A = cot (A – 18°), then the value of A is:**
   (a) 18°
   (b) 36°
   (c) 24°
   (d) 27°
15. **If cos 3θ = √3/2; 0 < θ < 20°, then the value of θ is :**
   (a) 15°
   (b) 10°
   (c) 0°
   (d) 12°
16. **sin (60° + θ) – cos (30° – θ) is equal to :**
   (a) 2 cos θ
   (b) 2 sin θ
   (c) 0
   (d) 1
17. **When we raise 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

18. **When the length of the shadow of a pillar is equal to its height, the elevation at source of sight is:**
    (a) 30°
    (b) 45°
    (c) 60°
    (d) 90°
19. **The angle of depression from the top of a tower 12 m high, at a point on the ground is 30°. The distance of the point from the top of the tower is:**
    (a) 12 m
    (b) 4√3 m
    (c) 12√3 m
    (d) 24 m
20. **If the angle of depression of an object from a 75 m high tower is 30°, then the distance of the object from the base of tower is:**
    (a) 25√3 m
    (b) 50√3 m
    (c) 75√3 m
    (d) 150 m
21. **The tops of two poles of height 10m and 18m are connected with wire. If wire makes an angle of 30° with horizontal, then length of wire is:**
    (a) 10 m
    (b) 12 m
    (c) 16 m
    (d) 18 m
22. **Find the zeroes of the polynomial $x^2 - 17$**
    a) $\sqrt{17}, -\sqrt{17}$
    b) $\sqrt{3}, -\sqrt{3}$
    c) $\sqrt{19}, -\sqrt{19}$
    d) none of these
23. **Find a cubic polynomial when the zeroes are 3, -1, -1/3**
    a) $3x^3 - 5x^2 - 11x - 3$
    b) $3x^3 + 5x^2 + 11x - 3$
    c) $3x^3 - 5x^2 + 11x + 3$
    d) none of these
24. **Find all the zeroes of $2x^4 - 3x^3 - 3x^2 + 6x - 2$ if two of its zeroes are and $\sqrt{2}$ $-\sqrt{2}$**
    a) $\sqrt{2}, -\sqrt{2}, 1, \frac{-1}{2}$
    b) $\sqrt{2}, -\sqrt{2}, -1, \frac{-1}{2}$
    c) $\sqrt{2}, -\sqrt{2}, 2, \frac{1}{2}$
    d) $\sqrt{2}, -\sqrt{2}, \frac{1}{2}, 1$
25. **The quotient and remainder are x - 2 and -2x + 4 respectively. If the polynomial $x^3 - 3x^2 + x + 2$ is divided by g(x). Find g(x)**
    a) $x^2 + x + 1$
    b) $x^2 - x - 1$
    c) $x^2 - x + 1$
    d) none of these
26. **Find a quadratic polynomial whose zeroes are** $\frac{7+\sqrt{9}}{2}$ and $\frac{7-\sqrt{9}}{2}$
    a) $x^2 - 7x + 10$
    b) $x^2 + 7x + 10$
    c) $x^2 - 7x - 10$
    d) $x^2 + 7x - 10$

27. **Find the zeroes of the quadratic polynomial $x^2 + 19x + 90$**
    a) -9, -10
    b) 9, 10
    c) 4, 5
    d) -4, -5
28. **If p and q are the zeroes of the polynomial $x^2 - 5x - k$. Such that p - q = 1, find the value of K**
    a) 6
    b) 7
    c) 8
    d) 9
29. **Find the value of a so that -2 is a root of $2x^2 - x + a = 0$**
    a) 10
    b) -10
    c) 9
    d) -9
30. **If p and q are the zeroes of the polynomial $x^2 + px + q = 0$, then**
    a) p=1
    b) p=1 or 0
    c) p=2
    d) p=2 or 0

31. **The hypotenuse of a right angled triangle is 6 cm more than twice the shortest side. If the third side is 2 cm less than the hypotenuse. Find the side of the triangle**
    a) 10, 24, 26
    b) 4, 6, 8
    c) 3, 4, 5
    d) 5, 12, 13
32. **Find two consecutive odd positive integers, sum of whose squares is 290**
    a) 13,15
    b) 11,13
    c) 7,9
    d) 5,7
33. **Solve for x** $\frac{2x-3}{x-1}+1=\frac{6x^2-x-3}{x-1}$
    a) -1/3
    b) 2/3
    c) 1,-1/3
    d) 1/3,-1
34. **A rectangular park has perimeter 80 m and area 400 m^2. Find its length and breadth**
    a) 40, 10
    b) 20, 20
    c) 16, 25
    d) none of these
35. **A train covers a distance of 300 km at a certain average speed. If its speed were decreased by 10 km/hr, the Journey would take 1 hour' longer. What is average speed of the train?**
    a) 40 km/hr
    b) 50 km/hr
    c) 45 km/hr
    d) 60 km/hr

36. There are three consecutive positive integers such that the sum of the square of the first and the product of the other two is 154. What are the integers

a) 6, 7, 8
b) 7, 8, 9
c) 8, 9, 10
d) 9, 10, 11

37. Solve for y $y^2 + y\sqrt{2} - 3 = 0$

a) -2, 6
b) -2, 3/2
c) 2, 3/2
d) 3, 4

38. Circumference of a circle is numerically equal to area. Its diameter = ___ cm.

a) 2
b) 4
c) 8
d) 3

39. Area of region between two concentric circles of radii 28 cm and 35 cm = ____ cm^2

a) 1386
b) 3850
c) 1836
d) 2464

40. Area of the largest triangle that can be inscribed in a semicircle of radius 2r cm is

a) $4r^2\ cm^2$
b) $2r^2\ cm^2$
c) $r^2\ cm^2$
d) $8r^2\ cm^2$

41. The circumference of a circle exceeds its diameter by 180 cm. Then its radius is

a) 32 cm
b) 36 cm
c) 40 cm
d) 42 cm

42. If 18, a, b, – 3 are in A. P., then a + b =

a) 12
b) 15
c) 11
d) 16

43. The 11^{th} term from the end of the A.P. 3, 8, 13, ..., 253 is

a) 203
b) 303
c) 153
d) - 303

44. The sum of first 10 multiples of 3 is

a) 165
b) 160
c) 170
d) None of these

45. The famous mathematician associated with finding the sum of first 100 natural numbers is

a) Bhaskar
b) Newton
c) Eulid
d) Gauss

46. Sum of 4 terms of an A.P. is and the greatest and smallest terms are in ratio 4:1. Then the greatest term is

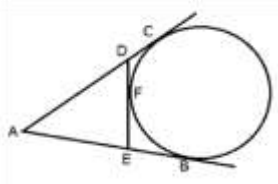
a) 22
b) 15
c) 18
d) 20

47. Quadrilateral ABCD circumscribes a circle of radius r. AB = 4 cm, BC = 5 cm, CD = 6 cm. DA = ___ cm.

a) 5.5
b) 4
c) 6
d) 5

48. In figure if AD = 6.5 cm, DE = 5.5 cm and EA = 8 cm then AC = ___ cm.

a) 10
b) 20
c) 15
d) 8



49. 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

50. A rhombus which is not a _____ cannot be inscribed in a circle.

a) Square
b) Rectangle
c) Parallelogram
d) isosceles triangle

51. The coordinates of centroid of triangle vertices A(3, 4), B(6, 7) and C(9, 13) are

a) (6, 8)
b) (8, 6)
c) (8, 8)
d) (6, 6)

52. The points A(1, 2) and B(r, s) are collinear with origin then

a) a = b
b) a = 2b
c) 2a = b
d) - 303

53. The distance of point A(3, 4) from origin is

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

54. The perimeter with vertices (0, 0), (9, 0) and (0, 40) is

a) 90
b) 49
c) 41
d) none of these

55. Three vertices of a parallelogram in order are (-1, 2), (2, -1), (3, 1). The fourth vertex is

a) (0, 4)
b) (4, 0)
c) (2, 2)
d) none of these

56. Two coins are tossed simultaneously. The probability of getting at least one head is

a) 1/3
b) 1/2
c) 1/4
d) 2/3

57. The probability of 53 Sundays in a leap year is

a) 53/365
b) 53/366
c) 1/7
d) 2/7

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

a) 2/13
b) 3/26
c) 1/13
d) 7/52

59. A card is drawn at random from a well shuffled deck of 52 playing cards. The probability of getting a non face card is

a) 9/13
b) 4/13
c) 3/13
d) 10/13

60. The positive root of $\sqrt{3x\,6^2 + = 9}$ is:

a) 3
b) 5
c) 4
d) 7

61. $(x^2 + 1)^2 - x^2 = 0$ has

a) 4 real roots
b) 2 real roots
c) 1 real roots
d) no real roots

62. For what value of r the quadratic equation $r\,x^2 + 4x - 4 = 0$ has real roots.

a) $r \geq -1$
b) $r \leq -1$
c) $r \geq 1$
d) $r \leq 1$

63. If the one root of the equation $4x^2 - 2x + (r - 4) = 0$ be the reciprocal of the other, then r =

a) 8
b) -8
c) 4
d) -4

64. **The cubes of side 3 cm which can be cut from a cube of side 6 cm is**
    a) 2
    b) 4
    c) 8
    d) 3
65. **The radii of two cylinders are in ratio 2:3 and their are in ratio 3:2. Ratio of their volumes is**
    a) 4:9
    b) 9:4
    c) 3:2
    d) 2:3
66. **The ratio of volumes of two spheres is 8:27, the ratio of their surface areas is**
    a) 4:9
    b) 9:4
    c) 2:3
    d) 3:2
67. **A solid is converted from one shape to another. The volume will _____**
    a) Increase
    b) remain same
    c) decrease
    d) none of these
68. **Two cubes of volume 125 cm^3 each is joined end to end. The surface are of resultant solid is _____ cm^2**
    a) 125
    b) 450
    c) 250
    d) 62.5
69. **The roots of quadratic equation $5x^2 – 4x + 5 = 0$ are**
    a) Real & Equal
    b) Real & Unequal
    c) Not Real
    d) Real & Equal
70. **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
71. **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
72. **Surface area of a sphere is 5544 cm^2. Its diameter is ____ cm**
    a) 42
    b) 63
    c) 126
    d) 21
73. **Which of the following is not a measure of central tendency**
    a) Mean
    b) Median
    c) Mode
    d) Standard Deviation

74. 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

75. If mean of 6, 7,X,8,Y,14 is 9, then

a) X+Y=21
b) X+Y=19
c) X-Y=19
d) X-Y=21