07. QUADRATIC EQUATIONS

Physics is mathematical not because we know so much about the physical world, but because we know so little; it is only its mathematical properties that we can discover.

Q01. The general form of a quadratic equation is:
(a) $ax^2 + bx + c$ (b) $ax^2 + bx + c = 0$ (c) $a^2x + b$ (d) $ax^2 + bx + c = 0,\ a \neq 0$

Q02. The number of possible solutions of a quadratic equation are:
(a) exactly two (b) at most two (c) at least two (d) None of these

Q03. The discriminant of the equation $bx^2 + ax + c = 0,\ b \neq 0$ is given by:
(a) $\sqrt{b^2 - 4ac}$ (b) $\sqrt{a^2 + 4bc}$ (c) $\sqrt{a^2 - 4bc}$ (d) $\sqrt{b^2 + 4ac}$

Q04. If the roots of a quadratic equation are equal, then the discriminant is:
(a) 1 (b) 0 (c) greater than 0 (d) less than 0

Q05. The roots of $3x^2 - 7x + 4 = 0$ are:
(a) rationals (b) irrationals (c) positive integers (d) negative integers

Q06. The roots of equation $x + \frac{16}{x} = 10$ are:
(a) 4, 6 (b) 4, 4 (c) 4, 5 (d) 2, 8

Q07. If α, β are the roots of $x^2 + px + q = 0$, then the value of $\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$ is:
(a) $(p^2 - 2q)/q$ (b) $(2q - p^2)/q$ (c) $(p^2 + 2q)/q$ (d) None of these

Q08. If the roots of $ax^2 + bx + c = 0$ be equal, then the value of c is:
(a) $-b/2a$ (b) $b/2a$ (c) $-b^2/4a$ (d) $b^2/4a$

Q09. If the sum of the roots of an equation is 6 and one root is $3 - \sqrt{5}$, then the equation is:
(a) $x^2 - 6x + 4 = 0$ (b) $x^2 - 4x + 6 = 0$ (c) $x^2 - 6x + 5 = 0$ (d) None of these

Q10. If α, β be the roots of $ax^2 + bx + c = 0$, then value of $\alpha^2 + \beta^2$ is:
(a) $(b^2 - 2ac)/2a$ (b) $(b^2 - 4ac)/2a$ (c) $(b^2 - 2ac)/a^2$ (d) $(b^2 + 4ac)/2ac$

Q11. The quadratic equation whose roots are a, $1/a$ is:
(a) $ax^2 - (a^2 + 1)x + a = 0$ (b) $ax^2 - (a^2 - 1)x + a = 0$
(c) $ax^2 - (a^2 - 1)x - a = 0$ (d) None of these

Q12. The sum of the age of a son and his father is 35years and the product is 150. Their ages are:
(a) 15years, 20years (b) 15years, 10years (c) 5years, 30years (d) 6years, 30years

Q13. A train travels 360km at a uniform speed. If the speed had been 5km/h more, it would have taken 1hour less for the same journey. The speed of the train is:
(a) 30km/h (b) 35km/h (c) 12km/h (d) 40km/h

Q14. The value of x on solving $\frac{x}{x-1} + \frac{x-1}{x} = 2\frac{1}{2}$ will be:
(a) –2, 1 (b) –2, –1 (c) 2, –1 (d) None of these

Q15. What is the sum of the roots of the equation $x(3x + 8) = 3$?
(a) 8/3 (b) –8/3 (c) 8 (d) 3

Q16. The roots of the equation $\sqrt{2x + 9} + x = 13$ are:
(a) 8, –20 (b) 20, –8 (c) –20, –8 (d) 20, 8

Q17. The values of x on solving $15x + \frac{3}{x} = 18$ are:
(a) 5, 1 (b) 2/5, 1/2 (c) 2, 3 (d) 1, 1/5

Q18. If $\sqrt{x - 7} + \sqrt{x - 3} = 2$ then the value of x is:
(a) 9 (b) 7 (c) 19 (d) 3

Q19. If $\frac{x}{2}+\frac{6}{x}=4$, then the value of x are:
(a) –6 and –2 (b) +6 and –2 (c) –6 and 2 (d) 6 and 2

Q20. If the sum of squares of two consecutive even numbers is 100, then the numbers are:
(a) 4 and 6 (b) 8 and 10 (c) 10 and 12 (d) None of these

Q21. The nature of the roots of quadratic equation $x^2-8x+12=0$ is:
(a) real and equal (b) real and unequal (c) doesn't exist (d) can't say

Q22. If α and β are the roots of $ax^2+bx+c=0$, then value of $\alpha^2+\beta^2+2\alpha\beta$ is:
(a) a^2/b^2 (b) b^2/a^2 (c) $-b^2/a^2$ (d) Data insufficient

Q23. Sum of the areas of two squares is $468m^2$. If the difference of their perimeter is 24m, find the sides of the two squares:
(a) 18m, 14m (b) 13m, 12m (c) 18m, 12m (d) None of these

Q24. If $\frac{x}{16}-\frac{4}{x}=0$, then x is:
(a) ± 3 (b) ± 8 (c) ± 16 (d) ± 4

Q25. If $x^2+y^2=17$ and $xy=4$ then the value of $\frac{x}{y}+\frac{y}{x}$ is:
(a) 4/17 (b) 17/4 (c) 5/4 (d) None of these

Q26. Sum of a number and its reciprocal is 17/4, the number is
(a) 4 (b) 1/4 (c) 5 (d) options (a) and (b) both

Q27. Sum of the squares of two consecutive natural numbers is 221 then, the numbers are:
(a) 9, 10 (b) 10, 11 (c) 11, 12 (d) 12, 13

Q28. If α and β are the roots of equation $2x^2-5x+3=0$ then $\alpha^2\beta+\beta^2\alpha$ =…...?
(a) 5/2 (b) 15/4 (c) 3/2 (d) –15/4

Q29. Product of the age of a child five years ago with his age nine years after is 15. His present age is:
(a) 4 years (b) 6 years (c) 5 years (d) None of these

Q30. If usual speed of a passenger train is increased by 5km/h then, it takes 2hour less in covering the distance of 300km. Its usual speed is:
(a) 25km/h (b) 20km/h (c) 30km/h (d) None of these

Q31. Which of the following is not a quadratic equation:
(a) $3x-\frac{5}{x}=x^2$ (b) $3-x^2-8x=0$ (c) $x+\frac{1}{x}=8$ (d) $x^2-3=4x^2-4x$

Q32. The equation which is not a quadratic equation in the followings is:
A. $x-\frac{3}{x}=3$ B. $x+\frac{1}{x}=3$ C. $3x+\frac{3}{x}=x^2$ D. $3x^2-1=4x^2-4x$

Q33. The value of k for which the equation $2x^2+8kx+8=0$ has equal roots is:
A. Only 3 B. Only –3 C. ±3 D. ±1

Q34. The value of k for which $x=-2$ is a root of the equation $kx^2+x-6=0$:
A. $-\frac{3}{2}$ B. –1 C. –2 D. 2

Q35. The value of p so that the quadratic equation $x^2+5px+16=0$ has no real roots:
A. $p>8$ B. $p<5$ C. $-\frac{8}{5}<p<\frac{8}{5}$ D. $-\frac{8}{5}\le p<0$

Q36. If $px^2+3x+q=0$ has two roots $x=-1$ and $x=-2$, the value of $q-p$ is:
A. –1 B. 1 C. 2 D. –2

Q37. The common root of the equations $x^2-3x+2=0$ and $2x^2-5x+2=0$ is:
A. $x=2$ B. $x=1$ C. $x=-2$ D. $x=\frac{1}{2}$

Q38. If $x^2 - 5x + 1 = 0$, the value of $\left(x + \frac{1}{x}\right)$ is:

A. –2 B. –5 C. 5 D. 3

Q39. If $a - 3 = \frac{10}{a}$, the values of a are:

A. 5, 0 B. 5, 2 C. –5, 2 D. 5, –2

Q40. If roots of the equation $kx^2 + (a+b)x + ab = 0$ are –1 and –b, the value of k is:

A. –1 B. 1 C. 2 D. –2

Q41. The quadratic equation with real coefficients whose one root is $2 + \sqrt{3}$ is:

A. $x^2 - 2x + 1 = 0$ B. $x^2 - 4x + 1 = 0$ C. $x^2 - 4x + 3 = 0$ D. $x^2 - 4x + 4 = 0$

Q42. The difference of roots of the quadratic equation $x^2 + kx + 12 = 0$ is 1, the positive value of k is:

A. –7 B. 7 C. 4 D. 8

Q43. If 2, 3 are the roots of $x^2 + px + q = 0$, then the values of p and q are:

A. –5, 6 B. 6, 5 C. –6, 5 D. –5, –6

Q44. The nature of the roots of $x^2 - 4x + 1 = 0$ is:

A. real roots B. no real roots C. real & equal roots D. None of these

08. ARITHMETIC PROGRESSION

Anyone who cannot cope with mathematics is not fully human. At best he is a tolerable subhuman who has learnt to wear shoes, bath, and not make messes in the house.

Q01. If a, b, c are in AP, then:
(a) $2b = a+c$ (b) $2c = b+a$ (c) $c = (a+b)/2$ (d) $a+c = b$

Q02. Next term of the AP: 9, 11, 13, 15, … is:
(a) 20 (b) 17 (c) 18 (d) 19

Q03. The sum of 6^{th} and 7^{th} terms of an AP is 39 and the common difference is 3, then the first term of AP is:
(a) 2 (b) –3 (c) 4 (d) 3

Q04. The sum of three numbers in AP is 30. If the greatest is 13 then, its common difference is:
(a) 2 (b) 4 (c) 5 (d) 3

Q05. The 9^{th} term from the end of the AP, 7, 11, 15, …, 147 is:
(a) 135 (b) 125 (c) 115 (d) 110

Q06. The sum of first 10 natural numbers is:
(a) 50 (b) 60 (c) 55 (d) 65

Q07. The common difference of the AP: $8\frac{1}{8}, 8\frac{2}{8}, 8\frac{3}{8}, \ldots$ is:
(a) $\frac{1}{8}$ (b) $1\frac{1}{8}$ (c) $8\frac{1}{8}$ (d) 1

Q08. How many natural numbers up to 300 are divisible by 17?
(a) 13 (b) 15 (c) 17 (d) 19

Q09. The sum of first n natural number is:
(a) $0.5n(n+1)$ (b) $n^2/2$ (c) $(n+2)$ (d) $0.5+(n+1)$

Q10. The fifteenth term of the AP: –23, –19, –15, … is:
(a) 30 (b) 31 (c) 32 (d) 33

Q11. The first negative term of the AP: 81/5, 77/5, 73/5, … is:
(a) 23 (b) 20 (c) 21 (d) 22

Q12. The sum of n terms of an AP is $n^2–n$, then the nth term will be:
(a) $2n$ (b) $2n–1$ (c) $2n–2$ (d) $2n–4$

Q13. If 1^{st} and 6^{th} terms of an AP are –12 and 8 and, sum of n terms is 120, then the number of terms is:
(a) 10 (b) 11 (c) 12 (d) 13

Q14. Which term of the AP: 21, 18, 15, … is –78?
(a) 5^{th} (b) 53^{rd} (c) 37^{th} (d) 34^{th}

Q15. How many two-digit numbers are divisible by 3?
(a) 23 (b) 25 (c) 30 (d) 33

Q16. How many terms of the A.P.: 9, 17, 25, … must taken to give a sum of 636?
(a) 13 (b) 14 (c) 12 (d) 15

Q17. The sum of the first 25 terms of an AP whose n^{th} term is given by $t_n = 2–3n$, is:
(a) 925 (b) –925 (c) 875 (d) None of these

Q18. If $2x$, $(x+10)$ and $(3x+2)$ are in AP then x =……?
(a) 4 (b) 5 (c) 6 (d) 8

Q19. The first term of an arithmetic progression is 6 and its common difference is 5. The 8^{th} term is:
(a) 5 (b) 41 (c) 46 (d) None of these

Q20. In an AP if m times the m^{th} term is equal to n times the n^{th} term, then $(m+n)^{th}$ term is:
(a) 0 (b) 1 (c) 2 (d) 3

Q21. If 1^{st} term of an AP is m and common difference is n, then the tenth term is:
(a) $m+10n$ (b) $m+9n$ (c) $m–9n$ (d) $2m+9$

Q22. The 10^{th} term of the A.P. 2, 7, 12, … is:

(a) 47 (b) 74 (c) 37 (d) 43

Q23. Which term of the A.P. 21, 18, 15, … is –81?
(a) 27 (b) 23 (c) 35 (d) None of these

Q24. How many two digit numbers are divisible by 3?
(a) 25 (b) 30 (c) 37 (d) None of these

Q25. What is the 11^{th} term from last term of the AP, 10, 7, 4, …, –62?
(a) –36 (b) –26 (c) –32 (d) –11

Q26. The sum of first 24 terms of the list of numbers whose n^{th} term is $a_n = 3 + 2n$:
(a) 642 (b) 6420 (c) 672 (d) None of these

Q27. If $(p+1)$, $3p$, $(4p + 2)$ are in arithmetic progression then the value of p will be:
(a) 1 (b) 2 (c) 3 (d) 4

Q28. If $\frac{a^{n+1} + b^{n+1}}{a^n + b^n}$ is the arithmetic mean between 'a' and 'b', then value of n will be:
(a) 0 (b) 1 (c) –1 (d) Can't be determined

Q29. The sum of all even numbers between 100 and 200 will be:
(a) 5640 (b) 7350 (c) 6750 (d) None of these

Q30. The common difference of the AP whose general term is $a_n = 2n + 1$ is:
A. 1 B. 2 C. –2 D. –1

Q31. The number of terms in 2, 5, 8, …, 59 is:
A. 12 B. 19 C. 20 D. 25

Q32. The first positive term of the AP –11, –8, –5, … is:
A. –2 B. 1 C. –4 D. 3

Q33. The 4^{th} term from the end of the AP given as 2, 5, 8, …, 35 is:
A. 29 B. 26 C. 23 D. 32

Q34. The 11^{th} and 13^{th} terms of an AP are 35 and 41 respectively. Its common difference is:
A. 38 B. 32 C. 6 D. 3

Q35. The next term of the AP, $\sqrt{8}, \sqrt{18}, \sqrt{32}, \ldots$ is:
A. $5\sqrt{2}$ B. $2\sqrt{5}$ C. $3\sqrt{3}$ D. $5\sqrt{3}$

Q36. If for an AP, $a_5 + a_{25} = 56$, then a_{15} is:
A. 28 B. 82 C. 76 D. 67

Q37. Which of the following is not an AP?
A. 1, 4, 7, … B. –5, –2, 1, … C. 3, 7, 12, 18, … D. 11, 14, 17, 20, …

Q38. The sum of the first 20 odd natural numbers is:
A. 281 B. 285 C. 400 D. 421

Q39. The sum of first 20 natural numbers is:
A. 110 B. 170 C. 190 D. 210

Q40. The sum of first 10 multiples of 7 is:
A. 315 B. 371 C. 385 D. 406

Q41. The sum of the AP represented by 3, 7, 11, … is 210. The number of terms in this AP is:
A. 10 B. 12 C. 15 D. 22

Q42. The 30^{th} term of AP, 10, 7, 4, …, is:
(a) 97 (b) 7 (c) –77 (d) –97

Q43. 11^{th} term of AP, –3, –1/2, 2, …, is:
(a) 28 (b) 22 (c) –38 (d) –28

Q44. Which term of AP, 3, 10, 17,… will be 84 more than its 13^{th} term?
(a) t_{25} (b) t_{24} (c) t_{22} (d) t_{26}

Q45. What is the sum of first n odd natural numbers?
(a) n^2–1 (b) n^2 (c) n^2–2 (d) None of these

Q46. The sum of n terms of an AP is $2n^2+3n$. The sum of its first 10 terms is:
(a) 230 (b) 320 (c) 420 (d) 240

Q47. In an AP, the 3^{rd} term is 4 times its 1^{st} term and 6^{th} term is 17. The first term is:
(a) 2 (b) 5 (c) 8 (d) 11

Q48. The sum of first n natural numbers is:
(a) $n(n+1)/2$ (b) $n(n^2+1)/2$ (c) $n+1$ (d) n^2

Q49. If $t_{10} - t_5 = 200$ then the common difference is:
(a) 30 (b) 40 (c) 50 (d) 60

Q50. How many 2 digit numbers are divisible by 5?
(a) 18 (b) 19 (c) 21 (d) 22

Q51. If the sides of a right angled triangle are in AP, then they will be equal to:
(a) 2, 4, 5 (b) 3, 4, 5 (c) 1, 2, 3 (d) 2, 3, 5

Q52. The sum of first 9 natural numbers is:
(a) 54 (b) 45 (c) 90 (d) 55

Q53. The sum of all the numbers between 1 and 1000, which are divisible by 5 but not by 2, is:
(a) 101100 (b) 50050 (c) 50000 (d) 10100

Q54. An arithmetic progression is such that the sum of first 8 numbers is –100 and the c.d. is 1. For what value of n would the sum of first n numbers be –100 again?
(a) 25 (b) 30 (c) 24 (d) There is no such $n = 8$

Q55. The sum to 100 terms of (1–2+3– 4+5 – …) is:
(a) –500 (b) –50 (c) –100 (d) –1000

09. COORDINATE GEOMETRY

The essence of mathematics is not to make simple things complicated,
but to make complicated things simple.

Q01. P is a point on X-axis at a distance of 3units from Y-axis to its left. The coordinates of P are:
(a) (3, 0) (b) (0, 3) (c) (–3, 0) (d) (0, –3)

Q02. The coordinates of the point where line $\frac{x}{a}+\frac{y}{b}=7$ intersects Y-axis are:
(a) (a, 0) (b) (0, b) (c) (0, 7b) (d) (7a, 0)

Q03. The area of the triangle OAB, the coordinates of the points A(4, 0), B(0, –7) and O is origin, is:
(a) 11sq.units (b) 18sq.units (c) 28sq.units (d) None of these

Q04. The line $\frac{x}{2}+\frac{y}{4}=1$ intersects the axes at P and Q, the coordinates of the midpoint of PQ are:
(a) (1, 2) (b) (2, 0) (c) (0, 4) (d) (2, 1)

Q05. The distance between the lines $2x+4=0$ and $x-5=0$, is:
(a) 9units (b) 1unit (c) 5units (d) 7units

Q06. The distance between the points $\left(5\cos 35^\circ, 0\right)$ and $\left(0, 5\cos 55^\circ\right)$ is:
(a) 10units (b) 1unit (c) 5units (d) 2units

Q07. If a is any positive integer such that the distance between the points P(a, 2) and Q(3, –6) is 10units, then the value of a is:
(a) –3 (b) 6 (c) 9 (d) 3

Q08. The perimeter of triangle formed by the points (0, 0), (2, 0) and (0, 2) is:
(a) 4units (b) 6units (c) $6\sqrt{2}$ units (d) $4+2\sqrt{2}$ units

Q09. The points (1, 2), (–5, 6) and (a, –2) are collinear only if a = _____:
(a) –3 (b) 7 (c) 2 (d) 5

Q10. The two points of line segment are (a, b) and (–a, –b), then the length of the line is:
(a) $\sqrt{a^2+b^2}$ (b) $2\sqrt{a^2+b^2}$ (c) $\frac{2}{3}\sqrt{a^2+b^2}$ (d) None of these

Q11. If the points (a, 0), (0, b) and (1, 1) are collinear, then:
(a) $a^2+b^2=ab$ (b) $a+b=ab$ (c) $a+b=a^2b^2$ (d) All these are false

Q12. The point on the x-axis which is equidistant from (2, –5) and (–2, 9) is:
(a) (–7, 0) (b) (–5, 0) (c) (–6, 0) (d) (–7, 1)

Q13. The coordinate of a general point on x-axis is of the form:
(a) (x,0) (b) (0, x) (c) (x, y) (d) None of these

Q14. If the points A(6, 1), B(8, 2), C(9, 4) and D(p,3) are vertices of a parallelogram , taken in order, then the value of p is:
(a) 7 (b) 9 (c) 5 (d) 8

Q15. In what ratio is the segment joining the points A(6, 3) and B(–2, –5) divided by the x-axis?
(a) 3:2 (b) 3:5 (c) 2:3 (d) 2:5

Q16. The distance between the points (3, 7) and (8, 9) is:
(a) 11units (b) 12units (c) $\sqrt{29}$ units (d) Can't be found

Q17. The distance between (tanα, 0) and (0, 1) is:
(a) $\sec^2\alpha$ (b) $\cot^2\alpha$ (c) $\sec\alpha$ (d) $\cot\alpha$

Q18. The ratio in which the line joining the points (5, 3) and (–1, 6) is divided by y-axis is:
(a) 5:3 (b) 2:3 (c) 4:5 (d) 5:1

Q19. The centroid of a triangle with two vertices (3, –10), (–1, –9) is (2, –4). The co-ordinates of the third vertex are:
(a) (–4, –7) (b) (4, –7) (c) (4, 7) (d) (7, 4)

Q20. The distance of the point (2, 3) from the x-axis is:
A. 2units B. 3units C. 4units D. 5units

Q21. The distance of (–6, 8) from the origin is:
A. 8units B. 27units C. 10units D. 6units

Q22. AOBC is a rectangle whose three vertices are A(0, 3), O(0, 0) and B(5, 0). Square of the length of its diagonal is:
A. 5units B. 3units C. 34units D. 4units

Q23. The perimeter of a triangle with vertices (0, 4), (0, 0) and (3, 0) is:
A. 5units B. 12units C. 11units D. 10units

Q24. The points (–4, 0), (4, 0) and (0, 3) are the vertices of a:
A. Right triangle B. Isosceles triangle C. Equilateral triangle D. Scalene triangle

Q25. Point on x-axis has coordinates:
A. $(a, 0)$ B. $(0, a)$ C. $(-a, a)$ D. $(a, -a)$

Q26. If the points $(1, x)$, (5, 2) and (9, 5) are collinear then value of x is:
A. 5/2 B. –5/2 C. –1 D. 1

Q27. The end points of diameter of circles are (2, 4) and (–3, –1). Its radius is:
A. $\frac{5\sqrt{2}}{2}$ units B. $5\sqrt{2}$ units C. $3\sqrt{2}$ units D. $\pm\frac{5\sqrt{2}}{2}$ units

Q28. The ratio in which x-axis divides the line segment joining the points (5, 4) and (2, –3) is:
A. 5:2 B. 3:4 C. 2:5 D. 4:3

Q29. The point which divides the line segment joining the points (7, –6) and (3, 4) in ratio 1:2 internally lies in the:
A. I quadrant B. II quadrant C. III quadrant D. IV quadrant

Q30. The point which lies on the perpendicular bisector of the line joining the points (–2, –5) and (2, 5) is:
A. (0, 0) B. (0, 2) C. (2, 0) D. (–2, 0)

Q31. The fourth vertex D of a parallelogram ABCD whose three vertices are A(–2, 3), B(6, 7) and C(8, 3) is:
A. (0, 1) B. (0, –1) C. (–1, 0) D. (1, 0)

Q32. If the point P(2, 1) lies on the line joining A(4,2) and B(8,4), then:
A. AP = (1/3)AB B. AP = PB C. PB = (1/3)AB D. AP = (1/2)AB

Q33. What type of triangle do the points (3, 2), (–2,–3) and (2, 3) form?
(a) right triangle (b) equilateral triangle (c) isosceles triangle (d) None of these

Q34. The values of y for which the distance between the points P (2, –3) and Q (10, y) is 10units, is:
(a) –9, 5 (b) –9, 3 (c) –9, 2 (d) –9, 6

Q35. Find the area of the triangle whose vertices are (1, –1), (–4, 6) and (–3, –5).
(a) 26*sq.units* (b) 34*sq.units* (c) 24*sq.units* (d) 28*sq.units*

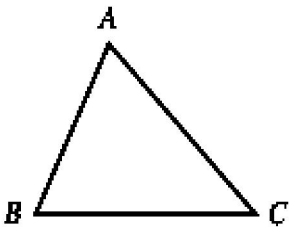
Q36. In which quadrant does the point (2, –5) lie?
(a) 1st (b) 2nd (c) 3rd (d) 4th

Q37. The distance between the points A(b, 0) and B(0, a) is:
(a) $\sqrt{a^2+b^2}$ (b) $\sqrt{a^2-b^2}$ (c) $\sqrt{a+b}$ (d) $\sqrt{a-b}$

Q38. Two of the vertices of a ΔABC are A(–1, 4) and B(5, 2) and its centroid is (0, –3). The co-ordinates of the vertex C are:
(a) (4, 3) (b) (4, 15) (c) (–4, –15) (d) (–15, –4)

Q39. The equation of a line parallel to x-axis at a distance of 5 units below x-axis is
(a) $x = 5$ (b) $x = -5$ (c) $y = -5$ (d) $y = -5x$

Q40. Three villages A, B and C form a scalene triangle on flat land (see the figure below). A well needs to be constructed on the same flat land in such a way that it is equidistant from the three villages.



The well should be built at:

(a) the incentre of triangle ABC
(b) the centroid of triangle ABC
(c) the circumcentre of triangle ABC
(d) the orthocenter of triangle ABC

10. APPLICATIONS OF TRIGONOMETRY

One can't just sit and fear Mathematics. One has to have some courage.
In fact courage is not the acknowledgement of our fears. Rather it is the acknowledgement of something which is more important than our fears!

Q01. In given Fig.1 , that $CE \parallel AB$. The angle of elevation at points A and D respectively are:

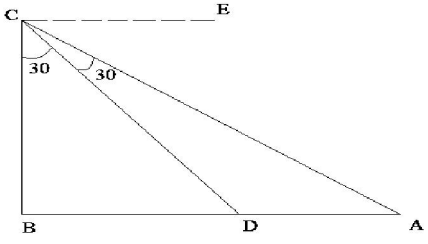


Fig.1

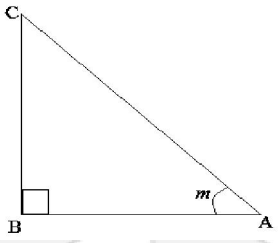


Fig.2

(a) $30^\circ, 60^\circ$ (b) $60^\circ, 30^\circ$ (c) $45^\circ, 45^\circ$ (d) $30^\circ, 30^\circ$

Q02. The angle of elevation of the top of a tower from two points at distances a and b from the base and on the same straight line with it are complimentary. The height of the tower is:

(a) ab (b) $\sqrt{ab}$ (c) $(ab)^2$ (d) a/b

Q03. The angle of elevation of the top of a tower from the points at a distance of 4m and 9m from the base of the land in the same straight line with it, are complementary. The height of the tower is:

(a) 4m (b) 7m (c) 12m (d) 6m

Q04. In the Fig.2, $\tan m = 3/4$. If AB = 12cm, then BC is:

(a) 8cm (b) 12cm (c) 10cm (d) 9cm

Q05. A tower stands vertically on the ground, form a point on the ground, which is 15m away from the foot of the tower, the angle of elevation of the top of the tower is found to be 60º. The height of tower is:

(a) 3m (b) $15\sqrt{3}$ m (c) 15m (d) $3\sqrt{15}$ m

Q06. An observer 1.5m tall is 28.5m away from chimney. The angle of elevation of the chimney from her eyes is 45º. The height of the chimney is:

(a) 30m (b) 27m (c) 15m (d) None of these

Q07. The shadow of a tree 6m in its height is $2\sqrt{3}$m . The angle of elevation of the sun is:

(a) 60º (b) 30º (c) 85º (d) 45º

Q08. A tower on the ground is the vertical position. At a point on the ground 16m away from the foot of the tower the angle of elevation of the tower is 60º. The height of the tower is:

(a) $6\sqrt{3}$ m (b) $16\sqrt{3}$ m (c) 16m (d) None of these

Q09. In the following figure [Fig.3], the perimeter of rectangle ABCD is:

(a) 40m (b) $10(\sqrt{3}+1)$ m (c) $20(\sqrt{3}+1)$ m (d) 60m

Q10. Two poles P_1 and P_2 stand 30m apart on the ground [See fig.4]. M is a point on pole P_2 such that the two ends of pole P_1 subtend a right angle at the point M and the angle of elevation of the top of pole P_1 from the point M is 60°. The height of pole P_1, in metres is:

(a) $20\sqrt{3}$ (b) $40\sqrt{3}$ (c) $60\sqrt{3}$ (d) $120\sqrt{3}$

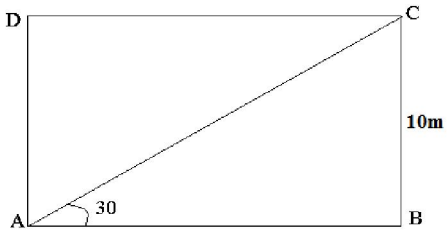


Fig.3

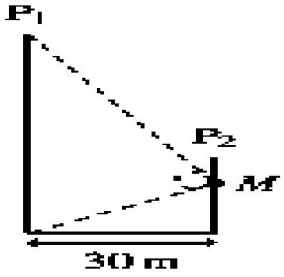
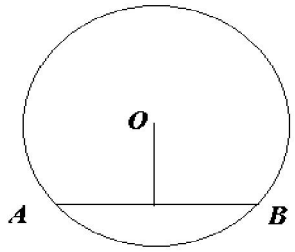


Fig.4

11. CIRCLE & CONSTRUCTIONS

In mathematics the art of posing problems is easier than that of solving them!

Q01. In the following figure, O is the centre of a circle and AB is chord of circle, whose length is 24cm. If the length of the perpendicular OM on AB is 5cm, the radius of the circle is



(a) 10cm (b) 12cm (c) 13cm (d) 14.5cm

Q02. A tangent PQ at a point P of a circle of radius 5cm meets a line through the centre O at a point Q so that OQ = 12cm. Length PQ is:

(a) 12cm (b) 13cm (c) 8.5cm (d) $\sqrt{119}$ cm

Q03. If the radius of the circle is 13 cm and the chord is 10cm then, the length of the perpendicular drawn from the centre to the chord is:

(a) 12cm (b) 13cm (c) 8cm (d) None of these

Q04. From a point Q, the length of the tangent to a circle is 24cm and the distance of Q from the centre is 25cm. Then the radius of the circle is:

(a) 7cm (b) 12cm (c) 15cm (d) 24.5cm

Q05. The number of common tangents that can be drawn to given circle is at the most:

(a) One (b) Two (c) Three (d) Four

Q06. If two angles are complementary of each other then each angle is

(a) an obtuse angle (b) a right angle

(c) an acute angle (d) a supplementary angle

Q07. If the ratio of corresponding sides of two similar triangles is 2:3, then ratio of their areas will be:

(a) 2:3 (b) 4:9 (c) 5:9 (d) 7:4

Q08. Two non-parallel lines intersect:

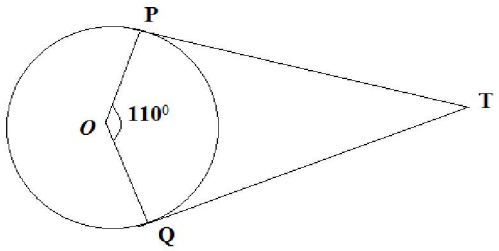
(a) at a point (b) at infinite number of points

(c) both (a) and (b) may be possible (d) None of these

Q09. Find the angle which is equal to the one third of its supplement.

(a) 30° (b) 45° (c) 60° (d) 90°

Q10. In the given figure, if TP and TQ are two tangents to a circle with a center O so that $\angle POQ = 110°$, then $\angle PTQ$ is equal to:



(a) 60° (b) 70° (c) 80° (d) 90°

Q11. To divide a line segment AB in the ratio 3:7, first a ray AX is drawn so that angle BAX is an acute angle and then at equal distances, points are marked on the ray AX such that minimum number of these points is:

A. 3 B. 10 C. **7** D. 12

Q12. To divide a line segment AB in the ratio 4:5, a ray AX is drawn firstly such that angle BAX is an acute angle and then points A_1, A_2, A_3, … are located at equal distances on the ray AX and the point B is joined to:

A. A_4 B. A_5 C. A_{10} D. A_9

Q13. To divide a line segment AB in the ratio 4:5, draw a ray AX such that angle BAX is an acute angle, then draw a ray BY parallel to AX and the points A_1, A_2, A_3, … and B_1, B_2, B_3, … are located at equal distances on the rays AX and BY, respectively. Then the points joined are:

A. A_5 and B_6 B. A_6 and B_5 C. A_4 and B_5 D. A_5 and B_4

Q14. To construct a triangle similar to a given triangle ABC with its sides 2/5 of the corresponding sides of triangle ABC, first draw a ray BX such that angle CBX is an acute angle and X lies on the opposite side of A with respect to BC. Then locate points B_1, B_2, B_3, … on BX at equal distances and the next step is to join:

A. B_7 to C B. B_2 to C C. B_5 to C D. B_4 to C

Q15. To construct a triangle similar to a given triangle ABC with its sides 5/3 of the corresponding sides of triangle ABC, first draw a ray BX such that angle CBX is an acute angle and X lies on the opposite side of A with respect to BC. Then the minimum number of points to be marked at equal distances on the ray BX is:

A. 3 B. 5 C. 8 D. 2

Q16. To draw a pair of tangents to a circle which are inclined to each other at an angle of 30°, it is required to draw tangents at end points of those two radii of the circle, the angle between them should be:

A. 90° B. 150° C. 60° D. 120°

Q17. The compliment of 63^o is:

(a) 118^o (b) 28^o (c) 38^o (d) None of these

Q18. Ratio of corresponding sides of two similar triangles is 4:9, then the ratio of their areas is:

(a) 4:9 (b) 16:81 (c) 2:3 (d) 1:9

Q19. The supplement of 60^o is:

(a) 30^o (b) 40^o (c) 120^o (d) None of these

Q20. An angle which is greater than 180^o but less than 360^o is called:

(a) an acute angle (b) an obtuse angle (c) an adjacent angle (d) a reflex angle

12. MENSURATION – I

There are so many formulae in mensurations. We cannot memorize all these; we should not even do this. We have to learn firstly the concepts and, memorize the most important ones.

Q01. In the given Fig.1, ABC is quadrant of radius 14cm and a semicircle is drawn taking BC as the diameter. The area of the shaded region is:
(a) $102cm^2$ (b) $98cm^2$ (c) $89cm^2$ (d) $201cm^2$

Q02. If the biggest hand of a clock is 15cm long, then the distance covered by it in 40minutes will be:
(a) 31.5cm (b) 72.8cm (c) 24.1cm (d) None of these

Q03. The area of a triangle whose sides are respectively 3, 4 and 5cm is:
(a) $6cm^2$ (b) $60cm^2$ (c) $30cm^2$ (d) $10cm^2$

Q04. The radius of circle is increased by 1cm, then the ratio of the new circumference to the diameter is:
(a) $(\pi+2)$ (b) $(\pi+1)$ (c) π (d) None of these

Q05. A square and an equilateral triangle have equal perimeters. If the diagonal of the square is $6\sqrt{2}$cm, then the area of the triangle is:
(a) $16\sqrt{2}cm^2$ (b) $16\sqrt{3}cm^2$ (c) $12\sqrt{2}cm^2$ (d) None of these

Q06. The area of a circle inscribed in an equilateral triangle is 48π sq.units. Then the perimeter of triangle (in units) is given as:
(a) $72\sqrt{3}$ (b) 72 (c) $48\sqrt{3}$ (d) 36

Q07. The minute hand of a clock is $\sqrt{21}$ cm long. The area described by minute hand on the face of the clock between 7:00am to 7:05am is:
(a) $4.5cm^2$ (b) $6.6cm^2$ (c) $5.5cm^2$ (d) Can't be determined

Q08. If the minute hands of two clocks are of length 3cm and 4cm respectively. The ratio of the areas in two clocks covered by the minute hands in ½ hour will be:
(a) 9:16 (b) 4:9 (c) 16:9 (d) None of these

Q09. From each corner of a square of sides 4cm a quadrant of a circle of a radius 1cm is cut and also a circle of a diameter 2cm is cut. The area of the remaining portion of the square is [See Fig.2]:
(a) $10.25cm^2$ (b) $9.72cm^2$ (c) $11.52cm^2$ (d) None of these

Q10. ABCD is a square of 14cm. [See Fig.3]. The area of shaded region is:
(a) $42cm^2$ (b) $44cm^2$ (c) $46cm^2$ (d) Data incomplete

Q11. In the given figure [Fig.4], the area of an equilateral triangle ABC is $17320.5cm^2$, with each vertex of the triangle taken as a centre, circle is drawn with radius equal to half the length of the side of the triangle. The area of the shaded region is:
(a) $1220.5cm^2$ (b) $1320.7cm^2$ (c) $1520.8cm^2$ (d) $1620.5cm^2$

Q12. If the side of a square is increased by 25%, then how much percent does its area get increased?
(a) 25.65% (b) 25.56% (c) 65.52% (d) 56.25%

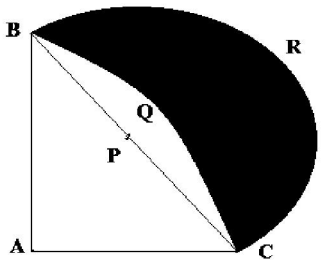


Fig.1

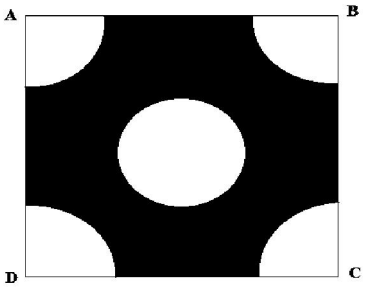


Fig.2

Q13. If the side of a square is doubled, how does area of the square change?
(a) becomes four times (b) becomes three times
(c) becomes two times (d) None of these

Q14. The length and breadth of the square is increased by 40% and 30% respectively. Then the area of the resulting rectangle exceeds the area of the square by:
(a) 42% (b) 62% (c) 82% (d) None of these

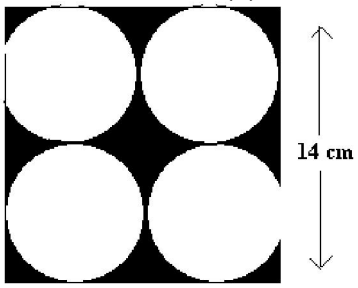


Fig.3

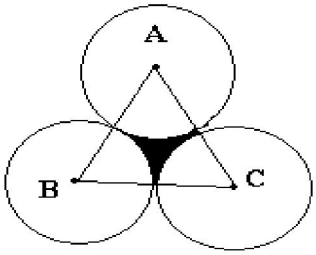


Fig.4

Q15. The diameter of a wheel is 63cm. Distance traveled by the wheel in 100 revolutions is:
(a) 99m (b) 198m (c) 63m (d) 136m

Q16. The radii of two circles are 8cm and 6cm. The radius of a circle having area equal to the sum of the areas of these two circles is:
(a) 12cm (b) 15cm (c) 10cm (d) 19cm

Q17. If radius of a circle is increased by 100%, then its area will be increased by:
(a) 400% (b) 200% (c) 300% (d) 250%

Q18. The perimeter of a semicircle of diameter 14cm is:
(a) 36cm (b) 42cm (c) 44cm (d) 58cm

Q19. If two circles touch externally and distance between their centres is 14cm and sum of their areas is 130π cm^2 then, the radii of two circles are:
(a) 11cm , 3cm (b) 8 cm, 6cm (c) 12cm, 2cm (d)13cm , 1cm

Q20. The area of shaded portion in the figure shown below [See Fig.5], will be:
(a) $2a^2(4-\pi)$ (b) $a^2(4-\pi)$ (c) $2a^2(8-\pi)$ (d) $2a(4a-\pi)$

Q21. In the given figure [See Fig.6] ABCD is a square P, Q, R and S are the midpoints of sides, the area of ΔDQR will be:
(a) $\frac{1}{2}(ar\text{ABCD})$ (b) $\frac{1}{4}(ar\text{ABCD})$ (c) $\frac{1}{2^3}(ar\text{ABCD})$ (d) $\frac{1}{2^4}(ar\text{ABCD})$

Q22. The diagonals of a rhombus are of measures 16cm and 10cm, its area is:
(a) 64cm^2 (b) 100cm^2 (c) 80cm^2 (d) 40cm^2

Q23. The area of the sector of a circle with sector angle θ is:
(a) $\pi r^2\theta$ (b) $\pi r^2\theta/360^o$ (c) $2\pi r/360^o$ (d) None of these

Q24. The ratio of area of a square of side 'a' and equilateral triangle of side 'a', is:
(a) 2:1 (b) 2: $\sqrt{3}$ (c) 4: 3 (d) 4 : $\sqrt{3}$

Q25. A rectangular sheet of cardboard is 4cm by 2cm. The greatest possible circle is cutoff form the cardboard then the remaining area is:
(a) $(16-\pi)$cm^2 (b) $(16-4\pi)$cm^2 (c) $(8-\pi)$cm^2 (d) None of these

Q26. Sum of lengths of the diagonals of a square is 144cm. The perimeter of the square is:
(a) $144\sqrt{2}$ cm (b) 144cm (c) $144\sqrt{3}$ cm (d) None of these

Q27. The perimeter of a rectangle is 200cm. If the ratio of its breadth and length is 3:5, its length is:
(a) 62.5cm (b) 64.5cm (c) 66.5cm (d) 68.5cm

Q28. The sides of a triangle are 5cm, 12cm and 13cm. Its area is:
(a) 24 sq.cm (b) 28 sq.cm (c) 30 sq.cm (d) None of these

Q29. If the radius of a circle is reduced by 20%, its area is reduced by:
(a) 40% (b) 38% (c) 36% (d) 34%

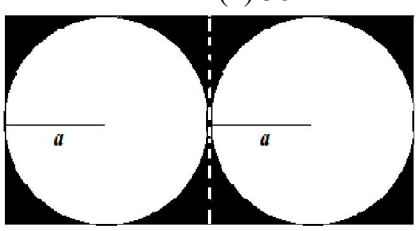


Fig.5

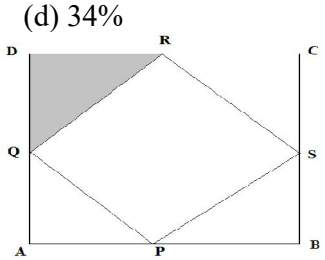


Fig.6

Q30. The area of the sector of a circle of 14cm diameter which subtends an angle of 36º at the centre is:
(a) 15.2 sq.cm (b) 15.4 sq.cm (c) 15.6 sq.cm (d) 15.8 sq.cm

Q31. There are two concentric circles of radius 5cm and 13cm. The length of the chord of the outer circle touching the inner circle is:
(a) 22cm (b) 24cm (c) 26cm (d) 28cm

Q32. The area of the sector of a circle of radius r and central angle α is:
A. $\frac{1}{2}.l\,r$ B. $\frac{2\pi r^2\alpha}{720}$ C. $\frac{2\pi r\alpha}{360}$ D. $\frac{\pi r\alpha}{360}$

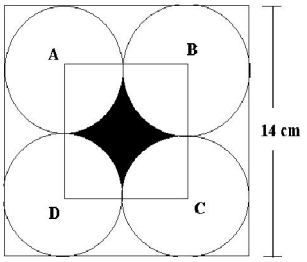


Fig.7

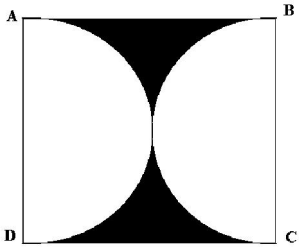


Fig.8

Q33. An arc of a circle is of length $5\pi\,cm$ and the sector it bounds has an area of $20\pi\,cm^2$. Its radius is:
A. 1cm B. 5cm C. 8cm D. 10cm

Q34. A sector is cut from a circle of radius 21cm. The angle of sector is 150°, its area is:
A. 577.5cm^2 B. 288.2cm^2 C. 152cm^2 D. 155cm^2

Q35. A chord AB of a circle of radius 10cm makes a right angle at the centre of circle. Then, area of major segment is:
A. 210cm^2 B. 235.7cm^2 C. 185.5cm^2 D. 285.71cm^2

Q36. A horse is tied to a pole with 56m long rope. The area of the field where the horse can graze is:
A. 2560m^2 B. 2464m^2 C. 9856m^2 D. 25600m^2

Q37. Three horses are tied to 7m rope at each of the corner of a triangular field whose sides are 20m, 30m and 40m long. The total area that can be gazed by them is:
A. 77m^2 B. 7.77m^2 C. 66m^2 D. 7.7m^2

Q38. The circumferences of two circles are in the ratio 2:3. The ratio of their area is:
A. 4:9 B. 2:3 C. 7:9 D. 4:10

Q39. Area enclosed between two concentric circles is 770cm^2. If the radius of outer circle is 21cm, then radius of inner circle is:
A. 12cm B. 13cm C. 14cm D. 15cm

Q40. The perimeter of a semicircle protector is 72cm. Its diameter is:
A. 28cm B. 14cm C. 36cm D. 24cm

Q41. The minute hand of a clock is 21cm long. The area described by it on the face of clock in 5minutes is:
A. 115.5cm^2 B.112.5cm^2 C. 211.5cm^2 D. 123.5cm^2

Q42. The area of a circle circumscribing a square of area 64cm^2 is:
A. 50.28cm^2 B. 25.5cm^2 C. 100.57cm^2 D. 75.48cm^2

Q43. In the diagram [Fig.7] shown below is a square of side 14cm.With centers A, B, C, D four circles are drawn such that each circle touches externally two of the remaining three circles. Then the area of shaded region is:
(a) 24cm^2 (b) 23cm^2 (c) 32cm^2 (d) None of these

Q44. In the figure [See Fig.8] ABCD is a square of side 14 cm, APD and BPC are semicircles. Then the area of the shaded region is:
(a) 32cm^2 (b) 37cm^2 (c) 42cm^2 (d) 44cm^2

Q45. A rectangular carpet has an area of 120m^2 and a perimeter of 46m. The length of its diagonal is:
(a) 15m (b) 16m (c) 17m (d) 20m

Q46. The area of an equilateral triangle is $24\sqrt{3}$ m^2. Its perimeter is:
(a) 96m (b) $12\sqrt{3}$ m (c) $24\sqrt{3}$ m (d) None of these

Q47. If the diameter of a circle is increased by 100%, its area will increased by:
(a) 100% (b) 200% (c) 300% (d) 400%

13. MENSURATION – II

If people do not believe that mathematics is simple, it is only because they do not realize how complicated life is.

Q01. The area of circle with the diameter d is:
(a) $2\pi d$ (b) $\pi d^2/4$ (c) πd^2 (d) None of these

Q02. If the circumference and area of a circle are numerically equal then, the radius of the circle is:
(a) 1 (b) 2 (c) 7 (d) None of these

Q03. The circumferences of two circles are in the ratio 4:5, the ratio of their areas is:
(a) 5:4 (b) 4:5 (c) 16:25 (d) None of these

Q04. The area of an equilateral triangle is $\sqrt{3}\,m^2$ then, its side is:
(a) $3\sqrt{3}\,m$ (b) $\frac{3\sqrt{3}}{4}m$ (c) 2m (d) 4m

Q05. Volume of the cubes is in the ratio of 8:125. The ratio of their surface areas is:
(a) 8:125 (b) 2:5 (c) 4:25 (d) 16:25

Q06. A wire is in the form of a circle of radius 7cm. It is bent into a square. The area of the square is:
(a) $11cm^2$ (b) $121cm^2$ (c) $154cm^2$ (d) $44cm^2$

Q07. Diameter of a sphere is 6cm. It is melted and drawn into a wire of radius 0.2cm. Then the length of the wire is:
(a) 6cm (b) 700cm (c) 900cm (d) None of these

Q08. The surface area of the walls of a cuboidal room is:
(a) $2(l+b+h)$ (b) lbh (c) $2(lb+bh+lh)$ (d) $2(l+b)h$

Q09. If a right circular cone of vertical height 12cm has a volume of $616cm^3$, then the radius of its base is:
(a) 6cm (b) 7cm (c) 8cm (d) 9cm

Q10. If all the sides of a cube are doubled then its area will become:
(a) 2 times (b) 3 times (c) 4 times (d) 8 times

Q11. The total surface of sphere and a cube are equal. The ratio of their volumes will be:
(a) $\sqrt{6}:\sqrt{\pi}$ (b) $6:\pi$ (c) $\sqrt{\pi}:\sqrt{6}$ (d) $\pi:6$

Q12. Three spheres of radii 3cm, 4cm, and 5cm are melted to form a solid sphere of radius:
(a) 5cm (b) 6.5cm (c) 7cm (d) 6cm

Q13. A hall 40m long, 15m broad, is to be paved with stones, each measuring 60 cm by 50cm. The number of stones required is:
(a) 1000 (b) 2000 (c) 30000 (d) None of these

Q14. A sphere of radius 10.5cm is heated and recast into small cones of radius 3.5cm having height 3cm, the number of such cones will be:
(a) 120 (b) 126 (c) 1100 (d) None of these

Q15. A spherical ball of radius 3cm is melted and recast into three spherical balls. The radii of two of balls are 1.5cm and 2cm. The radius of the third ball is
(a) 0.5cm (b) 1.0cm (c) 1.5cm (d) None of theses

Q16. Three spheres of radii 6cm, 8cm and 10cm are melted to form a sphere of radius:
(a) 11cm (b) 12cm (c) 13cm (d) None of these

Q17. A cone of height 24cm has a curved surface area $550cm^2$. Its volume will be:
(a) 616c.c. (b) 13200c.c. (c) 4400c.c. (d) 1232c.c.

Q18. The number of cubes of sides 2cm that can be cut from a cube of side 8cm is:
(a) 256 (b) 4 (c) 16 (d) 64

Q19. If the height of a right circular cone is y and radius of its base is x then, its volume will be:
(a) $\frac{\pi xy}{3}$ (b) $\frac{\pi xy^2}{3}$ (c) $\frac{\pi x^2 y}{3}$ (d) None of these

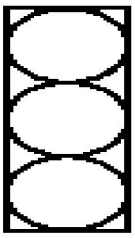
Q20. The volume and the surface area of a sphere are numerically equal, then its radius is:
A. 0unit B. 1unit C. 2units D. 3units

Q21. A cylinder, a cone and a hemisphere are of the same base and of the same height. Then the ratio of their volumes is:
A. 1:2:3 B. 2:1:3 C. 3:1:2 D. 3:2:1

Q22. Small spheres, each of radius 2cm, are made by melting a solid iron ball of radius 6cm, then the total number of small spheres is:
A. 9 B. 6 C. 27 D. 81

Q23. A solid sphere of radius r is melted and recast into the shape of a solid cone of a height r. Then the radius of the base of cone is:
A. $2r$ B. r C. $4r$ D. $3r$

Q24. A cylindrical tennis ball container contains three balls stacked on one another, such that they touch the wall of the container (see the figure). The top and bottom balls also touch the lid and the base of the container respectively.



If the volume of a tennis ball is $160cm^3$, then what is the volume of the container?
(a) $720cm^3$ (b) $840cm^3$ (c) $1440cm^3$ (d) $480cm^3$

Q25. The radii of the ends of a frustum of a cone 40cm high are 38cm and 8cm. Its slant height is:
A. 50cm B. 60.96cm C. $10\sqrt{7}$cm D. $4\sqrt{2}$cm

Q26. If three cubes of metal whose edges are 6cm, 8cm, and 10cm are melted and made into a single cube, then the edge of the new cube so formed will be:
(a) 6cm (b) 8cm (c) 12cm (d) 24cm

Q27. The curved surface area of cylinder is:
(a) $2\pi rh$ (b) $2\pi(r+h)$ (c) $\pi r^2 h$ (d) $\frac{\pi r^2 h}{3}$

Q28. If each side of a cube is increased by 50%, the percentage increased in the surface area is:
(a) 50% (b) 75% (c) 100% (d) 125%

Q29. If the diameter of the base of a closed right circular cylinder is equal to its height h, then its whole surface area is:
(a) $2\pi rh^2$ (b) $\frac{3}{2}\pi h^2$ (c) $\frac{4}{3}\pi h^2$ (d) πh^2

Q30. If the radius of the base of a right circular cone is 3r and its height is equal to the radius of the base, then its volume is:
(a) πr^3 (b) π^3 (c) $3\pi r^3$ (d) $9\pi r^3$

Q31. A cone, a hemisphere and a cylinder stand on equal base and have the same height. Ratio of their volumes is:
(a) 1:2:3 (b) 2:1:3 (c) 2:3:1 (d) 3:2:1

Q32. Three solid spheres of diameter 6cm, 8cm and 10cm are melted to form a single solid sphere. Its diameter is:
A. 6cm B. 4.5cm C. 3cm D. 12cm

Q33. The area of a sphere is $154cm^2$. The volume of the sphere is:
(a) 1437 ½ cm^3 (b) 179 ⅔ cm^3 (c) 359 ⅓ cm^3 (d) None of these

Q34. The radii of a sphere and the base of a cone are same. If there volumes are also same, then height of the cone is:
(a) r (b) $3r$ (c) $2r$ (d) $4r$

14. PROBABILITY

Small minds discuss persons. Average minds discuss events. Great minds discuss ideas.
Really great minds discuss Mathematics.

Q01. If E is an event then, P(E)+ P($\bar{E}$) = ……..?
(a) 0 (b) 1 (c) 2 (d) None of these

Q02. If P(E) is 38% for an event E, then the probability of failure of this event is:
(a) 12% (b) 62% (c) 1 (d) 0

Q03. In a survey, it is found that every fifth person possess a vehicle. The probability of a person 'not possessing the vehicle' is:
(a) 1/5 (b) 4/5 (c) 3/5 (d) 1

Q04. Which of the following can't be the probability of an event?
(a) 2/3 (b) –1/5 (c) 15 % (d) 0.7

Q05. If p is the probability of an impossible event then, p =?
(a) 2/3 (b) 0.1 (c) 1 (d) 0

Q06. The probability of a sure event is:
(a) 0 (b) 1 (c) 2 (d) None of these

Q07. What is the probability that an ordinary year has 53 Sunday?
(a) 6/13 (b) 1/7 (c) 2/7 (d) 3/8

Q08. A bag contains 9 red, 7 white and 4 black balls. A ball is drawn randomly. The probability that the 'ball drawn is not red' is:
(a) 1/11 (b) 9/11 (c) 2/11 (d) None of these

Q09. If a dice thrown, the probability of getting number less than 5 is given by p then, p is:
(a) 1 (b) 0 (c) $0 < p < 1$ (d) $p > 1$

Q10. If red face cards are removed from the deck of 52 playing cards, then the probability of getting a black jack is:
(a) 2/46 (b) 2/52 (c) 4/48 (d) 2/23

Q11. If there are 5 prizes and 20 are blanks, then the probability of winning a prize is:
(a) 1/5 (b) 1/4 (c) 1/3 (d) 4/5

Q12. In a bag, there are 100 bulbs out of which 30 are bad ones. A bulb is taken out of the bag at random. The probability of the selected bulb to be good is:
A. 0.50 B. 0.70 C. 0.30 D. None of these

Q13. A coin is tossed 1000 times and 560 times a 'head' occurs. The empirical probability of occurrence of a Head in this case is:
A. 0.50 B. 0.56 C. 0.44 D. 0.056

Q14. Two coins are tossed 200 times and the following outcomes are recorded:

HH	HT / TH	TT
56	110	34

The empirical probability of occurrence of at least one Head in the above case is:
A. 0.33 B. 0.34 C. 0.66 D. 0.83

Q15. On a particular day, the number of vehicles passing a crossing is given here:

Vehicle	Two wheeler	Three wheeler	Four wheeler
Frequency	52	71	77

What is the probability of a two wheeler passing the crossing on that day?
A. 0.26 B. 0.71 C. 0.385 D. 0.615

Q16. In a bag, there are 100 bulbs out of which 30 are good ones. A bulb is taken out of the bag at random. The probability of the selected bulb to be good is:
A. 0.50 B. 0.70 C. 0.30 D. None of these

Q17. A coin is tossed 1000 times and 560 times a 'tail' occurs. The empirical probability of occurrence of a Head in this case is:
A. 0.50 B. 0.56 C. 0.44 D. 0.056

Q18. Two coins are tossed 200 times and the following outcomes are recorded:

HH	HT / TH	TT
56	110	34

What is the empirical probability of occurrence of at least one Tail in the above case?
A. 0.33 B. 0.34 C. 0.66 D. 0.72

Q19. In a simultaneous throw of two coins, the probability of getting exactly two heads?
(a) ½ (b) ⅔ (c) ¼ (d) ⅓

Q20. What is the probability that a number selected from the number 1, 2, 3, 4, 5,…, 16 is a prime number?
(a) 1/16 (b) 5/8 (c) 3/8 (d) 7/16

Q21. A card is drawn at random from a pack of 52 cards. The probability that the card drawn is a face card is:
(a) 6/13 (b) 1/2 (c) 3/13 (d) 27/52

Q22. In a simultaneous throw of two dice, what is the probability of getting doublet?
(a) 1/6 (b) 1/4 (c) 3/4 (d) 2/3

Q23. A die is thrown once. Then the chance of getting a number which is less than 3 and greater than 2 is:
(a) 0 (b) 1 (c) 2/6 (d) 5/6

Q24. A card is drawn at random from a pack of 52 cards. What is the probability that the card drawn is a spade or a king?
(a) 4/13 (b) 3/13 (c) 2/13 (d) 1/13

Q25. A bag contains 6 black balls and 8 white balls. One ball is drawn at random. What is the probability that the ball drawn is white?
(a) 4/7 (b) 3/4 (c) 4/3 (d) 1/8

Q26. In a game, a number is chosen at random from the set {1, 2, 3, …, 28, 29, 30}. What is the probability that the number chosen is a product of exactly two different prime numbers?
(a) 1/6 (b) 7/30 (c) 4/15 (d) 1/5

15. MISCELLANEOUS QUESTIONS

Miscellaneous means anything that doesn't fit into any other part. So all the extra goes into this part, which makes it more miserable for you. But with sheer hard work and proper guidance, you can master it too!

Q01. If $x = 2+\sqrt{3}$, $y = 2-\sqrt{3}$ then, the value of x^3+y^3 is:
(a) 50 (b) 52 (c) 54 (d) 56

Q02. A man goes 18m towards west and then goes 24m towards north. His distance from starting points is:
(a) 15m (b) 20m (c) 25m (d) 30m

Q03. Two poles of height 6m and 11m stand on a plane ground. If the distance between their feet is 12m, the distance between their tops is:
(a) 9m (b) 10m (c) 11m (d) 13m

Q04. If $a:b$ = 3:5 and $b:c$ = 6:7, then $a:c$ is:
(a) 3:7 (b) 15:42 (c) 18:35 (d) 7:3

Q05. What should be added to each term of the ratio 7:13 to make it equal to 3:4?
(a) 8 (b) 11 (c) 10 (d) 9

Q06. In a college 500 students study Mathematics and 400 study Economics. If 200 students study both the subjects; the total number of students enrolled for these two subjects shall be:
(a) 650 (b) 675 (c) 700 (d) 750

Q07. Dividing 35 into two parts so that one-fourth of the greater part is equal to one-third of the smaller part, is possible in:
(a) 20, 15 (b) 18, 17 (c) 19, 16 (d) None of these

Q08. The value of a^2+b^2 when $a+b = 7$, $ab = 12$ is:
(a) 20 (b) 21 (c) 23 (d) 25

Q09. The triangles are similar, if:
(a) their corresponding angles are equal (b) their corresponding sides are proportional
(c) there is at least one angle of 90º (d) None of these

Q10. The solution of the equation $2x-8 = 0$ is:
(a) 1/4 (b) –4 (c) 4 (d) ±4

Q11. The rationalizing factor of $(a+\sqrt{b})$ is:
(a) $(a-\sqrt{b})$ (b) $(\sqrt{a}-b)$ (c) $(\sqrt{a}-\sqrt{b})$ (d) None of these

Q12. The value of $(x^a/x^b)^{a+b} \times (x^b/x^c)^{b+c} \times (x^c/x^a)^{c+a}$ is equal to:
(a) 1 (b) 0 (c) x^{abc} (d) abc

Q13. In the Fig.1, PA is a tangent and BC is a chord. If ∠PAB is 30º, then ∠ACB =….?
(a) 45º (b) 30º (c) 60º (d) None of these

Q14. In the Fig.2, the value of x is:
(a) 120º (b) 80º (c) 55º (d) (110º –x)

Q15. The angle in the major segment of a circle is:
(a) right angle (b) acute (c) obtuse (d) None of these

Q16. Sum of the opposite angles in a cyclic quadrilateral is:
(a) 90º (b) 180º (c) 60º (d) None of these

Q17. See Fig.3. The value of x will be:
(a) 35º (b) 70º (c) 55º (d) None of these

Q18. The values of x and y in the figure given above [See Fig.4] is:
(a) 45º, 30º (b) 30º, 45º (c) 30º, 15º (d) 30º, 75º

Q19. In ΔABC, $a = x^\circ$, $b=3x^\circ$, $c= y^\circ$, if $3y-5x=30^\circ$ then, ΔABC is:
(a) acute angled (b) right angled (c) obtuse angled (d) equilateral triangle

Q20. HCF and LCM of two numbers x and y are 3 and 105. If $x+y$ = 36 then, the value of $\frac{1}{x}+\frac{1}{y}$ is:
(a) 1/25 (b) 1/35 (c) 35 (d) 315

Q21. ABCD is a cyclic quadrilateral then, $\sin A + \sin B - \sin C - \sin D$ is equal to:
(a) 1 (b) 2 (c) 0 (d) –1

Q22. A number is as much greater than 32 as it is less than 72. Then the number is:
(a) 52 (b) 50 (c) 104 (d) None of these

Q23. A line segment has:
(a) one end point (b) two end point (c) no end point (d) None of these

Q24. In a circle the length of the chord is 10cm and radius is 13cm. The length of perpendicular from the centre on the chord is:
(a) 5cm (b) 10cm (c) 12cm (d) None of these

Q25. An angle in a semi circle is:
(a) 90° (b) 60° (c) 20° (d) 45°

Q26. Hema is three times as old as her son. Five years later she will be two and a half times as old as her son. The age of Hema is:
(a) 60years (b) 30years (c) 45years (d) 48years

Q27. In the Fig.5, the value of x is:
(a) 60º (b) 80º (c) 40º (d) 50º

Q28. Consider the Fig.6, AC = 12 m, measure of angle C is 30º, then AB =…….?
(a) $12\sqrt{3}$ m (b) $\frac{12}{\sqrt{3}}$ m (c) 12m (d) 24m

Q29. The number of tangents drawn from a point outside a circle is:
(a) 1 (b) 4 (c) 0 (d) 2

Q30. In the figure shown [See Fig.7], ABCD is a rectangle. The length of (AP+AQ) is:
(a) 180m (b) 210m (c) 135m (d) Insufficient data

Q31. In the Fig.8, O is centre of circle. The value of y will be:
(a) 80º (b) 130º (c) 105º (d) 135º

Q32. See Fig.9. ΔABC is a triangle in which AB =AC. The base BC is produced to D and ∠ACD =130º. Then ∠A equals:
(a) 80º (b) 60º (c) 50º (d) 40º

Q33. In the given Fig.10, AB and CD are two common tangents to the circle. If DC =4cm, then AB is equal to:
(a) 4cm (b) 6cm (c) 8cm (d) None of these

Q34. See Fig.11. O is the centre of the circle, if tangent PQ=12cm and BQ = 8cm, then the length of chord AB is:
(a) 10cm (b) $4\sqrt{5}$cm (c) 4cm (d) 8 cm

Q35. See Fig.12. AB is a diameter and AC is chord of a circle such that ∠BAC = 30°. The tangent at C intersects AB produced at D, then:
(a) BC< BD (b) BC >BD (c)BC=BD (d) Can't say

Q36. See Fig.13. AOB is a straight line, ∠AOC = $(3x+20)°$ and ∠BOC = $(4x–36)°$. The value of x is:
(a) 32 (b) 28 (c) 26 (d) 24

Q37. In the given Fig.14, AB is parallel to CD. ∠ALC = 60°, EC is the bisector of ∠LCD and EF is parallel to AB. Then, ∠CEF is equal to:
(a) 120° (b) 140° (c) 150° (d) None of these

Q38. In the given Fig.15, if EC parallel AB, ∠ECD=70° and ∠BOD =20°, then ∠OBD is:
(a) 20° (b) 50° (c) 60° (d) 70°

Q39. If three numbers are in the ratio 3:2:5 and they are such that the sum of their squares is 1862. The middle number is:
(a) 10 (b) 12 (c) 14 (d) Insufficient data

Q40. In the Fig.16, AB is parallel to CD, then ∠EFD is equal to:
(a) 20º (b) 25º (c) 25º (d) 35º

Q41. The sum of the squares of three numbers is 725. If the ratio of the numbers be 2 : 3 : 4, what are the numbers?
(a) 5, 10, 15 (b) 2, 3, 4 (c) 4, 6, 8 (d) 10, 15, 20

Q42. Value of π radians is:
(a) 60º (b) 180º (c) 90º (d) 360º

Q43. One angle of cyclic quadrilateral is 70º, then its opposite angle is:
(a) 30º (b) 90º (c) 20º (d) 110º

Q44. The number of roots of a quadratic equation are:
(a) one (b) two (c) three (d) depends on the given equation

Q45. If length of a chord is equal to the radius of the circle, then the angle subtended by the chord at the centre is:
(a) 60º (b) 30º (c) 120º (d) None of these

Q46. Inside a circle, ABCD is a square and AB 4cm, then the radius of the circle is:
(a) 2cm (b) $2\sqrt{2}$ cm (c) $4\sqrt{2}$ cm (d) None of these

Q47. See Fig.17. In a trapezium PQRS, ∠Q=90º, PQ = QR and ∠ PRS = 20º, then the value of θ will be:
(a) 75º (b) 55º (c) 65º (d) None of these

Q48. In the Fig.18, if β = γ and ∠BOC = 30º = $\frac{\alpha}{2}$, then the value of γ is:
(a) 30º (b) 35º (c) 45º (d) None of these

Q49. In the given Fig.19, if the area of smaller circle is 200cm^2, then the area of bigger circle is:
(a) 400cm^2 (b) 600cm^2 (c) 800cm^2 (d) None of these

Q50. The simplest form of $\frac{1}{\sqrt{2}-1}$ is:
(a) $\sqrt{2}+1$ (b) $\sqrt{2}-1$ (c) $1-\sqrt{2}$ (d) $\sqrt{2}\pm1$

VARIOUS FIGURES RELATED TO CHAPTER 15
(OBJECTIVE MATHEMATICIA SA 2)

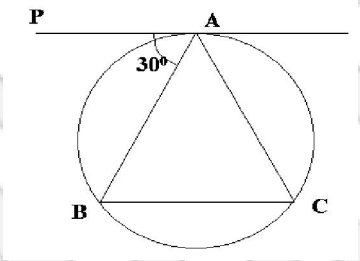


Fig.1

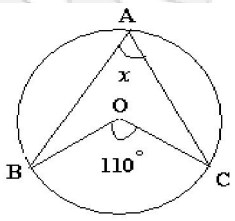


Fig.2

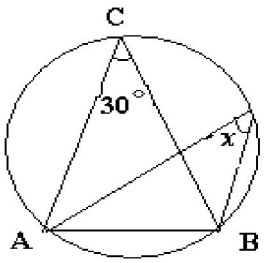


Fig.3

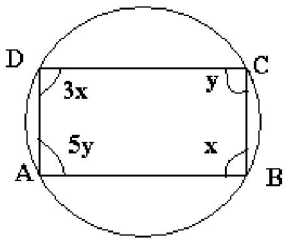


Fig.4

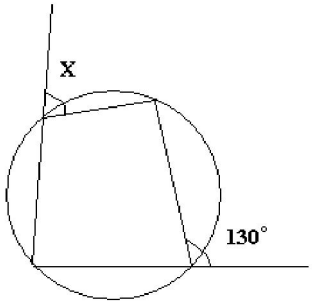


Fig.5

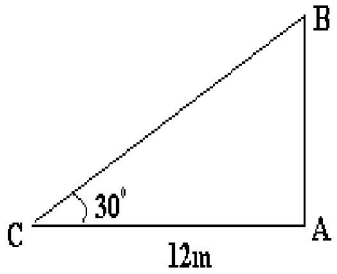


Fig.6

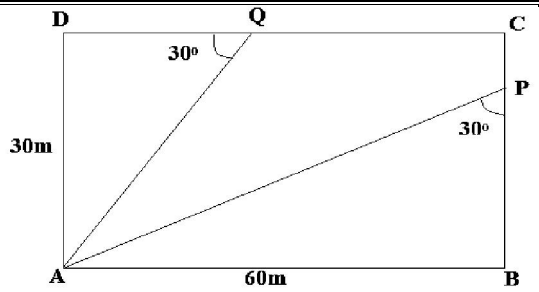


Fig.7

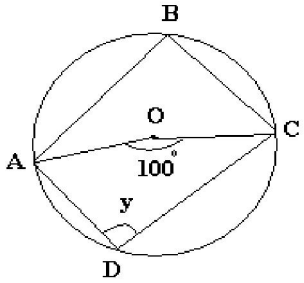


Fig.8

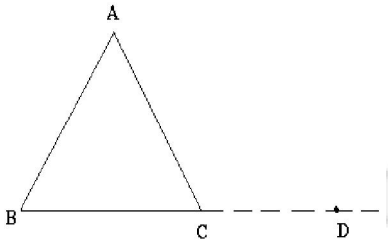


Fig.9

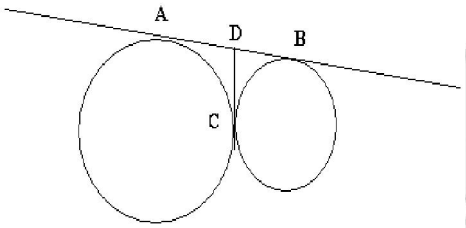


Fig.10

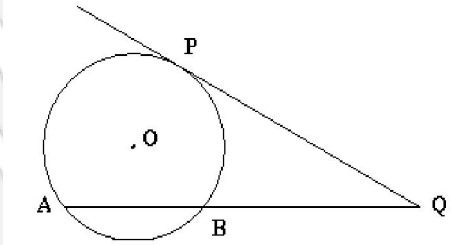


Fig.11

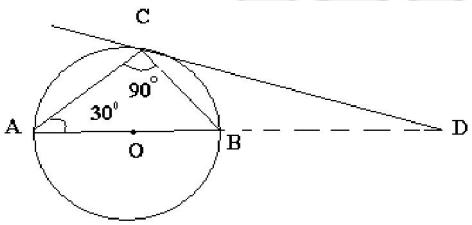


Fig.12

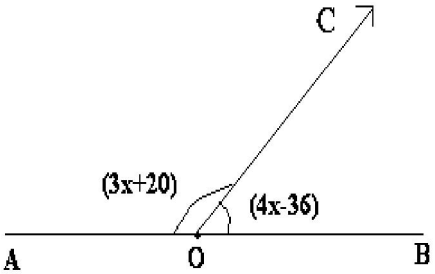


Fig.13

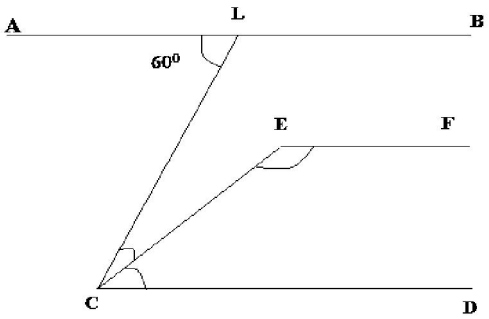


Fig.14

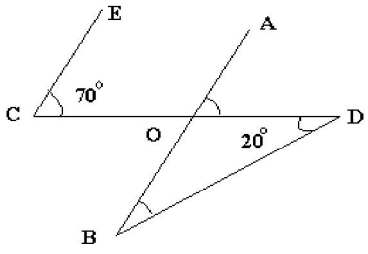


Fig.15

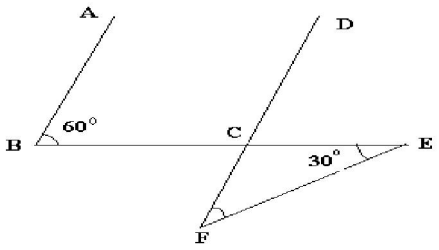


Fig.16

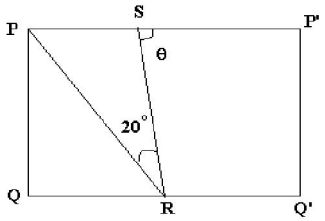


Fig.17

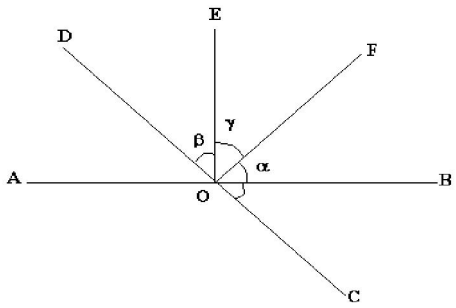


Fig.18

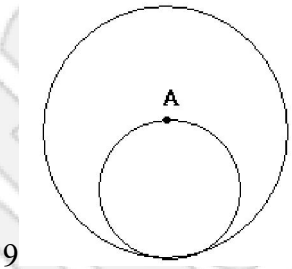


Fig.19

Answers Of Objective Mathematicia II

Chapter 07

Q01. d	Q02. a	Q03. c	Q04. b	Q05. a	Q06. d	Q07. a
Q08. d	Q09. a	Q10. c	Q11. a	Q12. c	Q13. d	Q14. c
Q15. b	Q16. d	Q17. d	Q18. b	Q19. d	Q20. d	Q21. b
Q22. b	Q23. c	Q24. b	Q25. b	Q26. a	Q27. b	Q28. b
Q29. a	Q30. d	Q31. c	Q32. d	Q33. d	Q34. d	Q35. c
Q36. a	Q37. a	Q38. d	Q39. d	Q40. a	Q41. b	Q42. b
Q43. a	Q44. a					

Chapter 08

Q01. a	Q02. b	Q03. d	Q04. d	Q05. c	Q06. c	Q07. a
Q08. c	Q09. a	Q10. d	Q11. d	Q12. c	Q13. d	Q14. d
Q15. c	Q16. c	Q17. b	Q18. c	Q19. b	Q20. a	Q21. b
Q22. a	Q23. c	Q24. b	Q25. c	Q26. c	Q27. c	Q28. a
Q29. b	Q30. b	Q31. c	Q32. b	Q33. b	Q34. d	Q35. a
Q36. a	Q37. c	Q38. c	Q39. d	Q40. c	Q41. a	Q42. c
Q43. b	Q44. a	Q45. a	Q46. a	Q47. a	Q48. a	Q49. c
Q50. a	Q51. b	Q52. b	Q53. c	Q54. a	Q55. b	

Chapter 09

Q01. c	Q02. c	Q03. d	Q04. a	Q05. d	Q06. c	Q07. c
Q08. d	Q09. b	Q10. b	Q11. b	Q12. a	Q13. a	Q14. a
Q15. b	Q16. c	Q17. c	Q18. d	Q19. c	Q20. b	Q21. c
Q22. c	Q23. b	Q24. b	Q25. a	Q26. c	Q27. a	Q28. d
Q29. b	Q30. a	Q31. b	Q32. c	Q33. a	Q34. b	Q35. c
Q36. d	Q37. a	Q38. c	Q39. c	Q40. c		

Chapter 10

Q01. a	Q02. b	Q03. d	Q04. d	Q05. b	Q06. a	Q07. a
Q08. b	Q09. c	Q10. c				

Chapter 11

Q01. c	Q02. d	Q03. a	Q04. a	Q05. b	Q06. c	Q07. b
Q08. a	Q09. b	Q10. b	Q11. c	Q12. b	Q13. c	Q14. c
Q15. b	Q16. b	Q17. d	Q18. b	Q19. c	Q20. d	

Chapter 12

Q01. b	Q02. d	Q03. a	Q04. c	Q05. b	Q06. b	Q07. c
Q08. a	Q09. b	Q10. a	Q11. d	Q12. d	Q13. a	Q14. c
Q15. b	Q16. c	Q17. c	Q18. a	Q19. a	Q20. a	Q21. c
Q22. c	Q23. b	Q24. b	Q25. c	Q26. a	Q27. a	Q28. c
Q29. a	Q30. b	Q31. b	Q32. b	Q33. c	Q34. a	Q35. d
Q36. c	Q37. a	Q38. a	Q39. c	Q40. a	Q41. a	Q42. a
Q43. d	Q44. c	Q45. c	Q46. b	Q47. c		

Chapter 13

Q01. b	Q02. b	Q03. c	Q04. c	Q05. c	Q06. b	Q07. c

Q08. d	Q09. b	Q10. c	Q11. a	Q12. d	Q13. b	Q14. b
Q15. d	Q16. b	Q17. Self	Q18. d	Q19. c	Q20. d	Q21. c
Q22. c	Q23. a	Q24. a	Q25. a	Q26. c	Q27. a	Q28. d
Q29. b	Q30. d	Q31. a	Q32. d	Q33. Self	Q34. d	

Chapter 14

Q01. b	Q02. b	Q03. b	Q04. b	Q05. d	Q06. b	Q07. b
Q08. d	Q09. c	Q10. a	Q11. a	Q12. b	Q13. b	Q14. d
Q15. a	Q16. c	Q17. c	Q18. d	Q19. c	Q20. c	Q21. c
Q22. a	Q23. a	Q24. a	Q25. a	Q26. b		

Chapter 15

Q01. b	Q02. d	Q03. d	Q04. c	Q05. b	Q06. c	Q07. a
Q08. d	Q09. b	Q10. c	Q11. a	Q12. a	Q13. b	Q14. Self
Q15. b	Q16. c	Q17. d	Q18. a	Q19. b	Q20. b	Q21. c
Q22. b	Q23. b	Q24. c	Q25. a	Q26. b	Q27. d	Q28. b
Q29. D	Q30. a	Q31. a	Q32. a	Q33. c	Q34. b	Q35. a
Q36. b	Q37. c	Q38. b	Q39. c	Q40. d	Q41. d	Q42. b
Q43. d	Q44. b	Q45. a	Q46. b	Q47. c	Q48. c	Q49. A
Q50. a.						