Mark the correct alternative in each of the following :

Question 1.

If the equation $x^2 + 4x + k = 0$ has real and distinct roots, then

(a) $k < 4$
(b) $k > 4$
(c) $k \geq 4$
(d) $k \leq 4$

Solution:

(a) In the equation $x^2 + 4x + k = 0$
$a = 1, b = 4, c = k$
$D = b^2 - 4ac = (4)^2 - 4 \times 1 \times k = 16 - 4k$
Roots are real and distinct
$D > 0$
$\Rightarrow 16 - 4k > 0$
$\Rightarrow 16 > 4k$
$\Rightarrow 4 > k$
$\Rightarrow k < 4$

Question 2.

If the equation $x^2 - ax + 1 = 0$ has two distinct roots, then

(a) $|a| = 2$
(b) $|a| < 2$
(c) $|a| > 2$
(d) None of these

Solution:

(c) In the equation $x^2 - ax + 1 = 0$
$a = 1, b = -a, c = 1$
$D = b^2 - 4ac = (-a)^2 - 4 \times 1 \times 1 = a^2 - 4$
Roots are distinct
$D > 0$
$\Rightarrow a^2 - 4 > 0$
$\Rightarrow a^2 > 4$
$\Rightarrow a^2 > (2)^2$
$\Rightarrow |a| > 2$

Question 3.

If the equation $9x^2 + 6kx + 4 = 0$, has equal roots, then the roots are both equal to

(a) ± 23
(b) ± 32
(c) 0
(d) ± 3

Solution:

(a)

In the equation
$9x^2 + 6kx + 4 = 0$
$a = 9$, $b = 6k$, $c = 4$ then
$D = b^2 - 4ac$
$= (6k)^2 - 4 \times 9 \times 4$
$= 36k^2 - 144$
$\because$ Roots are equal
$\therefore$ $D = 0$
$\Rightarrow 36k^2 - 144 = 0 \Rightarrow 36k^2 = 144$

$$\Rightarrow k^2 = \frac{144}{36} = 4 = (\pm 2)^2$$

$\therefore$ $k = \pm 2$

$$\therefore \text{ Roots are } = \frac{-b}{2a} = \frac{\pm 2 \times 6}{2 \times 9} = \pm \frac{2}{3}$$

Question 4.
If $ax^2 + bx + c = 0$ has equal roots, then c =

(a) $\frac{-b}{2a}$
(b) $\frac{b}{2a}$
(c) $\frac{-b^2}{4a}$
(d) $\frac{b^2}{4a}$

Solution:
(d) In the equation $ax^2 + bx + c = 0$
$D = b^2 - 4ac$
Roots are equal
$D = 0 \Rightarrow b^2 - 4ac = 0$
=> $4ac = b^2$
=> c = b24a

Question 5.
If the equation $ax^2 + 2x + a = 0$ has two distinct roots, if
(a) $a = \pm 1$
(b) $a = 0$
(c) $a = 0, 1$
(d) $a = -1, 0$
Solution:
(a) In the equation $ax^2 + 2x + a = 0$
$D = b^2 - 4ac = (2)^2 - 4 \times a \times a = 4 - 4a^2$
Roots are real and equal
$D = 0$
=> $4 - 4a^2 = 0$
=> $4 = 4a^2$
=> $1 = a^2$

=> $a^2 = 1$
=> $a^2 = (\pm1)^2$
=> $a = \pm1$

Question 6.
The positive value of k for which the equation $x^2 + kx + 64 = 0$ and $x^2 - 8x + k = 0$ will both have real roots, is
(a) 4
(b) 8
(c) 12
(d) 16
Solution:
(d) In the equation $x^2 + kx + 64 = 0$

$a = 1, b = k, c = 64$
$D = b^2 - 4ac = k^2 - 4 \times 1 \times 64$
$= k^2 - 256$
$\because$ The roots are real
$\therefore D \geq 0 \Rightarrow k^2 - 256 \geq 0$
$\Rightarrow k^2 \geq 256 \Rightarrow k^2 \geq (\pm16)^2$
$\Rightarrow k \geq 16$ ....(*i*)
Only positive value is taken
Now in second equation
$x^2 - 8x + k = 0$
$D = (-8)^2 - 4 \times 1 \times k = 64 - 4k$
$\because$ Roots are real
$\therefore D \geq 0 \Rightarrow 64 - 4k \geq 0 \Rightarrow 64 \geq 4k$
$16 \geq k$ ....(*ii*)
From (*i*) and
$16 \geq k \geq 16 \Rightarrow k = 16$

Question 7.

The value of $\sqrt{6+\sqrt{6+\sqrt{6+\ldots}}}$ is

(a) 4 **(b) 3**
(c) –2 **(d) 3.5**

Solution:
(b)

Let $x = \sqrt{6+\sqrt{6+\sqrt{6+}}}...$

$x = \sqrt{6+x} \Rightarrow x^2 = 6 + x$

$\Rightarrow x^2 - x - 6 = 0$

$\Rightarrow x^2 - 3x + 2x - 6 = 0$

$\Rightarrow x(x-3) + 2(x-3) = 0$

$\Rightarrow (x-3)(x+2) = 0$

Either $x - 3 = 0$, then $x = 3$

or $x + 2 = 0$, then $x = -2$

Now if $x = 3$, then

$3 = \sqrt{6+\sqrt{6+\sqrt{6+}}}...$

$= \sqrt{6+3} = \sqrt{9} = 3$

If $x = -2$, then

$x = \sqrt{6+x}$

$\Rightarrow -2 = \sqrt{6-2} = -2 = \sqrt{4} = 2$

Which is not possible

x = 3 is correct

Question 8.

If 2 is a root of the equation $x^2 + bx + 12 = 0$ and the equation $x^2 + bx + q = 0$ has equal roots, then q =

(a) 8

(b) – 8

(c) 16

(d) -16

Solution:

(c)

$$x^2 + bx + 12 = 0$$

$\because$ 2 is its root, then it will satisfy it

$\therefore$ $(2)^2 + b \times 2 \times 12 \Rightarrow 4 + 2b + 12 = 0$

$\Rightarrow 2b + 16 = 0 \Rightarrow b = \dfrac{-16}{2} = -8$

Now equation

$x^2 + bx + q = 0$, has equal roots, then

$D = 0 \Rightarrow b^2 - 4q = 0$

$\Rightarrow (-8)^2 - 4q = 0 \Rightarrow 64 = 4q$

$\Rightarrow q = 16$

Question 9.
If the equation $(a^2 + b^2) x^2 - 2 (ac + bd) x + c^2 + d^2 = 0$ has equal roots, then
(a) ab = cd
(b) ad = bc
(c) ad = √bc
(d) ab = √cd
Solution:
(b)

In the equation

$(a^2 + b^2) x^2 - 2 (ac + bd) x + (c^2 + d^2) = 0$

$D = B^2 - 4AC$

$= [-2(ac + bd)]^2 - 4 (a^2 + b^2) (c^2 + d^2)$

$= 4 [a^2c^2 + b^2d^2 + 2abcd] - 4 [a^2c^2 + a^2d^2 + b^2c^2 + b^2d^2]$

$= 4a^2c^2 + 4b^2d^2 + 8abcd - 4a^2c^2 - 4a^2d^2 - 4b^2c^2 - 4b^2d^2$

$= 8abcd - 4a^2d^2 - 4b^2c^2$

$= -4 [a^2d^2 + b^2c^2 - 2abcd]$

$= -4 (ad - bc)^2$

$\because$ Roots are equal

$\therefore$ $D = 0 \Rightarrow -4 (ad - bc)^2 = 0$

$\Rightarrow ad - bc = 0 \Rightarrow ad = bc$

Question 10.
If the roots of the equation $(a^2 + b^2) x^2 - 2b (a + c) x + (b^2 + c^2) = 0$ are equal, then ;
(a) 2b = a + c
(b) b^2 = ac
(c) b = 2aca+c
(d) b = ac

Solution:
(b)

In the equation

$(a^2 + b^2) x^2 - 2b (a + c) x + (b^2 + c^2) = 0$

$D = B^2 - 4AC$

$= [-2b(a + c)]^2 - 4 (a^2 + b^2) (b^2 + c^2)$

$= 4b^2 (a^2 + c^2 + 2ac) - 4 [a^2b^2 + a^2c^2 + b^4 + b^2c^2]$

$= 4a^2 b^2 + 4b^2c^2 + 8ab^2c - 4a^2b^2 - 4a^2c^2 - 4b^4 - 4b^2c^2$

$= 8ab^2c - 4a^2c^2 - 4b^4$

$= -4 [a^2c^2 + b^4 - 2ab^2c] = -4 [ac - b^2]^2$

$\because$ Roots are equal

$\therefore -4 (ac - b)^2 = 0$

$\Rightarrow ac - b^2 = 0 \Rightarrow ac = b^2$

$\Rightarrow b^2 = ac$

Question 11.
If the equation $x^2 - bx + 1 = 0$ does not possess real roots, then
(a) $-3 < b < 3$
(b) $-2 < b < 2$
(c) $b > 2$
(d) $b < -2$
Solution:
(b)

In the equation

$x^2 - bx + 1 = 0$

$D = b^2 - 4ac = (-b)^2 - 4 \times 1 \times 1$

$= b^2 - 4$

$\because$ The roots are not real

$\therefore D < 0 \Rightarrow b^2 - 4 < 0$

$\Rightarrow b^2 < 4 \Rightarrow b^2 < (\pm 2)^2$

$\therefore b < 2$ and $b > -2$ or $-2 < b$

$\therefore -2 < b < 2$

Question 12.
If $x = 1$ is a common root of the equations $ax^2 + ax + 3 = 0$ and $x^2 + x + b = 0$, then ab =
(a) 3
(b) 3.5
(c) 6
(d) -3
Solution:
(a) In the equation

$ax^2 + ax + 3 = 0$ and $x^2 + x + b = 0$
Substituting the value of x = 1, then in $ax^2 + ax + 3 = 0$

$$a(1)^2 + a(1) + 3 = 0 \Rightarrow a + a + 3 = 0$$

$$\Rightarrow 2a + 3 = 0 \Rightarrow 2a = -3 \Rightarrow a = \frac{-3}{2}$$

and in $x^2 + x + b = 0$

$$(1)^2 + 1 + b = 0 \Rightarrow 1 + 1 + b = 0 \Rightarrow b = -2$$

$$\therefore ab = \frac{-3}{2} \times (-2) = 3$$

Question 13.
If p and q are the roots of the equation $x^2 - px + q + 0$, then
(a) p = 1, q = -2
(b) p = 0, q = 1
(c) p = -2, q = 0
(d) p = -2, q = 1
Solution:
(a)

$\because$ p and q are the roots of the equation
$x^2 - px + q = 0$,
Sum of roots $= -(-p) = p$
and product of roots $= q$

(a) If $p = 1$, $q = -2$, then equation will be
$x^2 - (s)x + p = 0 \Rightarrow x^2 - (1 - 2)x + 1 \times (-2) = 0$
$\Rightarrow x^2 + x - 2 = 0$

(b) If $p = 0$, $q = 1$, then equation will be
$x^2 - (0 + 1)x + 0 \times 1 = 0$
$\Rightarrow x^2 - x + 0 = 0$

(c) If $p = -2$, $q = 0$, then equation will be
$x^2 - (-2 + 0)x + (-2 \times 0)$
$\Rightarrow x^2 + 2x + 0 = 0$

(d) $p = -2$, $q = 1$, then equation will be
$x^2 - (-2 + 1)x + (-2 \times 1) = 0$
$\Rightarrow x^2 + x - 2 = 0$

We see that only (a) is correct
When $p = 1$, $q = -2$

Question 14.
If a and b can take values 1, 2, 3, 4. Then the number of the equations of the form $ax^2 + bx +$

1 = 0 having real roots is
(a) 10
(b) 7
(c) 6
(d) 12
Solution:
(b)
$ax^2 + bx + 1 = 0$
$D = b^2 - 4a = b^2 - 4a$
Roots are real
$D \geq 0$
$\Rightarrow b^2 - 4a \geq 0$
$\Rightarrow b^2 \geq 4a$
Here value of b can be 2, 3 or 4
If b = 2, then a can be 1,
If b = 3, then a can be 1, 2
If b = 4, then a can be 1, 2, 3, 4
No. of equation can be 7

Question 15.
The number of quadratic equations having real roots and which do not change by squaring their roots is
(a) 4
(b) 3
(c) 2
(d) 1
Solution:
(c) There can be two such quad, equations whose roots can be 1 and 0
The square of 1 and 0 remains same
No. of quad equation are 2

Question 16.
If $(a^2 + b^2) x^2 + 2(ab + bd) x + c^2 + d^2 = 0$ has no real roots, then
(a) ad = bc
(b) ab = cd
(c) ac = bd
(d) $ad \neq bc$
Solution:

(d)

$(a^2 + b^2) x^2 + 2 (ab + bd) x + c^2 + d^2 = 0$

Here $A = a^2 + b^2$, $B = 2 (ab + bd)$, $C = c^2 + d^2$

$D = B^2 - 4AC = [2 (ac + bd)]^2 - 4 (a^2 + b^2)(c^2 + d^2)$

$= 4 [a^2c^2 + b^2d^2 + 2abcd] - 4 [a^2c^2 + a^2d^2 + b^2c^2 + b^2d^2]$

$= 4a^2c^2 + 4b^2d^2 + 8abcd - 4a^2c^2 - 4a^2d^2 - 4b^2c^2 - 4b^2d^2$

$= -4a^2d^2 - 4b^2c^2 + 8abcd$

$= -4 (a^2d^2 + b^2c^2 - 2abcd)$

$= -4 (ad - bc)^2$

$\because$ Roots are not real

$\therefore D < 0$

$\therefore -4 (ad - bc)^2 < 0 \Rightarrow (ad - bc)^2 < 0$

$\Rightarrow ad - bc < 0$ or $ad \neq bc$

Question 17.
If the sum of the roots of the equation $x^2 - x = \lambda (2x - 1)$ is zero, then $\lambda =$
(a) -2
(b) 2
(c) – 12
(d) 12
Solution:
(c)

$x^2 - x = \lambda (2x - 1)$

$\Rightarrow x^2 - x = 2\lambda x - \lambda$

$\Rightarrow x^2 - x - 2\lambda x + \lambda = 0$

$\Rightarrow x^2 - (1 + 2\lambda) x + \lambda = 0$

$$\text{Sum of roots} = \frac{-b}{a} = \frac{1+2\lambda}{1}$$

$$\frac{1+2\lambda}{1} = 0 \Rightarrow 2\lambda = -1$$

$$\lambda = -\frac{1}{2}$$

Question 18.
If $x = 1$ is a common root of $ax^2 + ax + 2 = 0$ and $x^2 + x + b = 0$ then, $ab =$
(a) 1
(b) 2

(c) 4
(d) 3
Solution:
(b)

$ax^2 + ax + 2 = 0$ ....(i)

$x^2 + x + b = 0$ ....(ii)

$x = 1$ is common root of equations (i) and (ii)

Then in (i) $a(1)^2 + a \times 1 + 2 = 0$

$\Rightarrow a + a + 2 = 0 \Rightarrow 2a + 2 = 0$

$\Rightarrow 2a = -2 \Rightarrow a = \frac{-2}{2} = -1$

$\therefore a = -1$

Then in (ii)

$(-1)^2 + 1 + b = 0 \Rightarrow 1 + 1 + b = 0$

$\Rightarrow 2 + b = 0 \Rightarrow b = -2$

$\therefore ab = (-1) \times (-2) = 2$

Question 19.
The value of c for which the equation $ax^2 + 2bx + c = 0$ has equal roots is

(a) $\frac{b^2}{a}$
(b) $\frac{b^2}{4a}$
(c) $\frac{a^2}{b}$
(d) $\frac{a^2}{4b}$

Solution:
(a)

$ax^2 + 2bx + c = 0$

$D = b^2 - 4ac$

$= (2b)^2 - 4 \times a \times c$

$= 4b^2 - 4ac$

$\because$ Roots are equal

$\therefore D = 0$

$\Rightarrow 4b^2 - 4ac = 0$

$\Rightarrow 4ac = 4b^2$

$\Rightarrow c = \frac{4b^2}{4a} = \frac{b^2}{a}$

Question 20.
If $x^2 + k(4x + k - 1) + 2 = 0$ has equal roots, then k =

(a) $-\frac{2}{3}, 1$ (b) $\frac{2}{3}, -1$

(c) $\frac{3}{2}, \frac{1}{3}$ (d) $\frac{3}{2}-, -\frac{1}{3}$

Solution:
(b)

$x^2 + k(4x + k - 1) + 2 = 0$

$\Rightarrow x^2 + 4kx + k^2 - k + 2 = 0$

$\Rightarrow$ Here $a = 1$, $b = 4k$, $c = k^2 - k + 2$

$\therefore D = b^2 - 4ac$

$= (4k)^2 - 4 \times 1(k^2 - k + 2)$

$= 16k^2 - 4k^2 + 4k - 8$

$= 12k^2 + 4k - 8$

$\because$ Roots are equal

$\therefore D = 0$

$\therefore 12k^2 + 4k - 8 = 0$

$\Rightarrow 3k^2 + k - 2 = 0$ (Dividing by 4)

Here $a = 3$, $b = 1$, $c = -2$

$$\because k = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a} = \frac{-1 \pm \sqrt{1 + 24}}{2 \times 3}$$

$$= \frac{-1 \pm \sqrt{25}}{6} = \frac{-1 \pm 5}{6}$$

$$\therefore k = \frac{-1+5}{6} = \frac{4}{6} = \frac{2}{3}$$

$$\text{and } k = \frac{-1-5}{6} = \frac{-6}{6} = -1$$

$$\therefore k = \frac{2}{3}, -1$$

Question 21.
If the sum and product of the roots of the equation $kx^2 + 6x + 4k = 0$ are equal, then k =

(a) $-\frac{3}{2}$ (b) $\frac{3}{2}$

(c) $\frac{2}{3}$ (d) $-\frac{2}{3}$

Solution:

(b)

$kx^2 + 6x + 4k = 0$

Here $a = k$, $b = 6$, $c = 4k$

$D = b^2 - 4ac = (6)^2 - 4 \times k \times 4k$

$= 36 - 16k^2$

$\because$ Roots are equal

$\therefore$ $D = 0 \Rightarrow 36 - 16k^2 = 0$

$\Rightarrow 16k^2 = 36$

$$k^2 = \frac{36}{16} = \left(\frac{6}{4}\right)^2$$

$$k = \frac{6}{4} = \frac{3}{2}$$

Question 22.

If sin α and cos α are the roots of the equations $ax^2 + bx + c = 0$, then $b^2 =$

(a) $a^2 - 2ac$

(b) $a^2 + 2ac$

(b) $a^2 - ac$

(d) $a^2 + ac$

Solution:

(b)

sin α and cos α are the roots of the equations
$ax^2 + bx + c = 0$

$\therefore$ Sum of roots $= \frac{-b}{a}$ and

product of roots $= \frac{c}{a}$

$\therefore \sin\alpha + \cos\alpha = \frac{-b}{a}$ and $\sin\alpha\cos\alpha = \frac{c}{a}$

$$(\sin\alpha + \cos\alpha)^2 = \left(\frac{-b}{a}\right)^2$$

$$\Rightarrow \sin^2\alpha + \cos^2\alpha + 2\sin\alpha\cos\alpha = \frac{b^2}{a^2}$$

$$\Rightarrow 1 + 2 \times \frac{c}{a} = \frac{b^2}{a^2}$$

$$\Rightarrow 1 + \frac{2c}{a} = \frac{b^2}{a^2} \Rightarrow b^2 = a^2 + 2ac$$

$\therefore b^2 = a^2 + 2ac$

Question 23.
If 2 is a root of the equation $x^2 + ax + 12 = 0$ and the quadratic equation $x^2 + ax + q = 0$ has equal roots, then q =
(a) 12
(b) 8
(c) 20
(d) 16
Solution:

(d)

2 is a root of equation $x^2 + ax + 12 = 0$

$\therefore (2)^2 + a \times 2 + 12 = 0 \Rightarrow 4 + 2a + 12 = 0$

$\Rightarrow 2a = -(12 + 4) \Rightarrow 2a = -16$

$$\Rightarrow a = \frac{-16}{2} = -8$$

and in quadratic equation roots are equal $x^2 + ax + q = 0$

$\therefore b^2 - 4ac = 0$

$\Rightarrow a^2 - 4q = 0 \Rightarrow (-8)^2 - 4q = 0$

$\Rightarrow 64 - 4q = 0 \Rightarrow 4q = 64$

$$\Rightarrow q = \frac{64}{4} = 16$$

$\therefore q = 16$

Question 24.
If the sum of the roots of the equation $x^2 - (k + 6)x + 2(2k - 1) = 0$ is equal to half of their product, then k =
(a) 6
(b) 7
(c) 1
(d) 5

Solution:
(b) In the quadratic equation
$x^2 - (k + 6)x + 2(2k - 1) = 0$
Here a = 1, b = – (k + 6), c = 2 (2k – 1)

$$\therefore \text{ Sum of roots} = \frac{-b}{a} = \frac{[(-k+6)]}{1} = k + 6$$

$$\text{and product of roots} = \frac{c}{a} = \frac{2(2k-1)}{1}$$

$= 4k - 2$

$$\text{But sum of roots} = \frac{1}{2} \text{ product of roots}$$

$$\therefore k + 6 = \frac{4k-2}{2}$$

$\Rightarrow k + 6 = 2k - 1$

$\Rightarrow 2k - k = 6 + 1 \Rightarrow k = 7$

$\therefore k = 7$

Question 25.
If a and b are roots of the equation $x^2 + ax + b = 0$, then a + b =
(a) 1
(b) 2
(c) -2
(d) -1
Solution:
(d) a and b are the roots of the equation $x^2 + ax + b = 0$
Sum of roots = – a and product of roots = b
Now a + b = – a
and ab = b => a = 1 ….(i)
2a + b = 0
=> 2 x 1 + b = 0
=> b = -2
Now a + b = 1 – 2 = -1

Question 26.
A quadratic equation whose one root is 2 and the sum of whose roots is zero, is
(a) $x^2 + 4 = 0$
(b) $x^2 – 4 = 0$
(c) $4x^2 – 1 = 0$
(d) $x^2 – 2 = 0$
Solution:
(b) Sum of roots of a quad, equation = 0
One root = 2
Second root = 0 – 2 = – 2
and product of roots = 2 x (-2) = – 4
Equation will be
x^2 + (sum of roots) x + product of roots = 0
$x^2 + 0x + (-4) = 0$
=> $x^2 – 4 = 0$

Question 27.
If one root of the equation $ax^2 + bx + c = 0$ is three times the other, then b^2 : ac =
(a) 3 : 1
(b) 3 : 16
(c) 16 : 3
(d) 16 : 1
Solution:

(c)

Quad. equation is $ax^2 + bx + c = 0$
Let first root = α, then
Second root = 3α

$\therefore$ Sum of root = $\alpha + 3\alpha = \frac{-b}{a} \Rightarrow 4\alpha = \frac{-b}{a}$

$\Rightarrow \alpha = \frac{-b}{4a}$ ....(i)

and produt of roots = $\alpha \times 3\alpha = \frac{c}{a}$

$\Rightarrow 3\alpha^2 = \frac{c}{a} \Rightarrow \alpha^2 = \frac{c}{3a}$

$\Rightarrow \left(\frac{-b}{4a}\right)^2 = \frac{c}{3a}$ [From (i)]

$\Rightarrow \frac{b^2}{16a^2} = \frac{c}{3a}$

$\Rightarrow \frac{b^2}{16a} = \frac{c}{3}$ (Dividing by a)

$\frac{b^2}{ac} = \frac{16}{3} \Rightarrow b^2 : ac = 16 : 3$

Question 28.
If one root of the equation $2x^2 + kx + 4 = 0$ is 2, then the other root is
(a) 6
(b) -6
(c) -1
(d) 1
Solution:
(d) The given quadratic equation $2x^2 + kx + 4 = 0$
One root is 2
Product of roots = ca = 42 = 2
Second root = 22 = 1

Question 29.
If one root of the equation $x^2 + ax + 3 = 0$ is 1, then its other root is
(a) 3
(b) -3
(c) 2

(d) -2

Solution:

(a) The quad, equation is $x^2 + ax + 3 = 0$

One root =1

and product of roots = ca = 31 = 3

Second root = 31 = 3

Question 30.

If one root of the equation $4x^2 – 2x + (\lambda – 4) = 0$ be the reciprocal of the other, then λ =

(a) 8

(b) -8

(c) 4

(d) -4

Solution:

(a)

The quad. equation is $4x^2 - 2x + (\lambda - 4) = 0$

Let first root = a

Then second root = $\frac{1}{a}$

Product of roots = $\frac{c}{a} - \frac{\lambda - 4}{4}$

$$\Rightarrow a \times \frac{1}{a} = \frac{\lambda - 4}{4}$$

$$\Rightarrow \frac{\lambda - 4}{4} = 1 \Rightarrow \lambda - 4 = 4$$

$$\Rightarrow \lambda = 4 + 4 = 8$$

Question 31.

If y = 1 is a common root of the equations $ay^2 + ay + 3 = 0$ and $y^2 + y + b = 0$, then ab equals

(a) 3

(b) – 12

(c) 6

(d) -3 **[CBSE 2012]**

Solution:

(a)

$$y = 1$$
$$ax^2 + ay + 3 = 0$$
$$\therefore\ a \times (1)^2 + a.1 + 3 = 0$$
$$a + a + 3 = 0 \Rightarrow 2a = -3$$
$$\Rightarrow a = \frac{-3}{2}$$
$$\text{and } y^2 + y + b = 0$$
$$(1)^2 + (1) + b = 0 \Rightarrow 1 + 1 + b = 0$$
$$\Rightarrow 2 + b = 0$$
$$\therefore\ b = -2$$
$$ab = \frac{-3}{2} \times (-2) = 3$$

Question 32.
The values of k for which the quadratic equation $16x^2 + 4kx + 9 = 0$ has real and equal roots are
(a) 6, – 16
(b) 36, -36
(c) 6, -6
(d) 34 , – 34 **[CBSE 2014]**
Solution:
(c) $16x^2 + 4kx + 9 = 0$
Here a = 16, b = 4k, c = 9
Now $D = b^2 - 4ac = (4k)^2 - 4 \times 16 \times 9 = 16k^2 - 576$
Roots are real and equal
$D = 0$ or $b^2 - 4ac = 0$
$\Rightarrow 16k^2 - 576 = 0$
$\Rightarrow k^2 - 36 = 0$
$\Rightarrow k^2 = 36 = (\pm 6)^2$
$k = \pm 6$
k = 6, -6