

**IEM KOLKATA****ALGEBRA**

Instructor: Akash Bhattacharya

Q1) Solve for  $x$ :  $2^{x+2} = 64$ 

(a) 3 (b) 4 (c) 5 (d) 6

Q2) What will be the value of  $c$ , if  $a(a+b+c) = 85$ ,  $b(a+b+c) = 96$ ,  $c(a+b+c) = 108$ ?Q3) Find the value of  $M - \frac{1}{M}$ , if  $M + \frac{1}{M} = 4$ ?Q4) Find value of  $\frac{a^2+2a+b^2}{a^3-2a^2}$ , if  $a + \frac{b^2}{a} = 2$ ?Q5) Find value of  $a^3 + b^3 + 3ab$ , when value of  $a + b = 1$ ?Q6) If  $a + b = 7$  and  $ab = 10$ , what is the value of  $(a^3 + b^3)$ ?

(a) 133 (b) 157 (c) 175 (d) 191

Q7) If  $l + m + n = 0$  then  $l^3 + m^3 + n^3$  would be equal to:(a)  $3lmn$  (b)  $\frac{(lm+mn+ln)}{lmn}$  (c)  $lmn(ln + lm + nm)$  (d)  $\frac{(l^2+m^2+n^2)}{lmn}$ Q8) If  $a - \frac{1}{a} = 2$ , then calculate the value of  $a^4 + \frac{1}{a^4}$ ?

(a) 14 (b) 85 (c) 34 (d) 0

Q9) If  $x^2 - 8x - 1 = 0$ , then what is the value of  $x^2 + \frac{1}{x^2}$ ?

(a) 68 (b) 62 (c) 64 (d) 66

Q10) What will be the value of  $(m + n)$  if we know that  $\sqrt{28 - 6\sqrt{3}} = \sqrt{3}m + n$ ?

(a) 1 (b) 2 (c) 3 (d) -1

Q11) If  $x + \frac{1}{x} = -\sqrt{3}$ , then find the value of  $x^{17} + \frac{1}{x^{17}}$ .Q12) If  $x^2 + 4x + k = 0$  has real roots, what is the range of values for  $k$ ?(a)  $k \leq 4$  (b)  $k \geq 4$  (c)  $k \leq -4$  (d)  $k \geq -4$ Q13) What is the number of real solutions of the equation  $x^2 - 7|x| - 18 = 0$ ?

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

Q14) Sum of the roots of a quadratic equation is 5 less than the product of the roots.

If one root is 1 more than the other root, find the product of the roots?

(a) 6 or 3 (b) 12 or 2 (c) 8 or 4 (d) 12 or 4