SET 1

1. If the roots of the equation $a(b-c)x^2 + b(c-a)x + c(a-b) = 0$ are real and equal and α, β be the roots of equation $ax^2 + bx + c = 0$ then H.M of α, β is

   (a) $-1 - \alpha\beta$
   (b) $-2 - \alpha\beta$
   (c) $-3 + \alpha\beta$
   (d) $-1 + 2\alpha\beta$

2. Number of real roots of the equation $\sum_{r=1}^{10}(x-r)^3 = 0$ is

   (a) 5
   (b) 4
   (c) 1
   (d) 2

3. Equation $\frac{a}{x-1} + \frac{b}{x-2} + \frac{c}{x-3} = 0 (a, b, c > 0)$ has

   (a) one real root in (3,5) and other in (2,3)
   (b) one real root in (1,2) and other in (2,3)
   (c) one real root in (-1,0) and other in (1,2)
   (d) one real root in (-2,-1) and other in (2,3)

4. If α is root of equation $4x^2 + 2x - 1 = 0$ and $f(x) = 4x^3 - 3x + 1$ then $2[f(\alpha) + 1] =$

   (a) 5
   (b) 4
   (c) 2
   (d) 1

5. The number of solution of equation $|x-1| = e^x$ is

   (a) 1
   (b) 0
   (c) 4
   (d) 3

6. If $p, q, r, s \in R$ then equation $(x^2 + px + 3q)(-x^2 + rx + q)(-x^2 + sx - 2q) = 0$ has

   (a) at least one real roots
   (b) no real root
   (c) at least two real roots
   (d) at most one real root

7. If α, β are the roots of equation $x^2+px+q=0$ and α^4, β^4 be those of equation $x^2-rx+s=0$ and $f(x)=x^2-4qx+2q^2-r$ then which one is necessarily true?

   (a) $f(p^2)=4$
   (b) $f(p^2)=0$
   (c) $f(2p^2)=0$
   (d) $f(4p^2)=0$

8. If a+b+c $> \frac{9c}{4}$ and equation $ax^2+2bx-5c=0$ has non real complex roots, then

   (a) $a>0, c<0$
   (b) $a<0, c<0$
   (c) $a>0, c>0$
   (d) $a>0, b<0$

9. If a,b,c,d are four non zero real numbers such that $(d+a-b)^2+(d+b-c)^2=0$ and roots of the equation $a(b-c)x^2+b(c-a)x+c(a-b)=0$ are real and equal , then

   (a) a+b+c $\neq 1$
   (b) a+b+c=0
   (c) a+b+c $\neq 0$
   (d) a+b+c =1

10. If n is even number and α, β are the roots of equation $x^2+px+q=0$ and also of equation $x^{2n}+p^nx^n+q^n=0$ and $f(x)=\frac{(1+x)^n}{1+x^n}$ then $f(\frac{\alpha}{\beta})=$ (where $\alpha^n+\beta^n \neq 0, p \neq 0$)

    (a) -1

11. If α, β, γ are the roots of the equation $x^3-px+q=0$ then the cubic equation whose roots are $\frac{\alpha}{1+\alpha}, \frac{\beta}{1+\beta}, \frac{\gamma}{1+\gamma}$ is

    (a) $(p+q-1)x^3-(2p+3q)x^2+(p+3q)x-q=0$

12. The number of real roots of the equation $x^8-x^5+x^2-x+1=0$ is

    (a) 0

13. If a,b,c $\in R$ and 1 is a root of the equation $ax^2+bx+c=0$ then the equation $4ax^2+3bx+2c=0$ $c \neq 0$ has

    (a) imaginary roots
    (b) real and equal roots
    (c) real and unequal roots
    (d) rational roots

14. The values of a for which both roots of the equation $(1-a)x^2+2ax-1=0$ lie between 0 and 1 are given by

(a) $a > 2$

15. If $sin\theta, cos\theta$ are the roots of the equation $ax^2 + bx + c = 0$ then

(a) $a^2 = b^2 - 2ac$

16. If $x^2 + px + q$ is an integer for every integral value of x, then which is necessarily true?

(a) $p \in I, q \notin I$

(b) $p \notin I, q \in I$

(c) $p \in I, q \in I$

(d) $p \notin I, q \notin I$