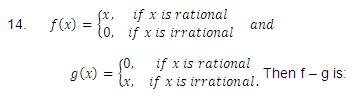
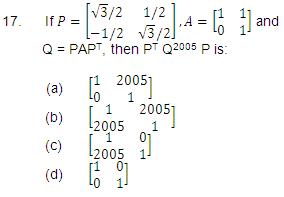
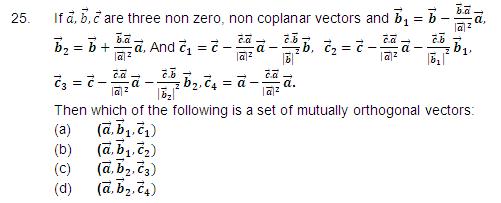
**IIT-JEE-Mathematics–Screening-2005**

**SCREENING**   
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**1.** The area of the equilateral triangle, in which three coins of radius 1 cm are placed, as shown in the figure, is:   
(a) 6 + 4√3   
(b) 4√3 – 6   
(c) 7 + 4√3   
(d) 4√3   
  
**2.** The area bounded by the curves y = (x – 1)2, y = (x + 1)2 and y = 1/4 is:   
(a) 1/3   
(b) 2/3   
(c) 1/4   
(d) 1/5   
  
**3.** The value of ∫-20[x3+3x2+3x+3+(x+1)cos(x+1)dx] is:   
(a) 0   
(b) 3   
(c) 4   
(d) 1   
  
**4.** The tangent at (1, 7) to the curve x2 = y – 6 touches the circle x2 + y2 + 16x + 12y + c = 0 at :   
(a) (6, 7)   
(b) (–6, 7)   
(c) (6, –7)   
(d) (–6, –7)   
  
**5.** If dy/dx=xy/(x2+y2 ), y(1) = 1, then one of the values of x0 satisfying y(x0) = e is given by   
(a) e√2   
(b) e√3   
(c) e√5   
(c) e/√2   
    
**6.**         The locus of the centre of circle which touches (y -1)2 + x2 = 1 externally also touches x axis is:   
            (a)       x2 = 4y È (0, y), y < 0   
            (b)       x2 = y   
            (c)        y = 4x2   
            (d)       y2 = 4x È (0, y), y Î R   
    
**7.**If ∫sin x1 t2 f(t) dt = 1 – sin x ∀ x ∈ [0, Π/2] then f(1/√3) is:   
              
            (a)       3   
            (b)       √3   
            (c)       1/3   
            (d)       none of these   
    
**8.** iit-maths-question  
            (a)       30C11   
            (b)       60C10   
            (c)        30C10   
            (d)       65C55   
 **9.**        A variable plane x/a + y/b + z/c = 1 at a unit distance from origin cuts the coordinate axes at A, B and C. Centroid (x, y, z) satisfies the equation 1/x2 + 1/y2 + 1/z2 = K. The value of K is :   
            (a)       9   
            (b)       3   
            (c)      1/9  
            (d)      1/3   
    
**10.**      Let f(x) = ax2 + bx + c, a ¹ 0 and D = b2 - 4ac. If a + b, a2 + b2 and a3 + b3 are in G.P., then :   
            (a)       Δ ≠ 0   
            (b)       b ≠ 0   
            (c)       c ≠ 0   
            (d)       bc ≠ 0   
  
**11.** Tangent at a point of the ellipse x2/a2 + y2/b2 = 1 is drawn which cuts the coordinate axes at A and B. The minimum area of the triangle OAB is (O being the origin) :   
(a) ab   
(b) (a3 + ab + b3)/3   
(c) a2 + b2   
(d) ((a2 + b2))/4   
  
**12.** A fair die is rolled. The probability that the first time 1 occurs at the even throw is :   
(a) 1/6   
(b) 5/11   
(c) 6/11   
(d) 5/36   
  
**13.** If xdy = y (dx + ydy), y(1) = 1 and y(x) > 0. Then y(–3) = :   
(a) 3   
(b) 2   
(c) 1   
(d) 0   
  
  
  
(a) one-one and into   
(b) neither one-one nor onto   
(c) many one and onto   
(d) one-one and onto  
  
**15.** A rectangle with sides (2n – 1) and (2m – 1) is divided into squares of unit length. The number of rectangle which can be formed with sides of odd length is :   
(a) m2 n2   
(b) mn(m + 1) (n + 1)   
(c) 4m + n – 1   
(d) none of these   
  
**16.** The minimum value of |a + bω + cω2|, where a, b and c are all not equal integers and ω(≠  1) is a cube root of unity, is:   
(a) √3   
(b) 1/3   
(c) 1   
(d) 0

     
  
**18.** The shaded region, where   
P ≡ (–1, 0), Q ≡ (–1 + √2,√2)   
R ≡ (–1 + √2, – √2), S ≡ (1, 0) is represented by:   
(a) |z + 1| > 2, |arg (z + 1)|< π/4   
(b) |z + 1| < 2, |arg (z + 1)|< π/2   
(c) |z – 1| > 2, |arg (z + 1)|> π/4   
(d) |z – 1| < 2, |arg (z + 1)|> π/2   
  
**19.** The number of ordered pairs (α, β), where α, β ∈ (–Π, Π) satisfying cos (α – β) = 1 and cos (α + β) = 1/e is :   
(a) 0   
(b) 1   
(c) 2   
(d) 4   
  
**20.** Let f(x) = |x|–1, then points where f(x) is not differentiable is/(are) :   
(a) 0, + 1   
(b) + 1   
(c) 0   
(d) 1   
  
**21.** The second degree polynomial f(x), satisfying f(0) = 0, f(1) = 1, f’(x) > 0 for all x ∈ (0, 1) :   
(a) f(x) = φ   
(b) f(x) = ax + (1 – a) x2; ∀ a ∈ (0, ∞)   
(c) f(x) = ax + (1 – a) x2; ∀ a ∈ (0, 2)   
(d) no such polynomial   
  
**22.** If f is a differentiable function satisfying f(1/n) = 0 for all n > 1, n  I, then :   
(a) f(x) = 0, x  (0, 1]   
(b) f’(0) = 0 = f(0)   
(c) f(0) = 0 but f’(0) not necessarily zero   
(d) |f(x)| < 1, x  (0, 1]  
  
matrix-question  
  
6A-1 = A2 + cA + dI, then (c, d) is:   
  
(a) (–6, 11)   
(b) (–11, 6)   
(c) (11, 6)   
(d) (6, 11)

**24.** In a ΔABC, among the following which one is true?   
(a) (b + c) cos A/2 = a sin ((B+C)/2)   
(b) (b + c) cos ((B+C)/2) = a sin A/2   
(c) (b – c) cos ((B-C)/2) = a cos (A/2)   
(d) (b – c) cos A/2 = a cos ((B-C)/2)   
  
  
  
**26.** If y = f(x) and y cos x + x cos y = Π, then the value of f’(0) is :   
(a) Π   
(b) – Π   
(c) 0   
(d) 2Π   
  
**27.** Let f be twice differentiable function satisfying f(1) = 1, f(2) = 4, f(3) = 9, then :   
(a) f’(x) = 2, ∀ x ∈ (R)   
(b) f’(x) = 5 = f’’ (x), for some x ∈ (1, 3)   
(c) There exists at least one x ∈ (1, 3) such that f’(x) = 2   
(d) none of these   
  
**28.** If X and Y are two non-empty sets where f : X --> Y is function is defined such that   
f(c) = {f(x) : x ∈ C} for C ⊆ X   
and f-1 (D) = {x : f(x) ∈ D} for D  y,   
for any A  X and B  Y then :   
  
(a) f-1 (f(A)) = A   
(b) f-1 (f(A)) = A only if f(X) = Y   
(c) f(f-1 (B)) = B only if B  f(x)   
(d) f(f-1 (B)) = B