MATHEMATICS [Booklet No. 3350519]

Category : I

1. Each of a and b ... $ax^2 + bx + 1 = 0$ has real roots, is equal to [Ans.1/4]
2. Cards are drawn one-by-one ... time on the third turn is equal to [Ans.12/85]
3. There are two coins, one ... unbiased coin was selected is [Ans.2/5]
4. Lines x+y=1 and 3y=x+3 intersect ... The area of the triangle PQR is [Ans.18/5]
5. For the variable t, the locus of the point ... lines 3tx–2y+6t and 3x+2ty–6=0 is [Ans. the ellipse $x^2/4+y^2/9=1$]
6. The locus of the midpoints ... the minor axis is [Ans. an ellipse ... minor axis 1/2]
7. A point P ... the angle $\angle QPR$ is [Ans.$\pi/2$]
8. A point moves ... it's locus is [Ans.a circle with ... radius $1/\sqrt{2}$]
9. A circle passing ... origin is [Ans.5]
10. For the variable t, ...and x+2y=1/t is [Ans.the hyperbola with ... $(\sqrt{5}/2,0)$]
11. The number of ... the set {1, 2,....,10} is [Ans.10×(11)!]
12. Let p(x) be ... of p(x) = 0 is [Ans.1/2]
13. The limit ... as $x\to 0$ [Ans. approaches$+\infty$]
14. Eleven apples ... statements is true [Ans.The girl...4 apples...least 8 apples]
15. Let $z_1 = 2 + 3i$ and ... $|z - z_1|^2 + |z - z_2|^2 = |z_1 - z_2|^2$ represents [Ans. a circle]
16. Five numbers ...three terms is [Ans. 11/2]
17. Let P = (...) and ... equal to [Ans. $\begin{pmatrix} -1 \\ 0 \end{pmatrix}$]
18. If α and β...+ β^{2013} is equal to [Ans. – 2]
19. The number ... x + y + z = 10 in ..... x, y, z, is equal to [Ans. 36]
20. The value of... $\int_{-1}^{+1}\left\{\frac{x^{2013}}{e^{|x|}\left(x^2+\cos x\right)}+\frac{1}{e^{|x|}}\right\}dx$ is equal to [Ans. $2(1-e^{-1})$]
21. For $0 \le P, Q \le \pi/2$, ... is equal to [Ans.1]
22. Let $f(x) = 2^{100}x + 1$, ... f(g(x)) = x is [Ans. a singleton]
23. The limit of {1/x...} as $x\to 0$ [Ans. does not exist]
24. The value...$\cos^2 75^\circ$+...–$\cos^2 60^\circ$ is[Ans.1/2]
25. The maximum...respecitvely [Ans.1&1/4]
26. Suppose z=x+iy...lie on [Ans. a straight line]
27. If a,b,c are...co-ordinates are [Ans.(1,–1)]
28. The equation $2x^2+5xy-12y^2=0$ represents a [Ans. pair of non-perpendicular...lines]
29. If one end ... the other end is [Ans. (2,–4)]
30. The line y=x ... length $5/\sqrt{2}$ is [Ans. $\sqrt{5}/3$]

31. The limit ... as $x \to 0$ [Ans. is equal to 0]
32. The value of $1000[...]$ is equal to [Ans. 999]
33. Let $I=(...)$ and $P=(...)$...equal to [Ans. $2\mathbf{I}+P$]
34. The value of the determinent$|...|$ is equal to [Ans.$(1+a^2+b^2)^3$]
35. If $\alpha,\beta...,\beta-1/\alpha$ is[Ans. $bx^2+a(b-1)x+(b-1)^2=0$]
36. If the ... eccentricity is [Ans. $1/2(\sqrt{5}-1)$]
37. The equation of the circle ... and $x^2+y^2-6=0$ is [Ans. $x^2+y^2+3x-5=0$]
38. The number ... the point $(-1,2)$ is [Ans. 0]
39. Six positive ... the last term is [Ans. 1/100]
40. If $\alpha,\beta...3b^2=16ac$ then[Ans. $\alpha=3\beta$ or $\beta=3\alpha$]
41. In the set...relation is[Ans. an equi. ...relation]
42. For any...relation R is[Ans. an equi. ...relation]
43. For the curve...the points[Ans. $(8,-4)\&(-8,4)$]
44. Let f(x)={... Then [Ans. f is...but not...$x=2$]
45. The value of ... is equal to [Ans. 1/n]
46. The limit ... as $x \to \infty$[Ans. exists and...$+\infty$]
47. Let $f(\theta)$=... values of θ [Ans. $2 \le f(\theta) \le 9/4$]
48. If $f(x)=e^x(x-2)^2$ then[Ans.f is inc. ... dec. $(0,2)$]
49. Let n be a positive ... $(1+x)^n$ is [Ans. 21]
50. Five numbers are in A.P. ... terms are in G.P., then [Ans.the 5^{th} term is always 0]
51. Let $exp(x)$...interval $[2,5]$ is [Ans. $\exp(e^{1/e})$]
52. The minimum ... $f(x)=2|x-1|+|x-2|$ is [Ans.1]
53. The sum...$+1/26\times27\,{}^{25}C_{25}$[Ans.$(2^{27}-1)/(26\times27)$]
54. If p,Q,R ... $(\cos R - i \sin R)$ equal to[Ans.$-i$]
55. Let f : $R \to R$ ...x,y,z are in[Ans.A.P. always]
56. The value of the ... is [Ans.$e^2(1+\log_e 2)-e$]
57. The number of ... is [Ans.1]
58. Let P = ... and Q = ... then [Ans.P=2Q]
59. The area of ... $y = x+1$ is [Ans.9/2]
60. Let $f(x)$=..f attains its[Ans.max. at $x=\sin^{-1}(1/4)$]

Category : II

61. An objective ... four questions is [Ans.3/64]
62. The solution...solution is [Ans.$x=y^2(1+\log_e y)$]
63. A family...of curves is a[Ans.$x^2y=c$,c is const.]
64. The sol...$y(\pi/4)=1$ is[Ans.$\cos x/y=-\log_e y+1/\sqrt{2}$]
65. A line passing ... is equal to [Ans.32/9]
66. If $\sin^2\theta + 3\cos\theta = 2$ ... is [Ans.18]
67. Let [a] ... the integral ... is [Ans.$-\pi/2$]
68. Let x = ... and y = ... of $\log_e y$ is [Ans.e]
69. If P = ... then P^5 equals [Ans.P]
70. The value of... $\frac{1^2+2^2}{\lfloor 3}$ +...is [Ans.5e/6–1/2]
71. The value of ... $\int_{\pi/6}^{\pi/3} \frac{(\sin x - x\cos x)}{x(x+\sin x)}dx$ is equal to [Ans.$\log_e(2(\pi+3)/2(\pi+3\sqrt{3})$]
72. Let $f(x) = x^{2/3}$, $x \ge 0$ ...x = 8 is [Ans.129/10]
73. Let $f(x) = x\left\lfloor \frac{}{x-1}+\frac{}{x}+\frac{}{x+1}\right\rfloor$, x>1. Then [Ans.f(x)>3]

74. Let P be a point ... $\frac{\tan\angle PQF}{\tan\angle PFQ}$ is [Ans.1]

75. Let $F(x) = \int_0^x \frac{\cos t}{(1+t^2)} dt, 0 \le x \le 2\pi$. Then

[Ans.F is inc... and dec. ... $(\pi/2, 3\pi/2)$]

Category : III

76. The equations ... $4x+3y = 12$ ... quadrant, are

[Ans.$x^2+y^2-2x-2y+1=0; x^2+y^2-12x-12y+36=0$]

77. The area of the region ... $y^2 = x$ and ... value of m is [Ans.–2; 2]

78. Let $\sin\alpha, \cos\alpha$ be the roots of the ... statements is/are correct? [Ans.$c \le 1/2$; $b \le \sqrt{2}$]

79. Consider the system of equations: ... equations has [Ans.infinite number...α,β,γ are equal;a unique...α,β,γ are distinct]

80. Which of the following ... not even functions?

[Ans.$f(x)=e^x x^3 \sin x$; $f(x)=x-[x]$, ... equal to x]