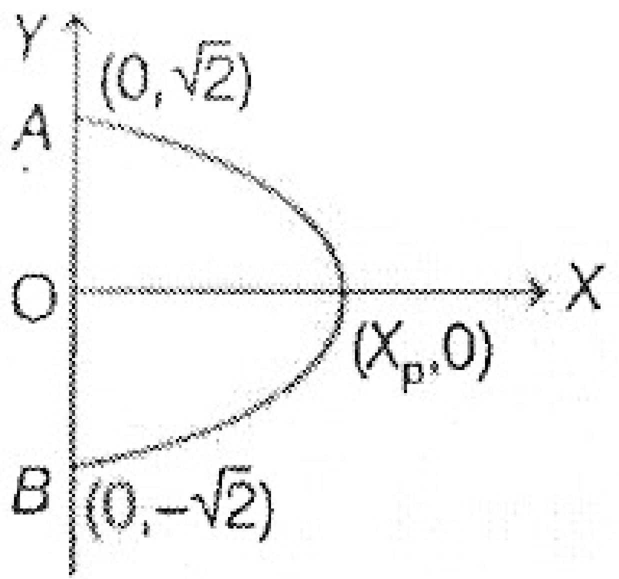
Subjective questions

AI24BTECH11018 - Sreya

21. Sketch the curves and identify the region bounded by $x = \frac{1}{2}$,$x = 2$,$y = \ln x$ and $y = 2^x$. Find the area of region.
(1991 – 4*Marks*)
22. if f is a continous function with $\int_0^x f(t)dt \to \infty$ as $| x | \to \infty$, then show that every line $y = mx$



intersects the curve $y^2 + \int_0^x f(t)dt = 2!$
1991 – 4*Marks*
23. Evaluate $\int_0^{\pi} \frac{xsin2xsin(\frac{\pi}{2}cosx)}{2x-\pi}$
1991 – 4*Marks*
24. Sketch the region bounded by the curves $y = x^2$ and $y = \frac{2}{1+x^2}$. Find the area.
1992 – 4*Marks*
25. Determine a positive integer $n \leq 5$, such that $\int_e^x (x-1)^n = 16 - 6e$
(1992 – 4*Marks*)
26. Evaluate $\int_2^3 \frac{2x^5+x^4-2x^3+2x^4+1}{(x^2+1)(x^4-1)}dx$
(1993 – 5*Marks*)
27. Show that $\int_0^{n\pi+v} | sinx | dx = 2n + 1 - cosv$ where n is a positive integer and $0 \leq v < \pi$
(1994 – 4*Marks*)
28. In what ratio does the x-axis divide the area of the region bounded by the parabolas $y = 4x-x^2$ and $y = x^2 - x$?
(1994 – 5*Marks*)
29. $I_m = \int_0^{\pi} \frac{1-cosmx}{1-cosx}dx$. Use mathematical induction to prove that $I_m = m\pi$, $m = 0, 1, 2, 3, ...$
(1995 – 5*marks*)

30 Evaluate the definite integral: $\int_{\frac{-1}{\sqrt{3}}}^{\frac{1}{\sqrt{3}}} (\frac{x^4}{1-x^4})cos^{-1}(\frac{2x}{1+x^2})$
(1995 – 5*Marks*)

31. Consider a square with vertices at (1,1),(-1,1),(-1,-1) and (1,-1). Let s be the region consisting of all points inside the square which are nearer to the orgin than to any edge. Sketch the region S and find its area.
(1995 – 5*Marks*)

32. Let A_n be the area bounded by the curve $y = (tanx)^n$ and the lines $l = 0$,$y = 0$ and $x = \frac{\pi}{4}$. Prove that for $n > 2$, $A_n + A_n - 2 = \frac{1}{n-2}$ and deduce $\frac{1}{2n+2} < A_n < \frac{1}{2n-2}$.
(1996 – 3*Marks*)
33. Determine the value of $\int_{-\pi}^{\pi} \frac{2x(1+six)}{1+cos^2x}dx$.
(1997 – 5*Marks*)
34. Let $f(x)$= Maximum $x^2, (1-x)^2, 2x(1-x)$, Where $0 \leq x \leq 1$. Determine the area of the region bounded by the curves $y = f(x)$,x-axis,$x = 0$ and $x = 1$. (1997 – 5*Marks*)
35. Prove that $\int_0^1 tan^{-1}(\frac{1}{1-x+x^2})dx$=$2\int_0^1 tan^{-1}xdx$. Hence or otherwise, evaluate the integral $\int_0^1 tan^{-1}(1-x+x^2)dx$. (1998 – 8*Marks*)