QUESTION BANK

GOVT.(AUTO) COLLEGE ROURKELA

Sub- Mathematics,Paper-C-1

Q.1Answer the followings:

(a) The range of sine hyperbolic function is ————————

(b) The curve of n^{th} degree cuts the asymptotes at ————————————

(c) Evaluate lim $(1 + sinx)^{\frac{1}{x}}$
x→0

(d)Write True/False- : Through any point,, six normals can be drawn to conicoid.

(e)The perimeter of the curve r = 2cosθ is ————————

(f)Define slant asymptote.

(g) $\int_0^{\frac{\pi}{2}} cos^5 x$dx

(h) Rectification is the process of evaluating the ————————

(i)Area of the surface of revolution of the curve y = f(x) between x=a and x= b is ————————

(j)Quadrature is the process of determining ————————

(k)The length of the arc of the curve y = log secx between x=0 and x=$\frac{\pi}{6}$

(l) For what value of t the vector $\vec{a}$ = 2 $\hat{\imath}$ –3$\hat{\jmath}$ +t$\hat{k}$, b =3 $\hat{\imath}$ –$\hat{\jmath}$ +2$\hat{k}$ are coplanar.

(m)The asymptotes parallel to x-axis for the curve $x^2y^2 + x^2y – xy^2 + x + y + 1 = 0$ are ———

(n) D^nlog(1 +x) = ———

(o)If y = sin(5 –3x) then y_n = ———

(p)If x = t –sint , y = 1 – cost then value of $\frac{d^2y}{dx^2}$ at $\frac{\pi}{6}$

(q) The parabola $y^2 = 4ax$ has ——— number of real asymptotes.

(r)$\int_0^{ln3} \frac{e^x - e^{-x}}{e^x + e^{-x}}$ dx = ————————

(s) If f(x) = x e^x then the value of f^n (x) is ————————

(t)$\int Cosec^2(3x)$ dx = ————

Q.No-2

(a) Determine a, b and c such that the graph of $f(x) = ax^3 + bx^2 + c$ has an inflection point and slope 1 at (-1,2).

(b)Find the point of inflection for the function f defined by $f(x) = x^4 + 4x^3 – 18x^2 + 9x – 3$

(c) Trace the curve $x^{\frac{2}{3}} + y^{\frac{2}{3}} = a^{\frac{2}{3}}$

(d)Sketch the graph of the conics given by r = $\frac{6}{2+cos\theta}$ in polar coordinate.

(e) Find the eccentricity and distance from the pole to the directrix in the following polar equation

a) r = $\frac{6}{2+cos\theta}$ (b) $\frac{4}{2+3cos\theta}$

(f)Find a rotation angle θ to remove xy term $9x^2 + 24xy + 16y^2 – 80x – 60y – 100 = 0$.

(g)Find a formula for the surface area of a sphere of radius r.

(i) Find the area of the surface generated by revolving the curve $x = t^2$, y = 5t, $0 \leq t \leq 2$ about y –axis.

(j) Transform the equation $x^2 – y^2 = 25$ when the axes are rotated through 45^o

Q.No-3

(a)Find the exact arc length of the curve given parametrically by the equation x = a $cos^3\theta$, y = a $sin^3\theta$

(b)Use Washer's method , find the volume of the solid that results when the region enclosed by he curves $y = x^2$, $x = y^2$ is revolved about y –axis.

(c) Prove that every differentiable vector valued function are continuous but converse is not true.

(d)Find the interval in which f(t) = sint $\hat{\imath}$ – $\frac{1}{1-t}$ $\hat{\jmath}$ +lnt$\hat{k}$ is continuous.

(e) Find the volume of the solid generated by revolving around the x-axis, the area enclosed by xy = 4 and x+y = 5 ,Using the cylindrical shell method and washer Method.

(f)Evaluate $\int tan^4$x secxdx by using reduction formula.

(g) If y = sin(m $\sin^{-1}$x) then show that $(1–x^2)\frac{d^2y}{dx^2} – x\frac{dy}{dx} + m^2y = 0$.

(h)Evaluate $\int Cosec^n$x dx

Q.No-4

(a) Evaluate $\int_0^1 xe^{\sqrt{x}}$dx using reduction formula.

(b)Trace the curve r = a sin3θ

(c)Evaluate $\int_0^{\frac{\pi}{2}} sin^8$x cosxdx.

(d)If y = cosh($\sin^{-1}$x) show that $(1–x^2)y_{n+2} – (2n + 1)x\ y_{n+1} – (n^2+1)y_n = 0$