TELANGANA UNIVERSITY
S.S.R. DEGREE COLLEGE, NIZAMABAD (C.C:5029)
I SEMESTER INTERNAL ASSESSMENT II EXAMINATIONS
MATHEMATICS QUESTION BANK

I. Multiple choice questions.

1. Envelope of the system of circles $(x-\alpha)^2+y^2=4\alpha$ is [a]

a. $y^2-4x-4=a$ b. $y^2+4x-4=a$ c. $y^2-4x+4=a$ d. $y^2+4x+4=a$

2. Locus of center of curvature is known as [c]

a. Circle of curvature b. Chord of curvature c. Evolute d. Envelope

3. The radius of curvature at (x,y) of the curve $y=c\cosh\left(\frac{x}{c}\right)$ is [a]

a. y/c b. y^2/c c. y^3/c d. cy

4. Radius of curvature of the curve $y = e^x$ at the point (0,1) is [b]

a. $2\sqrt{2}$ b. $3\sqrt{2}$ c. 0 d. None of these

5. The radius of curvature of the origin, if X-axis is the tangent at the origin, is given by [d]

a. $\lim_{x\to 0}\frac{x^2}{2y}$ b. $\lim_{x\to 0}\frac{x^2}{y}$ c. $\lim_{x\to 0}\frac{y^2}{x}$ d. $\lim_{x\to 0}\frac{y^2}{2x}$

6. The angle between the radius vector and tangent for the curve $r=ae^{\theta\cot\alpha}$ is [a]

a. α b. 2α c. $\frac{\alpha}{2}$ d. $\frac{\alpha}{4}$

7. The perimeter of the cardioids $r=(1+\cos\theta)$ is [c]

a. 4a b. 4πa c. 8a d. 8πa

8. The circle $x^2+y^2=a^2$ in positive quadrant is rotated about y-axis, the volume generated is [c]

a. πa^3 b. $2\pi a^3$ c. $\frac{2}{3}\pi a^3$ d. $\frac{4}{3}\pi a^3$

9. The surface area of the solid of revolution of the circle $x^2+y^2=a^2$ about the diameter is [ ]

a. πa^2 b. $2\pi a^2$ c. $3\pi a^2$ d. $4\pi a^2$

10. The surface area of a cone whose semi-vertical angle is α is [ ]

a. $\pi r^2\sin\alpha$ b. $\pi r^2\operatorname{cosec}\alpha$ c. $\pi r^2\cos\alpha$ a. $\pi r^2\sec\alpha$

II. Fill in the blanks.

1. The reciprocal of the curvature at that point is defined as the Radius of curvature
2. The evolute of a curve is the envelope of its normals.
3. The whole length of the evolute of the asteroid $x = a\cos^3\theta$, $y = a\sin^3\theta$ is 12a
4. If r = asinn θ then P at the pole is na/2
5. The positive direction of the normal obtained by rotating the positive direction of the Tangent
6. The process of determining the tength of arc of a plane curve is known as Rectification
7. The perimeter of asteroid $x^{2/3} + y^{2/3} = a^{2/3}$ is 6a
8. The length of the arc of the equiangular spiral $r = a.e^{\theta\cot\alpha}$ between the points for which the radii vectors are r_1 and r_2 is $(r_2-r_1)\sec\alpha$
9. The length of one arc of cycloid x = a(θ-sin θ), y = a(1-cos θ) is 8a
10. The surface area of the solid generated by revolving the asteroid $x = a\cos^3t$, $y = a\sin^3t$ about the X-axis is $12\pi a^2/5$
11. If x = a(t+sint) and y = a(1-cost) then unital is tan t/2
12. The envelope of the family of straight lines y = mx + unital is $x^2 = 4ay$
13. The chord of curvature passing through the pole and parallel to X-axis $2\int \sin 4$
14. For cartision equation is $\int = \frac{(1+y_1^2)^{3/2}}{y_2}$
15. In the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$. Radius of curvature at the end of major axis is equal to semi lactus rectum $\frac{b^2}{a}$

16. Radius of the curvature $r^m = a^m \cos m\theta$ is $\int = \frac{a^m}{(m+1)r^{m-1}}$

17. The equation y = f(x) is rotated about the straight line x = a between y = c & y = d. The volume so formed is $\pi \int_c^d (a-x)^2 dy$

18. The surface of revolution for the equation of curve x = f(t) revolves about X-axis between $t = t_1$ & $t = t_2$ is $2\pi \int_{t_1}^{t_2} y \sqrt{\left(\frac{dx}{dt}\right)^2 + \left(\frac{dy}{dt}\right)^2}\, dt$

19. The length of the arc of the catenary $y = c\cosh\frac{x}{c}$ from x = 0 to x = a is given by $\int_0^a \cosh\frac{x}{c} dx$

20. The parameter of asteroid $x^{2/3} + y^{2/3} = a^{2/3}$ is 6a

III. Short answer questions.

1. Write the formula for the chord of curvature through the pole.
2. Define evolute and involute.
3. Find y2 if $y = c\cosh\left(\frac{x}{c}\right)$
4. Convert the parametric equation to Cartesian form $x = t^2$, $y = t - \frac{t^3}{3}$
5. If $x = a\cos\phi$, $y = b\sin\phi$ in ellipse, find ds.
6. Write the expression for the length of the curve x = f(t) and y = g(t) between t_1 and t_2.
7. Find the points where the curve $x^2(a^2-x^2)=8a^2y^2$ meets x-axis.
8. What is the radius of curvature at (3,4) on the curve $x^2+y^2=25$