Engineering Mathematics I-(BAS-103)
Unit 2 Differential Calculus I
Tutorial 2

Que1. Find all the symmetry in the curve

$(a) x^2 y^2 = x^2 - a^2$.　　　　　　**[2020-21]**　　　　(b) $x^{\frac{2}{3}} + y^{\frac{2}{3}} = a^{\frac{2}{3}}$

(c) $y^2(a^2 + x^2) = x^2(a^2 - x^2)$　**[2023-24]**　　　　(d) $r^2 \cos\theta = a^2 \sin 3\theta$

Que2. Find the asymptote of the following curves

(a) $xy(x^2 - y^2) + x^2 + y^2 = a^2$　　(b) $r\theta = a$

Que3. Show that the parabola $y^2 = 4ax$ has no asymptotes.

Que4. Find the nature of origin for the curve $y^2(a - x) = x^2(a + x)$

Que5. Trace the curve $y^2(a + x) = x^2 (3a - x)$.　　　　　　　　　　　　　　　　**[2017-18]**

Que6. Trace the curve $x^2 y^2 = (a^2 + y^2)(a^2 - y^2)$ where a is constant.　　　　　　**[2022-23]**

Que7. Trace the curve $r^2 = a^2 \cos 2\theta$.　　　　　　　　　　　　　　　　　　　　　**[2019-20]**

Que8. Trace the curve $r = a \sin 3\theta$

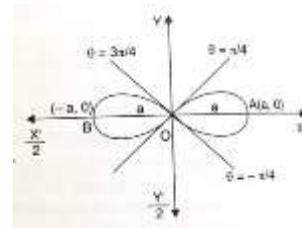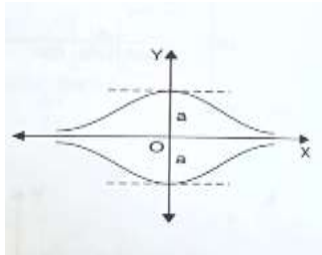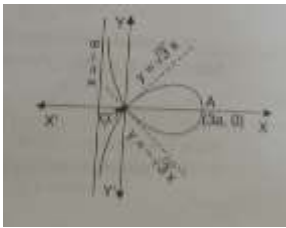**Que9.** Trace the curve $y^2(2a - x) = x^3$.　　　　　　　　　　　　　　　　　**[2014-15], [2016]**

Que10. Trace the curve $x^3 + y^3 = 3axy$ and writes its asymptotes.

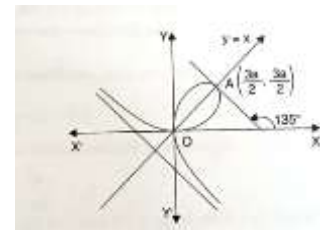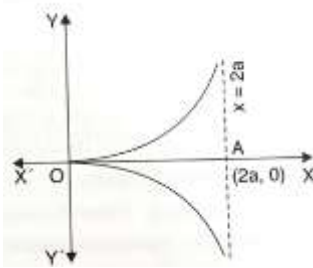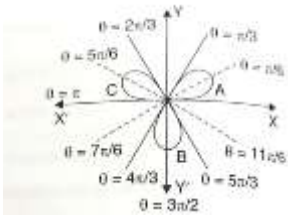**Que11.** Trace the curve $y^2 = x^3$

Answers

1. (a) The curve is symmetrical about both axes and in opposite quadrants.

(b) The curve is symmetrical about both axes and also symmetrical about lines $y = \pm x$

(c) The curve is symmetrical about both axes and also symmetrical in opposite quadrant.

(d) The curve is symmetrical about pole.

2. (a) $x = 0, y = 0, x + y = 0 \ and \ x - y = 0$

(b) $y = \pm x. \ a = r \ sin\theta.$

4. The curve passes through the origin. The tangents at origin are $y = \pm x$. The origin is a node.

5.   **6.**   **7.**

18.   **19.**   **10.**

11.