V.P. & R.P.T.P.Science College, V.V.Nagar

Internal Test

B.Sc.Semester - I

Subject : Mathematics (US01CMTH01)

(Analytic Geometry & Complex Numbers)

Date : 10/10/2017 **Total Marks: 25**

Day : Tuesday **Time : 1:30 pm to 2:30 pm**

Que. 1 Attempt the following. 3

1. The curve $y = \dfrac{x^2-1}{x^2-9}$ has ___________ branches.

   (a) 1 (b) 2 (c) 3 (d) 4

2. The curve $r = \dfrac{5}{3+\sin\theta}$ is an equation of _________.

   (a) Ellipse (b) Hyperbola (c) Line (d) Parabola

3. $(cis\theta)^{\frac{135}{105}}$ has ___________ distinct values.

   (a) 105 (b) 5 (c) 7 (d) 35

Que. 2 Attempt the following.(Any Two) 4

1. Find polar equation of circle with centre at $(3, 300^o)$ and radius is 2.
2. Find parametric equation of $\sqrt{x} + \sqrt{y} = \sqrt{a}$.
3. If $2\cos\theta = x + \dfrac{1}{x}$ then prove that $2\cos r\theta = x^r + \dfrac{1}{x^r}$.

Que. 3 Trace the curve $y = \dfrac{2}{(x+1)(x-2)}$ 6

OR

Que. 3 [C] If a curve given by $x = f(t), y = g(t)$ and both x and y get numerically large as t approaches some number say a. Then an oblique asymptote to the curve if it exist is given by $y = mx + c$, where $m = \lim_{t\to a}\left(\dfrac{dy}{dx}\right)$, $c = \lim_{t\to a}(y - mx)$ 4

[D] Find equation of normal to the ellipse $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} = 1$ at point $(a\cos\theta, b\sin\theta)$. 2

Que. 4 [A] Prove that polar equation of circle with centre (r_1, θ_1) and radius a is given by $r^2 + r_1^2 - 2rr_1\cos(\theta - \theta_1) = a^2$. Also find equation of circle if centre is on polar axis and normal axis at distance a from the pole. 4

[B] Identify the curve $r = 4 + 2\cos\theta$ and its reciprocal curve. 2

OR

Que. 4 [C] In usual natation prove that $r = \dfrac{pe}{1 \pm e\cos\theta}$ 4

[D] Find equation of line which touch the circle of radius 2 at the point $(2, 135^0)$. 2

Que. 5 [A] Find out the value of $\left(\dfrac{1}{2} + i\dfrac{\sqrt{3}}{2}\right)^{\frac{3}{4}}$. 2

[B] Expand $\cos^5\theta$ in a series of cosine of multiples of θ. 4

OR

Que. 5 State and prove De-Moiver's Theorem. 6

♣♣♣♣♣♣