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V.P.& R.P.T.P.Science College.Vallabh Vidyanagar.

Internal Test

B.Sc. Semester I

US01CMTH01 (Analytic Geometry)

7/10/2013 , Monday 11.00 a.m. to 12.00 p.m.

Maximum Marks: 30

Que.1 Fill in the blanks. 6

(1) The curve of $y = \dfrac{2}{(x+1)(x-2)}$ has ..... branches .

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

(2) Extent of $x = 2\cos^2\theta$, $y = 3\sin\theta$ is .....

(a) $0 \le x \le 2$, $-3 \le y \le 3$ (b) $-2 \le x \le 2$, $-3 \le y \le 3$

(c) $-1 \le x \le 1$, $-3 \le y \le 3$ (d) $-1 \le x \le 1$, $-1 \le y \le 1$

(3) The perpendicular distance of line $2\sqrt{2} = r(\sqrt{3}cos\theta + sin\theta)$ from the pole is .....

(a) 1 (b) $2\sqrt{2}$ (c) 2 (d) $\sqrt{2}$

(4) Centre of the circle $r = 5\cos\theta$ is .....

(a) $(5, 0^o)$ (b) $(5/2, 0^o)$ (c) $(5/2, \pi)$ (d) $(5, \pi)$

(5) Cube root unity are .....

(a) $1, -1$ (b) $1 , -\dfrac{1}{2} \pm i\dfrac{\sqrt{3}}{2}$ (c) $1 , \pm\dfrac{1}{2} \pm i\dfrac{\sqrt{3}}{2}$ (d) $1 , \dfrac{1}{2} \pm i\dfrac{\sqrt{3}}{2}$

(6) $(cis\ \theta)^{6/15}$ has only ..... distinct values.

(a) 15 (b) 6 (c) 6/15 (d) 5

Que.2 Answer the following (Any three) 6

(1) Find tangent parallel to axes for $x = 2t^2; y = 3t$.

(2) Find the parametric equation for $\sqrt{x} + \sqrt{y} = \sqrt{a}$.

(3) Write polar equation of horizontal line through the point $(2, -90^0)$

(4) Find equation of tangent line to the circle with radius 4 at the point $(4, 60^0)$.

(5) If $2\cos\theta = x + \dfrac{1}{x}$, then prove that $2\cos r\theta = x^r + 1/x^r$.

(6) Reduce $1 - \cos\alpha + i\sin\alpha$ in modulus-amplitude form .

Que.3 Sketch the curve given by $y = \dfrac{(x-1)(x+2)}{x(x-4)}$. 6

OR

Que.3 If a curve is given by $x = f(t); y = g(t)$ and that 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 $m = \lim\limits_{t\to a} \dfrac{dy}{dx}$ and $c = \lim\limits_{t\to a}(y - mx)$. 6

Que.4 In usual notation prove that $r = \dfrac{p\,e}{1 \pm e\ \sin\theta}$ 6

OR

Que.4 Prove that polar equation of circle with centre (r_1, θ_1) and radius a is given by $r^2 + r_1^2 - 2rr_1 cos(\theta - \theta_1) = a^2$. 6
Also find equation of circle if centre is (i) on polar axis (ii) on normal axis ,at distance a from the pole.

Que.5 Prove that there are q and only q distinct values of $(\cos\theta + i\ \sin\theta)^{1/q}$, where q is an integer. Hence find the cube roots of unity and show that they form an equilateral triangle in the Argand diagram. 6

OR

Que.5 State and prove De-Moivres theorem for complex number 6

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