

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

Internal Test

B.Sc. Semester - I

US01CMTH01

(ANALYTIC GEOMETRY AND COMPLEX NUMBERS)

Dt.6/12/2014 Saturday, 11.00 a.m. to 12.00 a.m. Maximum Marks: 25

Que.1 Fill in the blanks.

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(1) Asymptotes of $y = \frac{2}{(x-1)(x+2)}$ are(a) $x = 1, -2; y = 0$ (b) $x = -1, 2; y = 0$ (c) $x = 1, 2; y = 1$ (d) not possible .(2) Polar equation of circle with centre on polar axis and right to the pole at distance a is(a) $r = 2a \cos \theta$ (b) $r = 2a \sin \theta$ (c) $r = -2a \sin \theta$ (d) $r = -2a \cos \theta$ (3) Modulus of $\frac{(3 - \sqrt{2}i)^2}{(1 + 2i)^2}$ is(a) $\frac{11}{\sqrt{5}}$ (b) $\frac{11}{5}$ (c) $\frac{7}{5}$ (d) $\frac{13}{\sqrt{5}}$

Que.2 Answer the following (Any Two)

4

(1) Find tangent parallel to axes for the curve $x = \cos^2 \theta; y = 2 \sin \theta$.(2) Find the polar equation of conic if directrix passes through the point $(5, \pi/2)$ and $e = 2/3$.(3) Reduce $1 - \cos \alpha + i \sin \alpha$ in modulus-amplitude form .Que.3 (a) 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 $m = \lim_{t \rightarrow a} \frac{dy}{dx}$ and $c = \lim_{t \rightarrow a} (y - mx)$.

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(b) Find parametric equation of circle .

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OR

Que.3 (a) Find Symmetry, asymptotes and sign of function for the curve $y = \frac{2}{(x+1)(x-2)}$.

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(b) Obtain parametric equation of cycloid .

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Que.4 (a) In usual notation prove that $r = \frac{pe}{1 \pm e \cos \theta}$.

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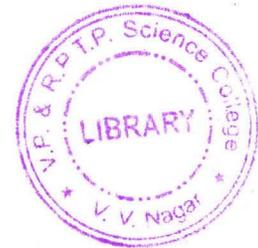
(b) Find centre and radius of the circle $r = -9 \sin \theta$.

1

OR

Que.4 (a) Prove that polar equation of circle with centre (r_1, θ_1) and radius a is given by $r^2 + r_1^2 - 2rr_1 \cos(\theta - \theta_1) = a^2$.

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(b) Identify the curve $r = 1 + \cos \theta$. Also find its reciprocal curve . Sketch reciprocal curve. 3

Que.5 (a) State and prove De-Moivres theorem .

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(b) Express $\left(\frac{1}{2} + \frac{\sqrt{3}i}{2}\right)^3$ in polar form and simplify it .

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OR

Que.5 (a) Solve $x^4 - x^3 + x^2 - x + 1 = 0$ by using De Moivre's theorem .

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(b) Prove that $\cos 6\theta = 32\cos^6\theta - 48\cos^4\theta + 18\cos^2\theta - 1$.

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