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Reg. No. : .....

Name : .....

Third Semester B.Sc. Degree Examination, January 2019
First Degree Programme under CBCSS
COMPLEMENTARY COURSE FOR CHEMISTRY AND POLYMER CHEMISTRY
MM 1331.2 : Mathematics – III (Vector Analysis and Theory of Equations)
(2014 Admission Onwards)

Time : 3 Hours Max. Marks : 80

SECTION – 1

Answer **all** questions. **Each** question carries **1** mark :

1. State the remainder theorem of polynomials.
2. Find the number of real roots of the equation $x^3 + x^2 + x + 1 = 0$.
3. If $f(x) = (x + 4)^2 \phi(x)$ and $\phi(x)$ is not divisible by $(x + 4)$, find the multiplicity of -4.
4. If α, β, γ are the roots of the equation $2x^3 - x^2 + 3x - 1 = 0$ find the equation whose roots are $-\alpha, -\beta, -\gamma$.
5. If α, β, γ are the roots of the equation $x^2 + 3x + 4 = 0$, find the equation whose roots are $1/\alpha$, $1/\beta$ and $1/\gamma$.
6. Find the domain of $\vec{r}(t)$ if $\vec{r}(t) = t^2\vec{i} - 2t\vec{j}$. Also find $\vec{r}(t_0)$ if $t_0 = 1$.
7. Find $\lim_{t \to \pi/4} \left(\cos t\,\vec{i} + \sin t\,\vec{j}\right)$.
8. Find $\vec{r}'(t)$ if $\vec{r}(t) = e^t\vec{i} - (te^t)\vec{j}$ at $t = 0$.
9. Find divergence of $\vec{F}$ if $\vec{F}(x, y, z) = x^2y\vec{i} + 2y^3z\vec{j} + 3z\vec{k}$.
10. Find $\int_0^1 \left(t^2\vec{i} + t^3\vec{j}\right)dt$.

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