KERALA AGRICULTURAL UNIVERSITY

B.Tech (Food. Engg) 2014 Admission

III[rd] Semester Final Examination-December -2015

Cat. No: Basc.2108 **Marks: 50.00**

Title: Engineering Mathematics III (2+1) **Time: 2 hours**

I Fill up the blanks **(10 x 1=10)**

1. Gradient vector field of $x^2 + y^2 + z - xy + 1$ at the point (1, -1,2)
2. $\nabla x R =$ _____
3. The Cauchy Reimann equations are _____
4. The general value of log (-*i*)
5. Write down convolution theorem.
6. Cauchy residue theorem is given by_____
7. A bilinear transformation transforms circle in to _____and it preserves _____of four points
8. What is an analytic function
9. The poles of $\frac{1}{1-e^z}$ are _____
10. $\nabla . R =$ _____

II Write the answer of any FIVE questions **(5 x 2=10)**

1. What is harmonic function? Find out the harmonic conjugate of a function whose real part is $x^3 - 3xy^2$
2. A particle move along the curve x =t^3 + 1, y = t^2 , z = 2t + 3 where t is the time . find the velocity at t = 1
3. Find out the singular point of $\frac{z^2}{(z-1)(z-2)^2}$
4. Obtain the half range sine series of f$(x) = e^x$ in $0 < x < 1$
5. State Gauss Divergence Theorem
6. Expand *tan z* using maclaurin's series expansion
7. Find the Fourier series representationary f $(x) = \begin{cases} x \; in \; (0, \pi) \\ 2\pi - x \; in \; (\pi, 2\pi) \end{cases}$

III Write answer of any FIVE questions **(5 x 4=20)**

1. Find the Fourier series of expansion of f (x) = x ,-1≤ $x \leq 1$
2. Expand f(z) = $\frac{1}{(z-1)(z-2)}$ in the region $1< |z| < 2$
3. Find the div $\bar{F}$ and curl $\bar{F}$ where $\bar{F}$ =grad $(x^3 + y^3 + z^3 - 3xy)$
4. If f(z) = u +iv is an analytic function with constant modulus ,then prove that f(z) is constant
5. Find the Taylor series expansion of *cos* z about z = $\frac{\pi}{2}$
6. Evaluate $\int_c \frac{e^z}{(z-1)(z-2)} dz$, where c is the circle $|z|$ =3
7. Find Fourier Sine Series and Cosine series for the function given by f(x) =x ; $0\leq x \leq 1$

IV Write answer of any ONE **(1 x 10=10)**

1. a) Define Bilinear transformation

   b) Find bilinear transformation which maps the points z =1, *i*,-1 in to the point *w*= *i*, 0,-i Hence, find the image of $|z| < 1$

2. a) State Cauchy's residue theorem

   b) By integrating around the a unit circle, evaluate $\int_0^{2\pi} \frac{\cos\theta}{5-4\cos\theta} d\theta$