LAST MOMENT TUITIONS

APPLIED MATHS III

DEC-2017

S.E.SEM-III

Total marks: 80

Total time: 3 Hours

INSTRUCTIONS:

(1) Question 1 is compulsory.

(2) Attempt any three from the remaining questions.

(3) Draw neat diagrams wherever necessary.

Q.1) (a)Find the laplaces transform of $\sin^2 3t$ **(20)**

(b)Prove tht f(z)=log z is analytic

(c)Obtain fourier series for $f(x)=x^2$ in (-2,2)

(d)Find the Z-transform of cos2k,k≥ 0

Q.2) (a)Prove that $\bar{F}=2xyz^3i+x^2z^3j+3x^2yz^2k$ is irrotational.Find the scalar potential of $\bar{F}$ **(06)**

(b)Find the inverse Laplaces Transform using covolution theorem **(06)**

$$\frac{1}{(s^2+6s+18)^2}$$

(c)Find the fourier sweries of $f(x)=\frac{\pi-x}{2}$in (0,2π) **(08)**

Hence deduce that $\frac{\pi}{4}=1-\frac{1}{3}+\frac{1}{5}+---$.

Q.3) (a)Find the analytic function f(z)=u+iv if u+v=cosx cosh y - sinx sinh y **(06)**

(b)Find inverse transform of $\frac{2z^2-10z+13}{(z-3)^2(z-2)}$, $2<|z|<3$ **(06)**

(c)Solve the differential equation $\frac{d^2y}{dx^2}+2\frac{dy}{dt}+y=3te^{-1}$, $y(0)=4, y'(0)=2$ usingLaplaces **(08)**

transform

Q.4)(a)Find the orthogonsl trajectory of x2+y2-3xy+2y=c **(06)**

(b) Using Greens theorem evaluate $\int_c (x^2 - y)\,dx + (2y^2 + x)\,dy$, C is closed path formed by **(06)**

y=4, $y=x^2$

(c)Express the function f(x)=$\begin{cases} sinx\ ; 0 < X \leq \pi \\ 0 \quad ; X > \pi \end{cases}$ as Fouriers integral.hence evaluate $\int_0^\infty \frac{\cos(\pi\lambda/2)}{1-\lambda^2} d\lambda$ **(08)**

Q.5) (a)Find inverse laplaces transform of $\frac{2s^2-6s+5}{s^3+6s^2+11s-6}$ **(06)**

(b)Find the Bilinear Transformation that maps the point z=1, I, -1 into w=1, 0, -1 **(06)**

(c)Evaluate using Stokes theorem $\int_c \bar{F}.\overline{dr}$ where c is the boundary of circle x2+y2+z2=1,z=0 **(08)**

and $\bar{F}$=yzi+zxj+xyk

Q.6)(a)Find the directional derivative of ∅ =x2+y2+z2 in the direction of thev line **(06)**

$\frac{x}{3} = \frac{y}{4} = \frac{z}{5}\ at\ (1,2,3)$

(b)Find the complex form of Fourier series for e^{ax} ;(-π,π) **(06)**

(c)Find halfr range sine series for f(x)=x(2-x) 0<x<2 **(08)**

Hence deduce that $\sum\left(\frac{1}{n^2}\right) = \frac{\pi^6}{945}$