SHAHEED BHAGAT SINGH STATE TECHNICAL CAMPUS, FEROZEPUR

ROLL No: | | | | | | | | | | | | Total number of pages: | |
Total number of questions:09

May 2018 Reappear

B.Tech. || ME || 5th Sem
Engg Mathematics III
Subject Code:BTAM-500/501 A 2011 Batch onwards
Paper ID

Max Marks: 60

Time allowed: 3 Hrs

Important Instructions:

- All questions are compulsory
- Assume any missing data
- Additional instructions, if any

PART A (2marks ×10)

Q. 1. Short-Answer Questions:

(a) Evaluate $\int \frac{z^3}{z+i} dz$ along the circle , $|z|=0$

(b) State any one property of analytic functions.

(c) Find $L(te^{-2t}sint)$

(d) Expand $\frac{1}{z}$ in taylor's series about the point . z = 2

(e) Write the formula for half range sine series.

(f) Evaluate $L^{-1}\left(log \frac{s^2+1}{(s-1)^2}\right)$

(g) Form p.d.e from the equation $2z = \frac{x^2}{a^2} + \frac{y^2}{b^2}$

(h) Determine the poles and residues of $\frac{z^2}{(z-1)(z-2)^2}$

(i) Find the general solution of p.d.e 3r +10s +3t = 0

(j) Write the Bessel's functions of the first and second order.

PART B (8×5)

Q. 2. Find the Fourier series expansion for the function $x + x^2$ in $[-\pi,\pi]$. COa

OR

Express sinx as a cosine series in $0 < x < \pi$ COa

Q. 3. Solve $y'' + 4y' + 3y = e^{-t}$, $y(0)= y'(0) = 1$ COb

OR

Evaluate $\int_0^\infty e^{-st} \frac{sin^2 t}{t} dt$ COb

COc

Q. 4. Solve $(1-x^2)\frac{d^2y}{dx^2} - 2x\frac{dy}{dx} + 2y = 0$

OR

COc

Prove that $\int j_3(x)dx = -j_2(x) - \frac{2}{x}j_1(x) + c$

COd

Q. 5. Obtain the taylor's and Laurent series which represents the function $(z) = \frac{z^2-1}{(3+z)(z+2)}$ when I $|z|<2$ II $2<|z|<3$ III $|z|>3$

OR

COd

Evaluate $\int_0^{\pi} \frac{d\theta}{3+sin^2\theta}$

COe

Q. 6. Solve the laplace equation $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$ subject to the conditions $u(0,y) = u(l,y) = u(x,0) = 0$ and $u(x,a) = \sin n\pi x$

OR

COe

Solve $(D^2 + DD' - D'^2) = y\,cosx$