Total No. of Questions : 8]   [Total No. of Printed Pages : 2

Roll No ....

BE-3001 (AU/ME/CM/MI) (CBGS)

B.E., IV Semester

Examination, May 2018

Choice Based Grading System (CBGS)

Mathematics - III

Time : Three Hours

Maximum Marks : 70

Note: i) Attempt any five questions out of eight.
  ii) All questions carry equal marks.

1. a) Express $f(x) = x$ as a half range sine series in $0 < x < 2$.
   b) Obtain the Fourier series for the function $f(x) = x^2, -\pi < x < \pi$.

2. a) Find Fourier sine transform of $f(x) = \dfrac{1}{x}$.
   b) Find Fourier cosine transform of $f(x) = e^{-x}$

3. a) Find Fourier cosine transform of $f(x) = \dfrac{1}{1+x^2}$
   b) Develop $\sin\left(\dfrac{\pi x}{l}\right)$ in half range cosine series in the range $0 < x < l$.

4. a) Find Laplace transform of $te^{-4t}\sin 3t$.
   b) Find inverse Laplace transform of $\dfrac{5s+3}{(s-1)\left(s^2+2s+5\right)}$.

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5. a) Find Laplace transform of
     i) $\dfrac{e^{-at} - e^{-bt}}{t}$
     ii) $\sin at - at \cos at$
   b) Using Laplace transform, solve the differential equation $y'' - 3y' + 2y = 4t + e^{3t}$ when $y(0) = 1$ and $y'(0) = -1$.

6. a) Discuss the analyticity of the function $f(z) = \dfrac{1}{2}$.
   b) Determine the poles of the function
     $f(z) = \dfrac{z^2}{(z-1)^2(z+2)}$ and evaluate residue of each pole. rgpvonline.com

7. a) Evaluate $\oint_c \dfrac{e^z}{(z+1)^2}$, where c is the circle $|z-1| = 3$.
   b) Find the imaginary part of the analytic function whose real part is $x^3 - 3xy^2 + 3x^2 - 3y^2$.

8. a) Use Picard's method to approximate y when $x = 0.2$ given that $y = 1$ when $x = 0$ and $\dfrac{dy}{dx} = x - y$
   b) Apply Runge-Kutta method to find an approximate value of y when $x = 0-2$, given that $\dfrac{dy}{dx} = x + y$, $y = 1$ when $x = 0$.

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