GIET UNIVERSITY, GUNUPUR – 765022

B. Tech (Third Semester – Regular) Examinations, December – 2020

BBSBS3010 - ENGINEERING MATHEMATICS-III

(Common to AGE, Biotech, Chemical, Civil, ECE, EE, EEE, Mechanical & PCPR)

Time: 2 hrs   Maximum: 50 Marks

Answer ALL Questions
The figures in the right hand margin indicate marks.

PART – A: (Multiple Choice Questions)   **(1 x 10 = 10 Marks)**

Q.1. Answer *ALL* questions   [CO#]   [PO#]

a. Cauchy-Riemann equations are   1   1

(i) $u_x = v_y$ and $u_y = -v_x$ (ii) $u_x = v_y$ and $u_y = v_x$

(iii) $u_x = v_x$ and $u_y = -v_y$ (iv) $u_x = -v_y$ and $u_y = v_x$

b. If $f(z)$ is analytic and $f'(z)$ is continuous at all points inside and on a simple closed curve C, then   1   1

(i) $\oint_C f(z)dz = 0$ (ii) $\oint_C f(z)dz \neq 0$

(iii) $\oint_C f(z)dz = 1$ (iv) $\oint_C f(z)dz \neq 1$

c. A point z_0 at which a function $f(z)$ is not analytic is known as a .... of $f(z)$ 1   2

(i)   Residue   (ii)   Singularity
(iii)   Integrals   (iv)   Zero

d. The residue of $f(z) = \cot z$ at each poles is   2   2

(i)   0   (ii)   1
(iii)   1/2   (iv)   -1

e. The nth divided differences of a polynomial of the nth degree is   3   1
(i)   Zero   (ii)   Constant
(iii)   -Variable   (iv)   One

f. The number of strips required in simpson.s 1/3 rule is a multiple of   3   2
(i)   2   (ii)   4
(iii)   3   (iv)   0

g. For Runge-Kutta methods, the derivatives of ___ order are not required   3   2
(i)   Lower   (ii)   Higher
(iii)   Constant   (iv)   First

h. Poisson distribution is a limiting form of   4   2
(i)   Uniform distribution   (ii)   Binomial distribution
(iii)   Normal distribution   (iv)   Exponential distribution

i. The sample is said to be small if   4   1
(i)   n > 30   (ii)   n > 100
(iii)   n < 30   (iv)   n = 10

j. Rejecting H_0, when it is true is called   4   1
(i)   type I error   (ii)   type II error
(iii)   Sampling error   (iv)   Standard error

PART – B: (Short Answer Questions)   (2 x 5 = 10 Marks)

Q.2. Answer ***ALL*** questions   [CO#]   [PO#]

a. Examine whether the function $u= x^2 y$ can be a real part of an analytic function.   1   2

b. Find the value of $\int_C \dfrac{3z^2+7z+1}{z+1}\,dz$ if C is $|z|=\dfrac{1}{2}$ 1   2

c. Define singularity of a function f(z).   2   2

d. Using Trapezoidal rule evaluate $\int_0^\pi \sin x\,dx$ by dividing the range into 3 equal parts.   3   2

e. If $f(x)=kx(2-x),\ 0\le x\le 2$ is a probability density function then find k.   4   1

PART – C: (Long Answer Questions)   (6 x 5 = 30 Marks)

| | Marks | [CO#] | [PO#] |

Answer ***ANY FIVE*** questions

3. Evaluate: $\int_C \dfrac{\sin \pi z^2+\cos \pi z^2}{(z-1)(z-2)}\,dz$, where C is $|z|=3$.by using cauchy's integral   6   1   2

    formula.

4. If $u(x,y)=3x^2y+2x^2-y^3-2y^2$,is real part of an analytic function f (z). then find   6   1   1

    the imaginary part v(x,y).

5. Expand $f(z)=\dfrac{7z-2}{z(z+1)(z-2)}$ as a Laurent's series in the region $0<|z+1|<3$ 6   2   2

6. Evauate: $\int_0^\infty \dfrac{x^2}{(x^2+9)(x^2+4)}\,dx$ by the method of residues.   6   2   2

7. Find y'(x) given   6   3   2

X	0	1	2	3	4
Y(x)	1	1	15	40	85

    Hence find y'(x) at x = 0.5

8. Compute y(0.1) by Runge-Kutta method of 4th order for the differential   6   3   2

    equation $\dfrac{dy}{dx}=xy+y^2,\,with\ y(0)=1.$

9. Define Binomial distribution and hence find mean and variance.   6   4   1

10. The following are the marks scored by 7 students in two tests in a subject.   6   4   2
    Calculate coefficient of correlation from the following data and interpret.

Marks in test-1	12	9	8	10	11	13	7
Marks in test-2	14	8	6	9	11	12	3

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