TMA-301                          1028

## Odd Semester Examination 2018-19

## B.TECH. (SEMESTER-III)

## MATHEMATICS-III

Time: 03:00 Hours                                                        Max Marks :70

Note: Attempt all questions.

1.  Attempt **any Four** questions:                                      [5×4=20]

    (a)  Show that f(z)= log z is analytic everywhere in the complex plane except at the origin and that its derivative is $\left(\frac{1}{z}\right)$.

    (b)  Expand $\frac{1}{z^2-3z+2}$ in the region when $1z1<1$

    (c)  Determines the poles and residue of the function $\frac{z2}{(z-1)(z-2)2}$

    (d)  Evaluate $\int_0^\pi \frac{1+2\cos\theta}{5+4\cos\theta}d\theta$

    (e)  Show that the function $e^x$ (cos y +isin y)is holomorphic and find its derivative .

2.  Attempt **any Two** questions:                                       [10x2 =20]

    (a)  For a distribution, the mean is 10, variance is 16. $y_1$ is 1 and $\beta_2$ is 4. Find the first four moments about the origin.

    (b)  The equation of the curve to be fitted is $y= ab^x$ to the following data.

| x | 2 | 3 | 4 | 5 | 6 |
|---|-----|-------|-------|-------|-------|
| y | 144 | 172.3 | 207.4 | 248.8 | 298.5 |

(c) Find rank correlation coefficient for the following data:

| x | 68 | 64 | 75 | 50 | 64 | 80 | 75 | 40 | 55 | 64 |
|---|----|----|----|----|----|----|----|----|----|----|
| y | 62 | 58 | 68 | 45 | 81 | 60 | 68 | 48 | 50 | 70 |

3. Attempt **any Two** questions: [10x2 =20]

(a) If the probability that an individual suffers a bad reaction from a certain injection is 0.001, determine the probability thatout of 2000 individuals (i) exactly 3 (ii) more than 2 individuals (iii) None (iv) More than one individual will suffer a bad reaction

(b) A sample of 100 dry battery cells tested to find the length of life produced the following results:

$\overline{x}$ =12 hours, σ =3 hours

Assuming the data to be normally distributed, what percentage of battery cells are expected to have life.

(i) more than 15 hours

(ii) less than 6 hours

(iii) between 10 and 14 hours

(c) The demand for a particular space part in a factory was found to vary from day to day. In a sample study, the followinginformation was obtained.

| Days | Mon | Tue | Wed | Thurs | Fri | Sat |
|------|-----|-----|-----|-------|-----|-----|
| No. of Parts Demanded | 1124 | 1125 | 1110 | 1120 | 1125 | 1116 |

Use Chi square to test the hypothesis that number of parts demanded does not depend on the day of the week at 5% level of significance. (5 df=11.07)

4. Attempt **any Two** questions: [10x2 =20]

(a) Find a positive root of $x^3-4x+1=0$ by the method of false position.

(b)  Estimate from the following table the number of students who obtained marks between 40 and 45

| Marks | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 |
|---|---|---|---|---|---|
| No. of students | 31 | 42 | 51 | 35 | 31 |

(c)  Find the missing values in the following data.

| x | 45 | 50 | 55 | 60 | 65 |
|---|---|---|---|---|---|
| y | 3 | ------ | 2 | -------- | -2.4 |

5.  Attempt any Twoquestions.[10×2=20]

(a)  Solve the following system

$10x+2y+z =9$

$2x+20y-2z = -44$

$-2x+3y+10z=22$

By Gauss Seidel method correct to two places of decimal.

(b)  (i)  Compute f'(4) from the following table

| x | 1 | 2 | 4 | 8 | 10 |
|---|---|---|---|---|---|
| f(x) | 0 | 1 | 5 | 21 | 27 |

(ii)  The velocities of a car which starts initially from rest (running on a straight road) at intervals of 2 minutesare given below.

| Time(minutes) | 2 | 4 | 6 | 8 | 10 | 12 |
|---|---|---|---|---|---|---|
| Velocity(Km/hr) | 22 | 30 | 27 | 18 | 7 | 0 |

Apply Simpson's 3/8 rule to find the distance covered by the car.

(c) Using Runge- kuttamethod of fourth order solve y'= xy for x= 1.2 upto four places of decimal. Initially x=1 , y=2 (take h=0.1)

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