Code No: R2021021

R20

SET - 1

II B. Tech I Semester Regular Examinations, Feb/March - 2022
MATHEMATICS-IV
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Answer any **FIVE** Questions each Question from each unit
All Questions carry **Equal** Marks
~~~~~~~~~~~~~~~~~~~~~~~~~

1 a) Show that $f(z)\begin{cases}\frac{x^2y^5(x+iy)}{x^4+y^{10}}, & z\neq 0\\ 0 & z=0\end{cases}$ [7M]

is not analytic at z = 0 although C-R equations are satisfied at origin.

b) Find analytic function if $u+v=e^x(cosy+siny)$. [7M]

Or

2 a) Find the orthogonal trajectories to the family of curves $e^{-x}(x\sin y - y\cos y) = c_1$. [7M]

b) Evaluate $\oint_C e^{\sin z^2}dz$ where C: $|z| = 1$. [7M]

3 a) Expand f(z) $=\frac{z-1}{z}$ $as\ a\ Laurent's\ \ series\ for\ for\ |z-1|>1$. [7M]

b) Obtain the Taylor's series expansion $f(z)=\frac{sinz}{(z-1)(z-2)}$ about z =2. [7M]

Or

4 a) Evaluate $\oint_C e^{\frac{1}{z^2}}$ dz where C: |z| = 2 using Cauchy's Residue theorem. [7M]

b) Evaluate $\int_0^\infty \frac{sin\,2x}{(16+x^2)}dx$. [7M]

5 a) A sample of 3 items is selected at random from a box containing 10 items of which 4 are defective. Find the expected number of defective items. [7M]

b) Check the given function is a PDF and if also find mean and variance $f(x)=\frac{1}{2}(x+1)$ if $-1<x<1$. [7M]

Or

6 a) If X is a Poisson variate such that $2P(X=0)=P(X=2)$then find $(i)P(X\leq 3)(ii)P(2<X\leq 5)$. [7M]

b) In a normal distribution 31% of the items are under 45 and 8% are over 64. Find the mean and variance of the distribution. [7M]

7 Samples of size 2 are taken from the population {5,10,14,18,13,24} without replacement. Find [14M]

a) The mean of the population
b) The standard deviation of the population
c) Mean of the sampling distribution of means
d) The standard deviation of the sampling distribution of means.

Or

|'''|'|'|''|''||'|||
~~~~~~~~~~~~~~~~~~~~~~~~~

8 a) If the mean of certain normal population is equal to the standard error of the mean of the sample of 64. Find the probability that the mean of the sample size 36 will be negative. [7M]

b) Find 99 % confidence limit for the mean of normal population from which the sample was taken {3,4,8,9} [7M]

9 a) [7M]

A sample of 64 bulbs gives a mean life of 1.038hrs with S.D of 0.146 hrs. The manufacturer claims that the mean life of bulbs 1hrs. Is the sample being up to the standard. test at 5% level.

b) If 100 out of 400 persons in rural area possessed 'cell' phones while 300 out of 500 in urban Area. Can it be accepted that the proportion of 'cell' phones in the rural area and Urban area is same or not. Use 5% of level. [7M]

Or

10 Two independent samples of 10 items respectively had the following values. [14M]

Sample I	67	24	57	55	63	54	56	68	33	43
Sample II	70	38	58	58	56	67	68	75	42	38

Can it be said two samples can from same normal population. Test at 5% level.