Code No: R2021021 **R20** SET - 1

II B. Tech I Semester Supplementary Examinations, July - 2023
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
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UNIT-I

1 a) Show that analytic function $f(z) = u + iv$ form an Orthogonal system. [7M]

b) Evaluate $\int_0^{3+i} z^2 dz$ along real axis from 0 to 3 and then vertically to 3+i. [7M]

Or

2 a) Evaluate $\int_c \frac{z}{(z^2-1)} dz$ *where* $c : |z| = 2$ using Cauchy's integral formula. [7M]

b) Find the analytic function $f(z)$ where $u = \sin x \cosh y$. [7M]

UNIT-II

3 a) Find the Laurent's expansion f(z) = $\frac{1}{z^2+4z+3}$ *for* $1<|z|>3$. [7M]

b) Expand f(z) $= \frac{1}{z^2}$ in powers of (z+1) by Taylor's series. [7M]

Or

4 a) Determine and classify the singular points of f(z) = $\frac{e^{1/z}}{z-1}$. [7M]

b) Evaluate $\int_0^{2\pi} \frac{d\theta}{3+2sin\theta}$ using residue theorem. [7M]

UNIT-III

5 a) From a lot of 10 items containing 3 defectives, a sample of 4 items drawn at random. Let X denotes the number of defective items then find the distribution function and also mean of the distribution. [7M]

b) If $f(x) = kx^3$ for$0 < x < 1$ then find (i) $P(\frac{1}{4} < x < \frac{3}{4})$ (ii) $P(x > \frac{2}{3})$. [7M]

Or

6 a) In eight throws of a die 5 or 6 is considered a success. Find the mean number of success and the standard deviation. [7M]

b) In a normal distribution 7% of the items are under 35 and 89% are under 63. Find the mean and variance of the distribution. [7M]

UNIT-IV

7 Samples of size 2 are taken from the population {1,2,3,4,5,6}without replacement. Find [14M]
(i) The mean of the population
(ii) The standard deviation of the population
(iii) Mean of the sampling distribution of means
(iv) The standard deviation of the sampling distribution of means

Or
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8 a) Calculate a 90% confidence interval for the true proportion for sample of 65 with mean 16 and variance 2. [7M]

b) What is the effect on standard error, if a sample is taken from an infinite population of size is increased from 400 to 900? [7M]

UNIT-V

9 a) The mean height of two large samples of sizes 50 and 50 members was 68.2 and 67.2 inches, respectively. The S.D of two samples are 2.5 and 2.8 respectively Can the samples be regarded as drawn from same population .Test at 5% level of significance [7M]

b) The rice eaters in U.P are 20 out of 400 people and in M.P 10 out of 300. Do this data support that majority of the people in U.P and M.P are chapati eaters. Test the claim at 5% level. [7M]

Or

10 a) The means of two random samples of sizes 16and 25 are 440 and 460and S.D are 40 and 42 respectively. Can the samples have same normal variance test at 5% level. [7M]

b) Test the significance difference between the performance of mathematics marks at 5% level for the following data. [7M]

	College 1	College 2	College3	College4
Successful Students	30	22	20	24
Failures	20	28	30	26