Sub Code: R2021021 **R20** **Set No. 1**

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II B. Tech I Semester Supplementary Examinations NOVEMBER -2025
MATHEMATICS-IV
(EEE)

Time: 3 hours **Max. Marks: 70**

Answer any FIVE Questions
ONE Question from Each unit
All Questions Carry Equal Marks
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1 a) Find the analytic function whose Real part is $v(x,y) = e^x siny$ [7]

b) Show that $f(z) = \begin{cases} \frac{x^2y^5(x+iy)}{x^4+y^{10}}, if\ z \neq 0 \\ 0 \qquad\quad if\ z = 0 \end{cases}$ [7]

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

(OR)

2 a) Evaluate $\int_C \frac{z+2}{z} dz$, where C is [7]

i) Upper half of the circle $|z|$=2 in the clock wise direction

ii) Lower half of the circle $|z|$=2 in the anti-clock wise direction.

b) Evaluate $\int_c \frac{\sin\pi z^2+\cos\pi z^2}{(z-1)(z-2)} dz$ where c : $|z| = 3$ using Cauchy's integral formula. [7]

3 a) Obtain the Taylor's series expansion $f(z) = \frac{z^2-1}{(z+2)(z+3)}$ in $|z| < 2$ [7]

b) Evaluate by Contour integration $\int_0^\infty \frac{dx}{1+x^2}$ [7]

(OR)

4 a) Represent f(z) = $\frac{4z+3}{z(z-3)(z+2)}$ in Laurent's series in 2 < |z| < 3 [7]

b) Evaluate $\oint_C \frac{Cosh\, z}{z^2-3iz} dz$ Where C : |z| = 1 using residue theorem [7]

5 a) Verify whether f(x) is a density function and also find mean for [7]

$$f(x) = \begin{cases} \frac{1}{16}(3+x)^2 \ \ if\ -3 \le x < -1 \\ \frac{1}{16}(6-2x^2) \ \ if\ -1 \le x < -1 \\ \frac{1}{16}(3-x)^2 \ \ if \quad 1 \le x < 3 \\ 0 \qquad\qquad otherwise \end{cases}$$

b) Fit the Poisson distribution for the following data [7]

x	0	1	2	3	4	5
f	147	147	74	25	6	1

(OR)

6 a) In a Normal distribution, 7% of the item are under 35 and 89% are under 63. Find the mean and standard deviation of the distribution. [7]

b) Find the value of 'k' and mean for the following discrete random variable [7]

x	-3	-2	-1	0	1	2	3
P(x)	K	0.1	K	0.2	2k	0.4	2k

7 Samples of size 2 are taken from the population {4,8,12,16} without replacement. Find [14]

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) Find the 95% confidence interval for sample mean is 35, with n = 64 $\alpha = 5\%$ with S.D 1.6 [7]

b) Test whether E(x/n) , E(x+1/n+1) are unbiased estimator of the binomial parameter 'p'. [7]

9 a) If 80 patients are treated with an antibiotic60got cured. From this data can you say that the antibiotic cure 70% of the people at 5% level of significance [7]

b) [7]

Test whether two sample means are drawn from same normal population at 1% level.

	Mean	S. D	Size of Sample
Sample I	50	10	60
Sample II	70	20	70

(OR)

10 Test whether two samples are drawn from same normal population at 5% level of significance [14]

Sample I	24	27	26	21	25	
Sample II	27	30	28	31	22	36

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