II B. Tech II Semester Supplementary Examinations, February - 2022
COMPLEX VARIABLES & STATISTICAL METHODS
(Mechanical Engineering)

Time: 3 hours　　　　　　　　　　　　　　　　　　　　　　Max. Marks: 75

Answer any **FIVE** Questions each Question from each unit
All Questions carry **Equal** Marks
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1	a)	Evaluate $\int_0^{1+2i}(x^2 + i2y)dx$ along the paths (i) y = 2x	[8M]
	b)	Show that $f(z) = \sqrt{|xy|}$ is not analytic at z = 0 although the C-R equations are satisfied at the origin.	[7M]

Or

2	a)	State and prove the necessary and sufficient condition for the function f(z) to be analytic	[7M]
	b)	Find the analytic function whose imaginary part is $e^x \sin y$.	[8M]

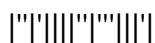|			
3	a)	Find Taylor's expansion f(z) $= \frac{z}{(z-1)(z-2)}$ about the point z = 2	[7M]
	b)	*Find the Laurent series of* $f(z) = \frac{z}{(z+1)(z+4)}$ *for* $1 < |z| < 4$	[8M]

Or

4	a)	Evaluate by Contour integration $\int_0^\infty \frac{xdx}{1+x^2}$	[8M]
	b)	Find the poles and Residues of f(z) = $tanz$ in the circle of radius 2 units .	[7M]

5	a)	Suppose 15 men out of 200 and 25 women 10,00 are colour blind. A colour blind person is chosen at random. What is the probability of the person being a male (Assume male and female to be in equal numbers)	[8M]
	b)	If 4 coins are tossed 160 times, then find the probity of getting heads for the following case. (i)Exactly two heads　(ii) None of heads	[7M]

Or

6	a)	The average no of accidents in national highway 216 per week are 12. then find probability for (i) at least 2 accident (ii) exactly 4 accidents	[7M]
	b)	If the masses of 500 students are normally distributed with mean 72 kg and standard deviation 4kg how many students have masses: 　(i)　greater than 72 kg (ii) between 65 and 75 kg 　(ii)	[8M]

7	Samples of size 2 are taken from the population 3 ,4,5,6,7 without replacement. Find (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	[15M]

Or

8	a)	Define population and sample and explain the various sampling methods in sampling distributions	[8M]
	b)	A random sample of 300 items is found to have mean 28 and S.D of 8.Find the maximum error of estimation at 99% confidence interval	[7M]

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9   a) A sample of 100 students have a mean weight of 50kgs. can this be regarded as a sample from population with mean weight 56 kgs with standard deviation 16 kgs. Test at 1 % level of significance   [8M]

     b) A coffee company claims that brand A outsells its brand b by 8% . If 42 out 200 prefer brand A and 18 out of 100 prefer brand B . Test the claim at 1% level.   [7M]

Or

10 a) Two random samples with following results. Test whether the differences of means is significant at 1% level   [7M]

Sample	Size	Mean	S.D
1	6	10	4
2	8	12	5

     b) A die is thrown 100 times with the following results. show that the die is unbiased at 5% level   [8M]

No appeared on die	1	2	3	4	5	6
Frequency	20	10	10	30	15	15

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