## Code No: R31021/R10

## III B.Tech I Semester Supplementary Examinations, Nov - 2015 COMPLEX VARIABLEDS AND STATISTICAL METHODS <br> (Electrical and Electronics Engineering)

Time: $\mathbf{3}$ hours
Max. Marks: 75

## Answer any FIVE Questions <br> All Questions carry equal marks

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1 a) Show that $f(z)=z^{3}$ is analytic for all z ?
b) Find K such that $f(x, y)=x^{3}+3 K x y^{2}$ may be harmonic and find its conjugate?
c) Write the statement of complex potential function?

2 a) Evaluate $\int_{C}\left(z^{2}+3 z+2\right) d z$; where C is the arc of the cycloid
$x=a(\theta+\sin \theta) ; y=a(1-\cos \theta)$ between the points $(0,0)$ and $(a \pi, 2 a)$ ?
b) Evaluate $\int_{c} \frac{z}{z^{2}+1} d z$ where $c$ is $\left|z+\frac{1}{z}\right|=2$ ?

3 a) Determine the poles and residues of the function $\frac{z+1}{z^{2}(z-2)}$
b) Evaluate by contour integration $\int_{0}^{\infty} \frac{d x}{1+x^{2}}$

4 a) Find and plot the rectangular region $0 \leq x \leq 1,0 \leq y \leq z$ under the transformation $w=\sqrt{2 e^{i \pi / 4} z+(1-2 i)}$
b) Find the bilinear transformation that maps the points $(0,1, \infty)$ in $z$-plane into the points ( $-1,-2,-i$ ) in the w-plane.

5 a) Two aeroplanes bomb a target in succession. The probability of each correctly scoring a hit is 0.3 and 0.2 respectively. The second will bomb only if the first misses the target. Find the probability that (i) target is hit (ii) both fails to score hits.
b) Find the probability that out of 100 patients between 84 and 95 inclusive will survive a heart operation given that the chances of survival is 0.9

6 a) Determine the expected number of random samples having their means (i) between 22.39 and 22.41 (ii)greater than 22.42 (iii) less than 22.37 , size of the population is 1500 , size of the sample is 36 , number of samples is 300 , population s.d. is 0.48 and population mean is 22.4.
b) Using the mean of random sample of size 150 to estimate the mean mechanical aptitude of mechanics of a large workshop and assuming $\sigma=6.2$, what can we assert with 0.99 probability about the maximum size of error.

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## Set No. 1

7 a) Write about null hypothesis and testing of hypothesis
b) A sample of 100 iron bars is said to be drawn from a large number of bars whose lengths are normally distributed with mean 4 feet and standard deviation 0.6 feet. If the sample mean is 4.2 feet, can the sample be regarded as truly random sample

8 A manager of a Merchandizing firm wishes to test whether its three salesmen A, B, C tend to make sales of the same size or whether they differ in their selling abilities. During a week there have been 14 sale calls; A made 5 calls, B made 4 calls and C made 5 calls. Following are the weekly sales record (in Rs.) of the three salesmen:

| A | 500 | 400 | 700 | 800 | 600 |
| :--- | :--- | :--- | :--- | :--- | :--- |
| B | 300 | 700 | 400 | 600 | - |
| C | 500 | 300 | 500 | 400 | 300 |
|  |  |  |  |  |  |

Perform the analysis of variance and draw your conclusion.

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