Code No: **P41025**   # R10   **Set No. 1**

IV B.Tech I Semester Supplementary Examinations, Mar/April - 2016
COMPLEX VARIABLES AND STATISTICAL METHODS
(Electrical and Electronics Engineering)

Time: 3 hours   **Max. Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
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1 a) Show that $\left(\dfrac{\partial^2}{\partial x^2} + \dfrac{\partial^2}{\partial y^2} \right) \log\left| f^{'}(z) \right| = 0, where f(z)$ is an analytic function. [8]

  b) Find a and b if $f(z) = (x^2 - 2xy + ay^2) + i(bx^2 - y^2 + 2xy)$ is analytic. Hence find $f(z)$ in terms of z. [7]

2 a) Obtain the Taylor series expansion of $f(z) = \dfrac{e^z}{z(z+1)}$ about z=2. [8]

  b) Find the Laurent expansion of $\dfrac{1}{z^2 - 4z + 3}, for\ \ 1 < |z| < 3.$ [7]

3 a) Find the poles of f(z) and the residues of the poles which lie on imaginary axis

   if $f(Z) = \dfrac{z^2 + 2z}{(z+1)^2(z^2 + 4)}$ [8]

  b) Evaluate $\displaystyle\int_{0}^{\infty} \dfrac{x \sin mx}{x^4 + 16}$ dx using Residue theorem. [7]

4 a) Find the image of the triangle with vertices i, 1+i, 1-i in the z- plane under the transformation w=3z+4-2i [8]

  b) Find the bilinear transformation which maps vertices ((1+i,-i, 2-i) of the triangle T of the z-plane into the points (0,1,i) of the w-plane. [7]

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5 a) Fit a Poisson distribution for the following data and calculate the expected
       Frequencies

X	0	1	2	3	4
F(x)	109	65	22	3	1

[8]

   b) Companies B_1, B_2, B_3 produce 30%,45% and 25% of the cars respectively. It is
       known that 2%, 3% and 2% of the cars produced from B_1,B_2,and B_3 are
       defective. If a car purchased is found to be defective what is the probability
       that this car is produced by company B_3?   [7]

6 a) Write a short note on interval estimation and Bayesian estimation   [8]

   b) A random sample of size 100 is taken from a population with σ =5.1 Given that
       the sample mean is $\bar{x}$ = 21 6. construct a 95% confidence interval for the
       population mean μ.   [7]

7 a) The mean life of a sample of 10 electric bulbs was found to be 1456 hours with
       S.D of 423 hours. A second sample of 17 bulbs chose from a different batch
       shoed a mean life of 1280 hours with S.D. of 398 hours. Is there a significant
       difference between the means of two batches?   [8]

   b) In a city 250 men out of 750 were found to be smokers. Does this information
       support the conclusion that the majority of men in this city are smokers?   [7]

8 a) The following table gives the number of refrigerators sold by 4 salesmen of
       Kelvinator (India) Ltd, in three months May, June, July

Month	A	B	C	D
May	50	40	48	39
June	46	48	50	45
July	39	44	40	39

[8]

   b) To compare two kinds of bumper guards.6 of each kind were mounted on a car
       and then the car was run into a concrete wall .T he following are the costs of
       repairs

Guard 1	107	148	123	165	102	119
Guard 2	134	115	112	151	133	129

[7]