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E-1130

B. E. IIIrd Semester (Main & Re) Examination, December – 2019

MATHEMATICS - III

Brach : (CSE, ECE, EE, CE, ME)

Time : Three Hours] *[Maximum Marks : 60*

Note : Attempt *all* questions from *Section – A four* questions from *Section – B* and *three* questions from *Section – C.*

Section- A : Filling the blanks/MCQ/True, false. 1 × 10 = 10

Section- B : Short answer type questions. 5 × 4 = 20

Section- C : Long/ descriptive answer type questions. 10 × 3 = 30

SECTION – A

Note : Write true or false.

1. $\int \bar{e}^{sx} f(x)\,dx$ is Fourier transform.
2. Fourier transform can be used to solve a boundary value problem.
3. Continuity is the necessary condition for differentiability.
4. Analytic function satisfies the Cauchy Riemann equations.
5. The point at which the function is not differentiable is called singular point.
6. If a function has more than one value is called single valued function.
7. Countour is not a Jordan Curve.
8. A time series has two components.
9. A null hypothesis is tested for possible rejection.

P. T. O.

10. In case of normal distribution $\mu_{n+1} = 0$.

SECTION – B

1. Find fourier sine transform of e^{-ax}/x.

2. Find the analytic function w = u + i v given that $v = \frac{x}{x^2+y^2} + \cos h\, x \cos y$.

3. Use cauchy's integral formula to calculate $\int_c \frac{2z+1}{z^2+z} dz$ where c $|z| = \frac{1}{2}$.

4. If a function f (z) is analytic and its derivative $f'(z)$ is continuous inside and on a simple closed curve C, then show then $\int_c f(z)\, dz = 0$.

5. Fit a straight line to the following data :

x	2	3	4	5	6
y	8.3	15.4	33.1	65.2	127.4

6. State and prove that Baye's theorem.

7. What are the types of sampling ?

8. Show that poisson distribution is a limiting case of binomial distribution.

SECTION – C

1. Using Fourier sine transform solve the partial differential equation $\frac{\partial u}{\partial t} = k \frac{\partial^2 u}{\partial x^2}$ under the boundary conditions $u = u_0$ when $x = 0, t > 0$ and the initial condition u= 0 when $t = 0, x > 0$.

2. Use the method of contour integration, prove that $\int_0^{\pi} \frac{\cos 2\theta \, d\theta}{1-2\cos\theta+a^2} = \frac{\pi a^2}{1-a^2} (-1 < a < 1)$.

3. Find the bilinear transformation which transforms the circular dise $|z| = \rho$ onto circular disc $|w| \leq \rho^1$.

4. Discuss the properties of normal distribution in detail.

5. An automobile company gives the following information about age- group and the liking for a particular model of the car which its plans to introduce :

Age Group.

Persons who	below 20	20-39	40-59	60 and above	Total
Liked the Car	140	80	40	20	280
Disliked the Car	60	50	30	80	220
Total	200	130	70	100	

On the basis of this data can it be concluded that the model appeal is independent of age group. (Give that for $\upsilon = 3$, $\chi^2_{0.05} = 7.815$.)