Sub Code:KAS304

Paper Id: 199354 Roll No: | | | | | | | | | | | | | |

B TECH
(SEM-III) THEORY EXAMINATION 2019-20
MATHEMATICS-V

Time: 3 Hours ***Total Marks: 100***

Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 10 = 20

a.	Explain Z- transform of unit step function
b.	Write the statement of convolution theorem on Fourier transformation.
c.	The following statement is true or false for a Binomial distribution, mean is 9 and variance is 15.
d.	Define the terms expectation and variance.
e.	Find second order divided difference of the function $f(x)=\frac{1}{x^2}$ for $x=a,b$
f.	Prove that E1/2=$\mu+\frac{\delta}{2}$
g.	Write the formula of T-Test.
h.	Define level of significance.
i.	What is statistical quality control?
j.	Write the difference between p chart and C chart.

SECTION B

2. **Attempt any three of the following: 10x3=30**

a.	Solve the equation $\frac{\partial u}{\partial t}=\frac{\partial^2 u}{\partial x^2}$,x>0 ,t > 0 subject to the conditions (i) u=0 when x=0 , t > 0 (ii) u =1 when 0< x< 1 and u=0 when x≥1(when t=0)
b.	Prove that Poission distribution is the limiting case of Binomial distribution.
c.	State and prove Newton's Divided Difference Interpolation formula and find f (7) from the given data:

x	3	7	9	10
f(x)	168	120	72	63

d.	The following table gives the number of good and bad parts produced by each of the

Paper Id: 199354 Roll No: | | | | | | | | | | | | | |

	three shifts in a factory: Apply Test whether or not the production of bad parts is independent of the shift on which they were produced given χ^2 at 5% level of significance is 5.991 for 2d.f.

	Good parts	Bad parts
Day shift	960	40
Evening shift	920	70
Night shift	850	60

e.	If the average fraction defective of a large sample of a product is 0.1537, calculate the control limits given that sub group size is 2000.

SECTION C

3. **Attempt any one part of the following:** **10x1=10**

a.	Determine the Fourier cosine transform of $\frac{1}{1+x^2}$ and hence find Fourier sine transform of $\frac{x}{1+x^2}$.
b.	Solve the difference equation $y_{k+2} - 3y_{k+2} - y_k = u(k)$ y(0)=y(1)=0.

4. **Attempt any one part of the following:** **10x1=10**

a.	If 10% of bolts produced by a machine are defective,determine the probability that out of 10 bolts choosen at random. Evaluate at most 2 bolts will be defective.
b.	In a sample of 1000 cases, the mean of a certain test is 14 and S. D. is 2.5. Assuming the distribution to be normal, determine (i) how many students score between 12 and 15? (ii) how many score above 18? (iii) how many score below 8? (iv) how many score 16?

5. **Attempt any one part of the following:** **10x1=10**

a.	Using Newton- Raphson method, find the real root of the equation 3x=cosx+1. Correct to four decimal places.
b.	Find $f'(1.1)$ from the following table:

x:	1.0	1.2	1.4	1.6	1.8	2.0
f(x):	0.0	0.1280	0.5540	1.2960	2.4320	4.0

Sub Code:KAS304

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6. **Attempt any one part of the following:** **10x1=10**

a. The three samples given below have been taken from normal population with equal variances. Discuss the hypothesis at 5% level such that population means are equal

A	B	C
7	10	9
5	8	11
11	9	14
8	12	10
9	11	16

It is also F(2,12)=3.88

b. Samples of sizes 10 and 14 were taken from two normal populations with S.D. 4.5 and 6.2. The sample means were found to be 20.8 and 12.6. Apply Test whether the means of the two populations are the same at 5% level given $t_{0.05} = 2.0739$ for 22 d.f.

7. **Attempt any one part of the following:** **10x1=10**

a. The number of defects observed in 10 sample of sheet of equal dimensions are given below:

Sample	1	2	3	4	5	6	7	8	9	10
Number of defects	2	5	3	5	4	2	3	6	7	4

Evaluate the control limit and Draw a control chart for the number of defects and discuss whether the process is under control or not.

b. Write advantages of statistical quality control.

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