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Printed Page: 1 of 2

## **BTECH** (SEM III) THEORY EXAMINATION 2021-22 **MATHEMATIVS-V**

Time: 3 Hours Total Marks: 100

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

Mention any two objectives of experimental design.

Differentiate between CRD and RBD.

Sample no.

defectives

No. of

1

3

2

3

7

4

11

5

3

6

2

1

8

9

12

10

8

### **SECTION A**

1.	Attempt <i>all</i> questions in brief. $2 \times 10 = 20$
a.	Write the formula to find Fourier sine transform of derivative of $f(x)$ .
b.	Find Z transform of a constant k.
c.	In Poisson distribution if mean of random variable is 4 then find the variance.
d.	Define probability density function.
e.	Write the formula used in Newton Raphson method.
f.	Express $\Delta - \nabla$ in terms of $E, E^{-1}$ .
g.	Find the degree of freedom for Chi square test for a contingency table of order 2X3.
h	Define the null hypothesis

## **SECTION B**

•	Attempt any t	<i>hree</i> of the	following:	09		10x3=30			
a.	Compute Fou	rier transfo	rm of $f(x) =$	$\begin{cases} \frac{1}{2a},  x  \le a \\ 0,  x  > a \end{cases}.$		5.2h			
b.	If 10% of the	holte prod	huged by a m		active detern	nine the probability			
υ.						ist one bolt will be			
	defective.	o dones eno	son at randor	n (1) 1 (n) ne	ine (iii) at lee	ist one boil will be			
c.	Find the cub values:	oic Lagran	ge's interpola	ating polynon	nial which to	akes the following			
	X	0	1		2	5			
	f(x)	2	3		12	147			
d.	The following	table gives t	he death recor	ds of three hos	pitals				
	Hospital A	3	4	3	5	0			
	Hospital B	6	3	3	4	4			
	Hospital C	7	3	4	6	5			
	From these data. Discuss about the difference in the number of the deaths per months								
	among three hospitals. Given that the tabulated value of F for 2 and 12 degrees of freedom								
	is 3.88 at 5% le								
e.	Discuss the dif	ference bet	ween np-chart	and p-chart. F	ollowing is the	data of defective of			
	10 samples of	size 100 eac	h. Construct ni	o-chart and exp	lain vour findir	ngs.			



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**Subject Code: KAS304** Roll No:

Printed Page: 2 of 2

# **BTECH** (SEM III) THEORY EXAMINATION 2021-22 MATHEMATIVS-V

<ul> <li>3. Attempt any one part of the following:  a. Determine Fourier sine transform of e<sup>-ax</sup>/x, a &gt; 0.  b. Solve the following difference equation: y<sub>n+2</sub> + 2y<sub>n+1</sub> + y<sub>n</sub> = n given that y<sub>0</sub> = y<sub>1</sub> = 0.  4. Attempt any one part of the following:  a. A manufacture knows from experience that the resistance of resistors he produces is normal with mean 100 ohms and standard deviation 2 ohms. Determine wha percentage of resistors will have resistance between 98 ohms and 102ohms.  b. A random variable x has the following probability function: x: 0 1 2 3 f(x): 3k 2k 2k k Determine (i) k (ii) mean of the distribution.  5. Attempt any one part of the following:  a. Using Regula-Falsi method, compute the real root of the equation x³ - 4x = 9.  b. Using forward difference operatorcalculate the missing terms in the following data: x 0 5 10 15 20 25 F(x) 6 10 - 17 - 31  6. Attempt any one part of the following:  a. A die is thrown some times and the results are observed as: No. appeared on die: 1 2 3 4 5 6 Frequency: 40 32 29 59 57 59  Test whether die is biased or not. Given Chi square of 5% level of significance for degree of freedom is 11.09.  b. The 9 items of a sample have the following values: 45, 47, 50, 52, 48, 47, 49, 53, 51. Apply t test to check the mean of these values differ significantly from the assumed mean 47.5. Use at 5% level of significance for 8 degree of freedom is 2.31.  7. Attempt any one part of the following: 10x1=10</li> </ul>					SE	CTIC	ON C						
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7. Attempt any one part of the following:	7						nce 10	r 8 deg	gree of	ireea	om 1s 2		1_10
a. Explain the following terms:						ving:						10X	1-10
<ul><li>a. Explain the following terms:</li><li>(i) Replication (ii) Randomization (iii) Components of variation in experimenta</li></ul>	a.					n (iii	Con	noner	nts of	variat	ion in	evner	rimental
designs.													
b. The following data shows the value of sample mean $\overline{X}$ and range R for 10 samples	b.												
of size 5 each. Calculate the values for central line and control limits for $\overline{X}$ and $\overline{Y}$					. "		-				_	_	_ 1
charts. Also determine whether the process is in under control or not.					_ / \						1 111111113	S 101 A	and K
charts. This determine whether the process is in under control of not.		Charts. 71180 act	CITITITE W	, incurred	pi	Jeess	เอามนโ	1401 00	O1 UI	1101.			
Sample no. 1 2 3 4 5 6 7 8 9 10		Sample no.	1	2	3	4	5	6	7	8	9	10	
Mean X 11.2 11.8 10.8 11.6 11 9.6 10.4 9.6 10.6 10		Mean $\overline{X}$	11.2	11.8	10.8	11.6	11	9.6	10.4	9.6	10.6	10	
Range R 7 4 8 5 7 4 8 4 7 9			7	4	8	5	7	4	8	4	7	9	