Printed page: **Subject Code: AAS0402**

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NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute)

Affiliated to Dr. A.P. J Abdul Kalam Technical University, Uttar Pradesh, Lucknow

Course: B.Tech **Branch: CSE/IT/IOT/ECE/CS**

Semester: IV **Examinatiom: PUT** **Year: (2021-22)**

Subject Name: Eng.Maths IV

Time: 2:00 Hrs **Max. Marks:60**

General Instructions:

1. *This Question paper consists of 5 pages & 4 questions. It comprises of three Sections -A, B, & C.*
2. ***Section A*** *–Q.No- 1 is Very short answer type questions carrying 1 mark each, Q. No- 2 is short answer type Question carrying 2 mark each. You are expected to answer them as directed.*
3. ***Section B-*** *Q.No-3 is Short answer type questions carrying 5 marks each. Attempt any four out of five questions given.*
4. ***Section C -*** *Q. No-4 is Long answer type questions carrying 6 marks each. Attempt any four out of six questions given.*

SECTION – A

1.	**Attempt all parts**		**[8x1=08]**	
	1-a.	The standard error of mean of a random large sample of size n from a population with μ variance σ^2 is: A. $\frac{\sigma}{\sqrt{n}}$ B. $\sigma\sqrt{n}$ C. $\frac{n}{\sqrt{\sigma}}$ D. $\sqrt{\frac{\sigma}{n}}$	**(1)**	**CO2**
	1-b.	In one-way Classified data involving 4 samples having 12 observations, then degree of freedom associated with error sum of square is- A. 12 B. 3 C. 8 D. 11	**(1)**	**CO2**
	1-c.	The point where the Null Hypothesis gets rejected is called as- A. Significant Value B. Rejection Value	**(1)**	**CO2**

		C. Acceptance Value D. Critical Value		
	1-d.	For the standard normal variate Z, mean and variance are- A. 0,1 B. μ, σ^2 C. 1,0 D. σ^2, μ	**(1)**	**CO4**
	1-e.	Let X be a poisson random variable s.t. $P(X = k) = P(X = k + 1)$ then the mean is- A. k B. $k + 1$ C. $k - 1$ D. $2k$	**(1)**	**CO4**
	1-f.	Out of 800 families with four children each, how many families would be expected to have at most two girls are (Assume equal probabilities for boys and girls) A. 250 B.350 C.550 D.750	**(1)**	**CO4**
	1-g.	The remainder is 29, when a number is divided 56. If the same number is divided by 8, then what is the remainder? A. 3 B. 4 C. 7 D. 5	**(1)**	**CO5**
	1-h.	A function $f : R \to R$ is given by $f(x) = x^2$ then $f(x)$ is A. 1-1 into B. 1-1 onto C. neither 1-1 nor onto D. many one into	**(1)**	**CO5**
2.	**Attempt <u>all</u> parts**		**[4×2=08]**	
	2-a.	Write the control limits (UCL & LCL) for Fraction defective chart.	**(2)**	**CO2**

	2-b.	Suppose that a random variable x has normal distribution with mean 9 and variance 9. Find value of c such that $P(x > c) = 0.16$ (Given that $\phi(1) = 0.34$)	**(2)**	**CO4**
	2-c.	A random sample of 200 measurements from a large population gave a mean value of 50 and S.D. of 9. Determine 95% confidence interval for the mean value of population.	**(2)**	**CO2**
	2-d.	An integer is chosen at random from two hundred digits. What is the probability that integers is divisible by 6 or 8?	**(2)**	**CO5**

SECTION – B

3.	**Attempt any four out of five questions-**		**[4x5=20]**	
	3-a.	Samples of sizes 10 and 14 were taken from two normal populations with SD 3.5 and 5.2. The sample means were found to be 20.3 and 18.6. Test whether the means of the two populations are the same at 5% LOS. The tabulated value is 2.07 at 5% LOS for 22 d.f.	**(5)**	**CO2**
	3-b.	Following is the data of defectives of 10 samples of size 100 each. Construct np −chart and state whether the process is in statistical control.	**(5)**	**CO2**
	3-c.	If the probabilities of a bad reaction from a certain injection is 0.0002, determine the chance that out of 1000 individuals more than two will get a bad reaction.	**(5)**	**CO4**
	3-d.	Four persons in a group of 20 are graduates. If 4 persons are selected at random from 20 find the probability that (i) All are graduates	**(5)**	**CO4**

Sample No.	1	2	3	4	5	6	7	8	9	10
No. of defective	6	9	12	5	12	8	8	16	13	7

		(ii) At least one is graduate		
	3-e.	Three news papers A, B and C are published in a certain city. It is estimated from a survey that of the adult population: 20% read A, 16% read B, 14% read C,8% read both A and B, 5% read both A and C, 4% read both B and C, 2% read all three. Find the probability what percentage read at-least one of the papers?	**(5)**	**CO5**

SECTION – C

4. Attempt any four out of six questions- [4×6=24]

4-a. **(6)** **CO2**

To test the effectiveness of inoculation against cholera, the following table was obtained:

	Attacked	Not attacked	total
Inoculated	30	160	190
Not inoculated	140	460	600
Total	170	620	790

Use Chi-Square test to defend or refute the statement that the inoculation prevents attack from cholera. If the tabulated value is 3.841 at 5% level.

4-b. **(6)** **CO2**

The following figures relate to the production in kg of three varieties I, II, III of wheat shown in 12 plots:

Variety I: 14 16 18
Variety II: 14 13 15 22
Variety III: 18 16 19 19 20

Is there any significant difference in the production of three varieties? Given the txabulated value of F for $v_1 = 2$ and $v_2 = 9$ at 5% level of significance is 4.26.

4-c. **(6)** **CO4**

In a distribution exactly Normal, 1.07% of the items lie below 42 and 4.46% of the items lie above 82. What are the mean and Standard deviation of this Distribution? It is given that if $f(t) = \frac{1}{\sqrt{2\pi}} \int_0^t e^{\frac{-x^2}{2}} dx$ then $f(1.7) = 0.4554, f(2.3) = 0.4893$

	4-d.	Find the moment generating function about origin for exponential distribution and also find mean & variance of the distribution.	**(6)**	**CO4**
	4-e.	The following table gives the number of days in a 50-day period during which automobile accidents occurred in a city- No. of Accidents: 0 | 1 | 2 | 3 | 4 No. of days: 21 | 18 | 7 | 3 | 1 Fit a Poisson distribution to the data and calculate expected frequencies.	**(6)**	**CO4**
	4-f.	Study the table carefully and answer the question given below: (i) Find the number of students scoring less than 40% marks in aggregate. (ii) If at least 60% marks in physics are required for pursuing higher studies in physics, how many students will eligible to pursue higher studies in physics?	**(6)**	**CO5**

Marks out of 50 → Subject ↓	≥ 40	≥ 30	≥ 20	≥ 10	≥ 0
Physics	9	32	80	92	100
Chemistry	4	21	66	81	100
Aggregate (Avg)	7	27	73	87	100

----------THE END ---------