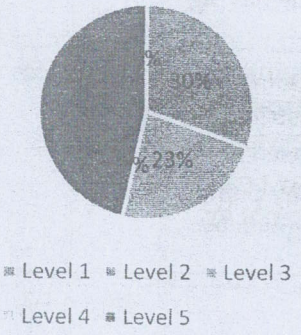
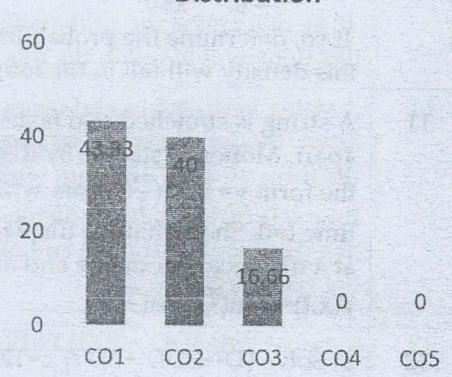
CO- Course Outcomes, KL- Knowledge Level, PO – Program Outcome

Course Outcomes	CO1	The mathematical tools needed in evaluating multiple integrals and their usage.
	CO2	The effective mathematical tools for the solutions of differential equations that model physical processes.
	CO3	The tools of differentiation and integration of functions of a complex variable that are used in various techniques dealing engineering problems
	CO4	An ability to apply effective, creative and innovative solutions, both independently and cooperatively, to current and future problems.
	CO5	A commitment to continuing learning and the capacity to maintain intellectual curiosity.

GRAFICAL REPRESENTATION





ARKAJAIN University Jharkhand

END TERM EXAMINATION
School of Engineering & IT

Branch	CSE, EEE, ME,CL	Program	B.Tech
Subject Name	Engineering Mathematics-III	Semester	3rd
		Year	2023/ Odd

Time: 3 Hour
Max. Marks : 70

- Start writing from 2nd page onwards; **don't Write on the 1st Page Backside**
- **Answer all Questions of Section A (Compulsory)**
- **Answer Any Four out of Six of Section B**
- **Answer Any Three out of Five of Section C**
- **Possession of Mobile Phones** or any kind of **Written Material, Arguments with the Invigilator or Discussing with Co-Student** will comes under **Unfair Means** and will **Result** in the **Cancellation of the Papers.**

Knowledge Level (KL)			
	K1 : Remembering	K3 : Applying	K5 : Evaluating
	K2 : Understanding	K4 : Analysing	K6 : Creating

Section A (Each question Carry 02 Marks from Q1-i to Q1-x) – 20 Marks

Q. N 1	QUESTIONS	Marks	COs	KL	PO
i	Define the Lagrange's Auxiliary equation?	2	CO2	K1	PO2
ii	Solve $Z=px+qy+\sqrt{1+p2+q2}$.	2	CO1	K2	PO1
iii	Write the D'Alembert's solution of the Wave equation.	2	CO2	K2	PO2
iv	Write down the general solution of one-dimensional heat flow equation	2	CO2	K2	PO2
v	Write mean, variance of binomial distribution?	2	CO1	K1	PO1
vi	If a random variable has a Poisson distribution such that P(1)=P(2) then find the mean of distribution. Also find p(3).	2	CO3	K5	PO2
vii	Write the relation between Mean Median and Mode.	2	CO1	K1	PO2
viii	Write the formula for coefficient of range	2	CO1	K2	PO1
ix	Write the difference between parameter and statistics	2	CO3	K2	PO1
x	Distinguish between Small Samples and Large Samples.	2	CO1	K3	PO2

Section B (Answer any FOUR out of SIX) – 20 Marks
(Each question 5 Marks)

Q. No.	QUESTIONS	Marks	COs	KL	PO
2	Solve $(x^2-y^2-z^2)p+2xyq=2xz$	5	CO2	K5	PO2
3	Solve $(D^2-4DD'+4D'^2)z= e^{x+2y}$	5	CO2	K5	PO3
4	The initial Value problem $U_{tt}=4\,U_{xx}$, $-\infty < x < \infty$, $t>0$ $U(x,0)= -x$, $U_t(x,0) =0$ then Find the value of U(2,2).	5	CO2	K3	PO2
5	The probability Mass function of a variate X is X: 0 | 1 | 2 | 3 | 4 | 5 | 6 P(x): k | 3k | 5k | 7k | 9k | 11k | 13k (i). Find p(x<4), P(X>5), P(3<x<6) (ii) what will be the minimum value of k so that P(X<2)>3.	5	CO1	K3	PO1
6	The probability that an entering student will graduate is 0.4. determine the probability that out of 5 students (i) none (ii) only one (iii) at least one will be graduate.	5	CO1	K4	PO2
7	Find out Median from the following data. Class Interval: 0-10 | 10-20 | 20-30 | 30-40 | 40-50 Frequency: 4 | 6 | 10 | 8 | 2	5	CO1	K2	PO1

Section C (Answer any THREE out of FIVE) – 30 Marks-
(Each question Carry 10 Marks)

Q. No.	QUESTIONS	Marks	COs	KL	PO
8	In a sample survey of opinion answer to the question (i) do you drink (ii) Are you in favour of local opinion on sale of liquor are tabulated below. Can you infer or not the local opinion on the sale of the liquor is depend on individual drink? Given that the value of $\chi^2_{0.05}$=3.841. Question-1 / Question-2: yes | No | Total yes: 56 | 31 | 87 NO: 18 | 6 | 24 Total: 74 | 37 | 111	10	CO1	K4	PO4
9	a) Calculate the Mean and Standard Deviation of the following data. Size: 6 | 7 | 8 | 9 | 10 | 11 | 12 Frequency: 3 | 6 | 9 | 13 | 8 | 5 | 4 b) Fit a binomial distribution for the following data and compare the theoretical frequencies with actual once. x: 0 | 1 | 2 | 3 | 4 | 5 f: 2 | 14 | 20 | 34 | 22 | 8	5+5	CO1	K5	PO1
10	a) Find the PDF by eliminating Arbitrary function $f(x+y+z, x^2+y^2-z^2)$. b) Is the function Defined as follows a density function? $F(x)=e^{-x}$, $x\geq 0$ $= 0$, $x<0$ If so, determine the probability that variate having this density will fall in the interval [1, 2].	5+5	CO1	K5	PO2
11	A string is stretched and fastened to two points L apart. Motion is started by displacing the string in the form $y= a\sin(\frac{\pi x}{l})$ from which it is released at time t=0. Show that the displacement of any point at a distance x from one end at a time t is given by $y(x,t)=a\sin(\frac{\pi x}{l})\cos(\frac{\pi ct}{l})$.	10	CO3	K3	PO2
12	a) Solve $(D^2+3DD'+2D'^2)\,z=12xy$ b) Solve $y^2p-xyq=x(z-2y)$.	5+5	CO2	K5	PO1