PG ENTRANCE COACHING

For

M.Sc., (MATHEMATICS)

Date: 01-Aug-2020 to30-Aug-2020

Time: 9:30 am to 12:30 Pm

Organized by

CAREER GUIDANCE & PLACEMENT CELL
2019–2020

INDEX

About Programme

The Career Guidance and Placement Cell at Sir C R Reddy College for Women organized PG entrance coaching classes for NANNAYACET 2020 in Mathematics. These classes were conducted by senior faculty members who specialize in the respective subjects at the college.

Program: PG Entrance Coaching for Mathematics Subject

Subjects Covered:

- M.Sc. (Mathematics)

Target Audience:

- III B.Sc. students aspiring for postgraduate studies (M.Sc.)

Duration:

- August 1st 2020, to Aug30^{th}, 2020 (30 days)

Time:

- 9:30 AM to 12:30 PM (Morning sessions)

Resource Persons:

- Mrs. V.D. Ratna Kumari(HOD) &
- Mrs. M.B.Rajyalakshmi

Organized By:

- Career Guidance and Placement Cell at Sir CR Reddy College for Women

Program Overview:

- Specifically designed coaching program focusing on NANNAYACET 2020 for M.Sc. aspirants.

- Conducted by seasoned faculty members from Sir CR Reddy College, each specializing in Mathematics.

- Comprehensive curriculum comprising subject-specific lectures, problem-solving sessions, practice tests, and exam strategy workshops.

- Tailored content to acquaint students with the NANNAYACET exam pattern, syllabi, and effective preparation methodologies.

Benefits for III B.Sc. Students:

- Early guidance and preparation assistance for M.Sc. entrance exams.

- Exposure to exam patterns, aiding in better preparedness.

- Access to experienced faculty for subject-specific guidance and doubt resolution.

- Enhanced readiness for M.Sc. studies by initiating preparation in advance.

This coaching program aims to support B.Sc. students in their aspirations for pursuing postgraduate studies by providing structured coaching specifically aligned with the requirements of the NANNAYACET 2020 examination.

Learning Objectives and Learning Outcomes

Learning Objectives:
1. Subject Mastery: To facilitate a comprehensive understanding of the core concepts and subject-specific knowledge required for M.Sc. entrance exams.
2. Exam Familiarity: To familiarize students with the exam pattern, question types, and syllabi specific to NANNAYACET 2020.
3. Problem-Solving Skills: To enhance problem-solving abilities and critical thinking necessary to tackle complex questions in the entrance exams.
4. Time Management: To equip students with effective time management strategies for the exam and optimize their performance within the stipulated time frame.
5. Exam Strategy: To provide guidance on effective exam strategies, including question selection, prioritization, and efficient answering techniques.

Expected Outcomes:
1. Strong Foundation: Students are expected to build a strong foundational understanding of their respective subjects, providing a basis for advanced studies.
2. Improved Performance: Enhanced problem-solving skills and a better grasp of exam patterns can result in improved performance in mock tests and the actual entrance exam.
3. Confidence: Through regular practice and guidance, students are likely to gain confidence in handling diverse questions and scenarios during the examination.
4. Effective Preparation: Students should be better prepared to face the challenges of the entrance exams by utilizing learned strategies and subject-specific knowledge.
5. Readiness for Postgraduate Studies: The coaching program aims to prepare students adequately for the rigors of postgraduate studies in their chosen fields.

Permission Letter

26-07-2020
Eluru

To
The Principal
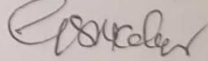Sir C.R.Reddy College for Women
Eluru

Subject: Request to grant permission to conduct P.G Entrance test Coaching Classes to final year students.

This is to bring to your kind notice that, Career Guidance and Placement Cell is planning to conduct P.G Entrance test Coaching Classes for interested III B.Sc/B.Com students specializing life Sciences, Mathematics, Physics, Chemistry, Commerce .

The coaching classes aim is to provide additional support and guidance to our ambitious students who aspire to excel in their respective fields and we believe that providing coaching classes with in our college will not only benefit our students but also contribute to the overall academic excellence of our institution. These classes will be conducted for about 30 days i.e., from 1^{St} August 2020 to 30th August 2020. The duration of these classes will be from 9:30 am to 12:30 pm. I kindly request your approval for this initiative, as it aligns with our commitment to fostering academic excellence and preparing our students for successful futures.

Thanking you Madam,

Permitted

Principal
Sir C.R.Reddy College for Women
ELURU

Yours Faithfully,
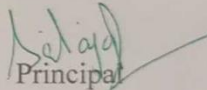
(Coordinator)

Career Guidance and Placement Cell

Notice to Students

NOTICE

27-07-2020

This is to inform you all that Career Guidance and placement Cell arranged P.G Entrance Test Coaching Classes for interested III B.Sc/B.Com students specializing life Sciences, Mathematics, Physics, Chemistry, Commerce. These Classes will be held within the college at Seminar Hall from 1st August 2020 to 30th August 2020 running from 9:30 am to 12:30 pm. This initiative aims to enhance your preparation for P G Entrance Test offering personalized guidance to help you excel in the examination. These sessions will provide valuable insights and guidance.

We encourage all interested candidates to attend and take advantage of this valuable opportunity.

Principal

Principal
Sir C.R.Reddy College for Women
ELURU

Course Structure

- Differential equations of first order and first degree
- Differential equations of first order but not of first degree
- Higher order linear differential equations
- Three-Dimensional Geometry
- Differentiation and Integration
- System of linear differential equations
- Groups
- Rings
- Real Numbers
- Linear Algebra
- Multiple Integral and Vector calculus

1. DIFFERENTIAL EQUATIONS

STUDY MATERIAL

★ **Differential equation:** An equation involving differentials or one dependent variable and its derivatives with respect to one or more independent variables is called a differential equation.

★ **Ordinary differential equation:** A differential equation is said to be ordinary if the derivatives in the equation have reference to only a single independent variable.

Ex: 1. $\left(\dfrac{dy}{dx}\right)^3 - 4\left(\dfrac{dy}{dx}\right)^2 + 7y = \cos x$

2. $\dfrac{d^2y}{dx^2} + 5x\left(\dfrac{dy}{dx}\right)^2 - 6y = \log x$

★ The general form of an ordinary differential n is

$F\left(x, y, \dfrac{dy}{dx}, \dfrac{d^2y}{dx^2}, \ldots \dfrac{d^ny}{dx^n}\right) = 0$

$F(x, y, y^1, y^2, \ldots y^n) = 0$

★ **Partial differential equation:** A differential equation is said to be partial if the derivatives in the equation have reference to two or more independent variables.

Ex: 1. $(y+z)\dfrac{\partial z}{\partial x} + (z+x)\dfrac{\partial z}{\partial y} = x + y$

2. $4\dfrac{\partial^2 u}{\partial x^2} + 2\dfrac{\partial^2 u}{\partial x \partial y} + \dfrac{\partial^2 u}{\partial y^2} = x - y$

★ **Order of a differential equation:** A differential equation is said to be of order n, if the nth derivative is the highest derivative in that equation.

★ **Degree of a differential equation:**

Let $F(x, y, y^1, \ldots y^n) = 0$ be a differential equation of order n. If the given differential equation is a polynomial in y^n, then the highest degree of $y^{(n)}$ is defined as the degree of the differential equation.

Ex: a $\dfrac{d^2y}{dx^2} = \left[1 + \left(\dfrac{dy}{dx}\right)^2\right]^{3/2}$

The order and degree of this equation is 2.

★ **General Solution of a differential equation:** Let $F(x, y, y^{(1)}, y^{(2)}, \ldots y^{(n)}) = 0$ be a differential equation of order n. If $\phi(x, y, c_1, c_2, \ldots c_n) = 0$ where $c_1, c_2, \ldots c_n$ are n independent arbitrary constants, is a solution of the given differential equation, then it is called the general solution of the given differential equation.

★ **Particular solution of a differential equation:** The solution obtained by giving particular values to arbitrary constants in the general solution of the differential equation $F(x, y, y^{(1)}, \ldots y^{(n)}) = 0$ is called a particular solution of given differential equation.

★ **Singular solution of a differential equation:** An equation $\psi(x,y) = 0$ is called singular solution of the differential equation $F(x, y, y^{(1)}, \ldots y^{(n)}) = 0$ if

i. $\psi(x, y) = 0$ is a solution of the given differential equation.

ii. $\psi(x, y) = 0$ does not contain arbitrary constant and

iii. $\psi(x, y) = 0$ is not obtained by giving particular values to arbitrary constants in the general solution.

★ An equation of the form $\dfrac{dy}{dx} = f(x,y)$ is called a differential equation of the first order and of the first degree.

★ The following four methods for solving $\dfrac{dy}{dx} = f(x,y)$

i. Variable separable

ii. Homogeneous equations and equations reducible to homogenous form.

iii. Exact equations and which can be made exact by the use of integrating factors

iv. Linear equations and Bernoulli's form.

★ **Existence and uniqueness theorem:** Let S denote the rectangular region defined by $|x - x_0| \le a$ and $|y - y_0| \le b$, a region with the point (x_0, y_0) as its centre. If f(x, y) and $\dfrac{\partial f}{\partial y}$ are continuous functions of x and y in a region S of the xy–plane and if $P(x_0, y_0) \in S$, then there exists one and only one function say $\phi(x)$, which in some neighbourhood of P, is

solution of the differential equation $\frac{dy}{dx} = f(x, y)$ and is such that $\phi(x_0) = y_0$.

★ **Homogeneous Factors:** A function $f(x,y)$ is said to be a homogeneous function of degree n in x and y if $f(kx,ky) = k^n f(x,y) \forall k$, n is a constant.

★ **Homogeneous differential equation:** A differential equation $\frac{dy}{dx} = f(x,y)$ of first order and first degree is called homogeneous in x and y if the function $f(x, y)$ is a homogeneous function of degree zero in x and y.

★ **Non–Homogeneous equation of the first degree in x and y:** The equation $\frac{dy}{dx} = f(x, y)$ can be written as $M(x, y)\,dx + N(x, y)\,dy = 0$ (or) $N(x,y)\frac{dy}{dx} = M(x, y)$, if $a_1, b_1, c_1, a_2, b_2, c_2$, are constants and $c_1 \neq 0$ or $c_2 \neq 0$ then $(a_2 x + b_2 y + c_2)\frac{dy}{dx} = a_1 x + b_1 x + c_1$ is called a non-homogeneous differential equation of the first degree in x and y.

★ **Exact differential equation:**
Let $M(x, y)\,dx + N(x, y)\,dy = 0$ be a first order and first degree differential equation where M, N are real valued functions defined for some real x, y on some rectangle R: $|x-x_0| \leq a$, $|y-y_0| \leq b$. Then the equation Mdx + Ndy = 0 is said to be an exact differential equation if there exists a function $f(x, y)$ having continuous first partial derivatives in R such that
$$\frac{\partial f}{\partial x}\,dx + \frac{\partial f}{\partial y}\,dy = Mdx + Ndy.$$

★ If $M(x, y)$, $N(x, y)$ are two real valued functions which have continuous first partial derivatives on some rectangle R: $|x - x_0| \leq a$, $|y - y_0| \leq b$, then a necessary and sufficient condition for the differential equation Mdx + Ndy = 0 to be exact in R, is
$$\frac{\partial M}{\partial y} = \frac{\partial N}{\partial x} \text{ in R.}$$

★ **Integrating Factors:** Let $M(x,y)\,dx + N(x, y)\,dy = 0$ be not an exact differential equation. If Mdx+Ndy= 0 can be made exact by multiplying it with a suitable function $\mu(x, y) \neq 0$ then $\mu(x, y)$ is called an integrating factor of Mdx + Ndy = 0.

★ **Method to find integrating factors.**

i. $d(xy) = xdy + ydx$

ii. $d(x/y) = \dfrac{ydx - xdy}{y^2}$

iii. $d(y/x) = \dfrac{xdy - ydx}{x^2}$

iv. $d\left(\dfrac{x^2 + y^2}{2}\right) = xdx + ydy$

v. $d\left[\log\left(\dfrac{y}{x}\right)\right] = \dfrac{xdy - ydx}{xy}$

vi. $d\left[\tan^{-1}\left(\dfrac{y}{x}\right)\right] = \dfrac{xdy - ydx}{x^2 + y^2}$

vii. $d\left[\log\sqrt{x^2 + y^2}\right] = \dfrac{xdx + ydy}{x^2 + y^2}$

viii. $d\left(\dfrac{e^x}{y}\right) = \dfrac{ye^x dx - e^x dy}{y^2}$

ix. $d\left(\dfrac{x^2}{y}\right) = \dfrac{2yxdx - x^2 dy}{y^2}$

x. $d(y^2/x) = \dfrac{2xydy - y^2 dx}{x^2}$

★ $M(x, y)\,dx + N(x, y)\,dy = 0$ is a homogeneous differential equation and $Mx + Ny \neq 0$ then $\dfrac{1}{Mx+Ny}$ is an integrating factor of Mdx + Ndy = 0.

Note: If $M_x + N_y = 0$ then M/N = y/x, then the equation mdx+ndy = 0 reduces to ydx − xdy = 0 and its solutin is x/y = c.

★ If the equation Mdx+Ndy = 0 is of the form $yf(xy)\,dx + xg(xy)\,dy = 0$ and $Mx - Ny \neq 0$ then $\dfrac{1}{Mx-Ny}$ is an integrating factor of Mdx+Ndy=0.

★ If there exists a continuous single variable function f(x) such that $\frac{\partial M}{\partial y} - \frac{\partial M}{\partial x} = N f(x)$ then $\int_e f(x)\,dx$ is an integrating factor of Mdx+Ndy = 0.

Note: 1. $\dfrac{1}{N}\left(\dfrac{\partial M}{\partial y} - \dfrac{\partial N}{\partial x}\right)$ is a function of x alone

2. $e^{\log f(x)} = f(x)$ and $e^{\log x^k} = x^k$ where k is constant.

★ If there exists a continuous and differential single variable function g(y) such that $\frac{\partial N}{\partial x} - \frac{\partial M}{\partial y} = Mg(y)$.
Then $\int_e g(y)\,dy$ is an integrating factor of Mdx+Ndy=0.

★ **Linear differential equations of first order:** An equation of the form $\frac{dy}{dx} + P(x)\,y = Q(x)$ where P(x) and Q(x) are defined over an interval I, is called a linear differential equation of first order in y.
If Q(x) = 0 for all x in I then the corresponding equation $\frac{dy}{dx} + P(x)y = 0$ is called a homogeneous linear equation of first order. If Q(x) $\neq 0$ for some x in I,

then $\frac{dy}{dx} + P(x)y = Q(x)$ is called a non homogeneous linear equation of first order.

★ If P and Q are differentiable functions of x over an interval I then $y \exp(\int Pdx) = \int \{Q \exp[(\int Pdx)]\} dx + c$ is the general solution of the equation $\frac{dy}{dx} + Py = Q$.

★ **Bernoulli's equation:** An equation of the form $\frac{dy}{dx} + Py = Qy^n$ is called Bernoulli's equation if P, Q are continuous functions of x on an interval I and n is a real number.

★ **Equations reducible to first order and first degree by $p = \frac{dy}{dx}$ substitution:** Consider the differential equation $f\left(\frac{d^2y}{dx^2}, \frac{dy}{dx}, x\right) = 0$ not containing y directly.

By putting $\frac{dy}{dx} = p$ the equation can be transformed as $F\left(\frac{dp}{dx}, p, x\right) = 0$ which is of first order and first degree.

★ An equation of the form f(x, y, p) = 0, where p is not of first degree, is called a differential equation of first order and not of first degree. An equation of the form $p^n + p_1(x,y)p^{n-1} + ... + p_{n-1}(x,y)p + p_n(x,y) = 0$ is called the general first order equation of degree n (>1).

★ **Clairaut's equation:** Differential equation of the form $y = px + \phi(p)$ is called Clairaut's equation.

★ **Orthogonal trajectory:** A curve which cuts every member of a given family of curves at a right angle is called an orthogonal trajectory of the given family.

★ The integral curves of the differential equation $F(x, y, -1/y^1) = 0$ are the orthogonal trajectories of the family or integral curves of $F(x,y,y^1) = 0$.

★ If f(r, θ, c) = 0, c being the parameter is the polar equation of the family of curves, then the differential equation of the family of its orthogonal trajectories is $F\left(r, \theta, -r^2 \frac{d\theta}{dr}\right) = 0$.

★ An equation of the form $\frac{d^n y}{dx^n} + P_1(x)\frac{d^{n-1}y}{dx^{n-1}} + P_2(x)\frac{d^{n-2}y}{dx^{n-2}} + ... + P_n(x)y = Q(x)$.

Where $P_1(x)$, $P_2(x)$, ... $P_n(x)$ and Q(x) are all continuous and real valued functions of x on an interval

I, is called a linear differential equation of order n.

Ex: 1. $\frac{d^3y}{dx^3} + x^3\frac{d^2y}{dx^2} + x^2\frac{dy}{dx} + 2x y^2 = \cos x$

★ **Differential operator:** Let the differential operator $\frac{d}{dx}$ be denoted by D and the differential operators $\frac{d^2}{dx^2}, \frac{d^3}{dx^3}, ... \frac{d^n}{dx^n}$ be denoted by $D^2, D^3, ... D^n$ when applied on function y of x yield.

$Dy = \frac{dy}{dx}$, $D^2y = \frac{d^2y}{dx^2}$, $D^n y = \frac{d^n y}{dx^n}$.

The polynomial $D^n + P_1 D^{n-1} + P_2 D^{n-2} + ... + P_n$ in D is called a differential operator of order n and it is denoted by f(D). $f(D) = D^n + P_1 D^{n-1} + P_2 D^{n-2} + ... + P_n$.

★ An equation of the form $\frac{d^n y}{dx^n} + P_1\frac{d^{n-1}y}{dx^{n-1}} + ...: + P_n(y) = Q(x)$.

Where $P_1, P_2, ... P_n$ are real constants and Q(x) is a continuous function of x defined on an interval I, is called a linear equation of order n with constant coefficients.

★ If $f(D) = D^n + P_1 D^{n-1} + P_2 D^{n-2} + ... + P_n$ where $P_1, P_2, ... P_n$ are real constants, then $f(D)e^{mx} = f(m)e^{mx}$ where m is a constant.

★ If m_1 is a root of the equation f(m) = 0 then $y = e^{m_1 x}$ is a solution of f(D) y = 0.

★ If $f(D) \equiv D^n + P_1 D^{n-1} + ... P_n$ where $P_1, P_2, ... P_n$ are real constants then $e^{mx}[f(D)y] = f(D-m) e^{mx}y$. Where y is a function of x.

★ **Auxillary equation of f(D)y=0:** The algebraic equation f(m) = 0 i.e. $m^n + P_1 m^{n-1} + ... + P_n = 0$. Where $P_1, P_2, ... P_n$ are real constants is called the auxillary equation of f(D) y = 0.

Note: $c_1 e^{m_1 x} + c_2 e^{m_2 x} + ... + c_n e^{m_n x}$ is the complementary functions of f(D) y = Q(x).

★ **Inverse operator:** The operator D^{-1} is called the inverse of the differential operator D.

★ If Q is a function of x defined on an interval I, then $\frac{1}{f(D)}Q$ is also some function of x, containing no arbitrary constant. When f(D) operates on this function, the result is the function Q.

★ If Q is any function of x defined on an interval I and α is a constant, then a particular value of $\frac{1}{D-\alpha}Q$ is equal to $e^{\alpha x} \int Q e^{-\alpha x} dx$.

★ If $\frac{1}{D-\beta}$, $\frac{1}{D-\alpha}$ are two inverse operators then we

OBJECTIVE BITS

1. The degree of $\left\{\dfrac{d^2y}{dx^2}+\left(\dfrac{dy}{dx}\right)^2\right\}^{\frac{3}{2}}=\dfrac{d^2y}{dx^2}$

   1. 3   2. 2   3. 1   4. $\dfrac{3}{2}$

2. The order and degree of the $\left(\dfrac{d^3y}{dx^3}\right)^{\frac{1}{2}}-2\left(\dfrac{dy}{dx}\right)^{\frac{1}{4}}$ $+xy=0$ respectively are

   1. 3, 4   2. 4, 3   3. 3, 5   4. 3, 2

3. The degree of $y=\sin\left(\dfrac{dy}{dx}\right)$

   1. 1   2. 2

   3. 3   4. not defined

4. The differential equation for the solution $y=e^x (A\cos 2x + B\sin 2x)$ is

   1. $y''+y'+5y = 0$ 2. $y''-2y'+5y=0$

   3. $y''+2y'-5y=0$ 4. None of these

5. The degree of the differential equation which has the solution $y=Ae^x+Be^{-2x}+Ce^{3x}$

   1. 1   2. 2

   3. 3   4. None of these

6. The differential equation of straight lines on xy plane is

   1. $\dfrac{d^2y}{dx^2}+\dfrac{dy}{dx}=0$ 2. $\dfrac{d^2y}{dx^2}-\dfrac{dy}{dx}=0$

   3. $\dfrac{dy}{dx}=0$ 4. $\dfrac{d^2y}{dx^2}=0$

7. The differential equation straight lines which are passing through origin on xy plane.

   1. $y=x\dfrac{dy}{dx}$ 2. $y=\dfrac{dy}{dx}$

   3. $y+x\dfrac{dy}{dx}$ 4. None of these

8. The general solution of $\dfrac{dy}{dx}=\sqrt{\dfrac{1-y^2}{1-x^2}}$ is

   1. $\sin^{-1}x-\sin^{-1}y=c$ 2. $\sin^{-1}x+\sin^{-1}y=c$

   3. $\sinh^{-1}x+\sinh^{-1}y=c$ 4. $\sinh^{-1}x-\sinh^{-1}y=c$

9. The solution of $\dfrac{dy}{dx}=\dfrac{f(x)}{(x+y)^2}-1$ is

   1. $(x+y)^2=3\int f(x)dx+c$ 2. $(x+y)^3=3\int f(x)dx+c$

   3. $(x+y)^3=\int f(x)dx+c$ 4. None of these

10. The solution of $x\cos^2 y\,dx+ \tan y\,dx = 0$ is

   1. $-x^2+\tan^2 y=c^2$ 2. $x^2-\tan^2 y=c^2$

   3. $x^2+\tan^2 y=c^2$ 4. None of these

11. The solution of the differential equation is $\dfrac{dy}{dx} = (4x+y+1)^2$

   1. $4x+y+1=2\tan(2x+c)$ 2. $4x+y+1=\tan(2x+c)$

   3. $4x+y+1=2\tan(x+c)$ 4. None of these

12. The solution of differential equation $(2x^2+x)\dfrac{dy}{dx}=1+2x$ at $y=2, x=1$ is

   1. $y=\log x-2$ 2. $y=\log x+4$

   3. $y=\log x+3$ 4. None of these

13. The solution of $(e^y+1)\cos x\,dx+e^y \sin x\,dy=0$ is

   1. $(1+e^y)\sin x = c$ 2. $(1+e^y)\cos x = c$

   3. $(1-e^y)\sin x = c$ 4. $(1-e^y)\cos x = c$

14. The solution of the equation $y\dfrac{dy}{dx}=xe^{x^2+y^2}$

   1. $e^x + e^y = c$ 2. $e^x - e^y = c$

   3. $e^{x^2} + e^{y^2}$ 4. None of these

15. The degree of homogeneous function $\dfrac{\sqrt[3]{x}+\sqrt[3]{y}}{x+y}$ is

   1. 3   2. 2   3. $-\dfrac{2}{3}$ 4. $-\dfrac{3}{2}$

16. The solution of the equation $x\,dy-y\,dx = \left(\sqrt{x^2+y^2}\right)dx$

   1. $y-\sqrt{x^2+y^2} = cx$ 2. $y+\sqrt{x^2+y^2} = cx$

   3. $y-\sqrt{x^2+y^2} = cx^2$ 4. $y+\sqrt{x^2+y^2} = cx^2$

17. The solution of the equation $\dfrac{dy}{dx}=\dfrac{y}{x+ye^{\frac{2x}{y}}}$

   1. $\log c^2x^2=\exp(2x/y)$ 2. $2(c+\log y)=\exp(x/y)$

   3. $2(c+\log y)=\exp(x/2y)$ 4. None of these

18. The solution of the equation $\dfrac{dy}{dx}=\dfrac{y}{x}+\tan\dfrac{y}{x}$ is

   1. $e^{x/y}\log(cx+1)$ 2. $e^{y/x}\log(cx+1) = 0$

   3. $e^{x/y}\log(cx+1) = 0$ 4. None of these

19. Substitution to solve the equation $y^2dy=x(x\,dy-y\,dx)\,e^{x/y}$ is

   1. $x=vy$ 2. $y=vx$

   3. 1 or 2   4. None of these

20. The nature of differential equation $(x+y-1)\dfrac{dy}{dx}=x-y+3$ is

   1. Homogeneous equation

   2. Heterogeneous equation

   3. Exact equation

   4. Legendre equation

2. THREE DIMENSIONAL GEOMETRY

STUDY MATERIAL

★ Let $P = (x, y, z)$ and OP (x,y,z) any two points. The length or magnitude or norm or modulus of the vector OP = $|OP|$ = $\sqrt{x^2 + y^2 + z^2}$

★ Distance between two points (x_1, y_1, z_1) and (x_2, y_2, z_2) is $\sqrt{[(x_2 - x_1)^2 + (y_2 - y_1)^2 + (z_2 - z_1)^2]}$

★ **Unit vector:** If A, B and A $\neq$ B are points, then $\frac{AB}{|AB|}$ is the unit vector along $\overleftrightarrow{AB}$ in the direction from A to B.

★ If $A = (x_1, y_1, z_1)$, $B = (x_2, y_2, z_2)$ then the unit vector along $\overrightarrow{AB}$ in the direction from A to B

$$= \frac{(x_2 - x_2, y_2 - y_1, z_2 - z_1)}{\sqrt{[(x_2 - x_1)^2 + (y_2 - y_1)^2 + (z_2 - z_1)^2]}}$$

★ If $P = a = (a_1, b_1, c_1)$, $Q = b = (a_2, b_2, c_2)$, $P \neq Q \neq 0$ and $(\overrightarrow{OP}, \overrightarrow{OQ}) = (a, b) = $ then

$$\cos\theta = \frac{a.b}{|a| \, |b|} = \frac{a_1a_2 + b_1b_2 + c_1c_2}{\sqrt{\left(a_1^2 + b_1^2 + c_1^2\right)\left(a_2^2 + b_2^2 + c_2^2\right)}}$$

If a, b are parallel vectors then

$a_1 : b_1 : c_1 = a_2 : b_2 : c_2$ (or) $a_1 = b_1 : b_2 = c_1 : c_2$

If a, b are perpendicular vectors $\Leftrightarrow$ a.b = 0

$\Leftrightarrow a_1a_2 + b_1b_2 + c_1c_2 = 0$

★ Projection of b on a $(\neq 0)$ is $- b.e$ where c is $\frac{b.a}{|a|}$ the unit vector in the direction of a.

★ If a, b are two non-zero or non parallel vectors then $a \times b = |a| \, |b|$ in s (a, b) n where n is a unit vector perpendicular to the plane containing a, b so tht a, b, n form a right handed system.

★ If $P = a = (a_1, b_1, c_1)$ $Q = b = (a_2, b_2, c_2)$ $(P \neq Q \neq 0)$ and $= (\overrightarrow{OP}, \overrightarrow{OQ}) = (a, b) = \theta$ then

$$\sin\theta = \frac{|a \times b|}{|a| \, |b|} = \frac{|(b_1c_2 - b_2c_1, c_1a_2 - c_2a_1, a_1b_2 - a_2b_1)|}{\sqrt{(a_1^2 + b_1^2 + c_1^2)(a_2^2 + b_2^2 + c_2^2)}}$$

★ If ABC is a triangle = then the area of $\triangle$ ABC

$= \frac{1}{2} |AB \times AC|$ Square units

Area of $\triangle$ ABC = 0 $\Leftrightarrow$ A, B, C are collinear

★ A, B, C, D are coplanar points. If ABCD is a parallelogram then the area of the parallelogram.

$= |AB \times AD|$ or $\frac{1}{2} |AC \times BD|$ Square units

★ If ABCD is a quadrilateral Then the area of the quadilateral $= \frac{1}{2} |AC \times BD|$ Square units

★ a, b, c are three non-coplanar vectors. If V is the volume of the parallelopiped with adjacent sides a, b, c then V = $|(a.b.c)|$ cubic units. If V is the volume of the tetrahedron with adjacent sides a, b, c then V= $\frac{1}{6} |abc|$ cubic units. If any two of a, b, c are parallel (a, b, c) = 0.

★ a, b, c are three non-zero, non-parallel vectors a,b,c are coplanar $\Leftrightarrow$ (a,b,c) = 0.

★ A, B are two distinct points. Distance of P form

$\overline{AB} = \frac{|AP \times AB|}{|AB|}$

★ If $A = (x_1, y_1, z_1)$, $B = (x_2, y_2, z_2)$ and P is a point dividing the line segment AB in the ratio $\lambda_1 : \lambda_2$ ($\lambda_1 + \lambda_2 \neq 0$) then

$$P = \left[\frac{\lambda_2 x_1 + \lambda_1 x_2}{\lambda_1 + \lambda_2}, \frac{\lambda_2 y_1 + \lambda_1 y_2}{\lambda_1 + \lambda_2}, \frac{\lambda_2 z_1 + \lambda_1 z_2}{\lambda_1 + \lambda_2} \right]$$

★ If (x_r, y_r, z_r) r = 1, 2, 3 are the vertices of a triangle then its medians are concurrent and the point of concurrence trisects any median of the triangle.

★ If $A = (x_1, y_1, z_1)$, $B = (x_2, y_2, z_2)$, $C = (x_3, y_3, z_3)$, $D = (x_4, y_4, z_4)$ are the vertices of the tetrahedron. ABCD then the line segments joining the vertices to their respective centroids of opposite faces are concurrent and the point of concurrence divides each line segment in the ratio 3:1.

★ If l, m, n are d.cs. of a line, then $l^2 + m^2 + n^2 = 1$.

★ If $P = (x_1, y_1, z_1)$, $Q = (x_2, y_2, z_2)$ then $x_2 - x_1, y_2 - y_1, z_2 - z_1$ are d.r.s of $\overrightarrow{PQ}$.

★ If $\overrightarrow{AB}$ is a ray with d.cs. l, m, n and $P = (x_1, y_1, z_1)$ Q $= (x_2, y_2, z_2)$ are two points then the projection of PQ on $\overleftrightarrow{AB}$ the direction AB is $(x_2 - x_1) l + (y_2 - y_1) m + (z_2 - z_1) n$.

OBJECTIVE BITS

1. The direction cosines of the line joining the points (4, 3, –5) and (–2, 1, –8) are
   1. 2, 4, –13
   2. 6, 2, 3
   3. $\frac{6}{7}, \frac{2}{7}, \frac{3}{7}$
   4. None of these

2. The direction cosines of the normal to the plane $2x-3y+6z = 7$ are
   1. $\frac{1}{3}, \frac{2}{3}, \frac{7}{3}$
   2. $\frac{2}{7}, \frac{-3}{7}, \frac{6}{7}$
   3. 2, –3, 6
   4. None of these

3. The angle between the planes $3x-4y+5z = 0$ $2x-y-2z = 5$ is
   1. $\frac{\pi}{3}$
   2. $\frac{\pi}{2}$
   3. $\frac{\pi}{6}$
   4. None

4. The line $\frac{x-\alpha}{l} = \frac{y-\beta}{m} = \frac{z-\gamma}{0}$ is perpendicular to
   1. x–axis
   2. y–axis
   3. z–axis
   4 None of these

5. The line $\frac{x-2}{3} = \frac{y-3}{4} = \frac{z-4}{5}$ is
   1. Parallel to
   2. Perpendicular to
   3. Lying in the plane $2x+y-2z=3$
   4. None of these

6. The foot of the perpendicular from (3,–1, 11) to the line $\frac{x}{2} = \frac{y-2}{3} = \frac{z-3}{4}$ is
   1. (0, 2, 3)
   2. (2, 3, 4)
   3. (2, 5, 7)
   4. (3, 4, 7)

7. The position vector of the ends of the diameter of a sphere are $\bar{a}, \bar{b}, \bar{r}$ is the position vector of a point on the sphere. The equation of the sphere drawn on the diameter is
   1. $(\bar{r}-\bar{a}) . (\bar{r}-\bar{b}) = 0$
   2. $(\bar{r}-\bar{a}) \times (\bar{r}-\bar{b}) = 0$
   3. $(\bar{r}-\bar{a}) = (\bar{r}-\bar{b}) = 0$
   4. $\frac{\bar{r}-\bar{a}}{(\bar{r}-\bar{b})} = 0$

8. $x(x-a) + y(y-b) + z(z-c) = 0$ is
   1. a pairs of planes
   2. sphere
   3. plane
   4. Line

9. Equation of the x–axis is
   1. $x = 0$
   2. $y+z = 0$
   3. $y=0, z=0$
   4. $y-z = 0$

10. $ax+by+cz = 0$ is parallel to
    1. $x = 0$
    2. $by = cz$
    3. None of (1) and (2)
    4. Both (1) and (2)

11. $x^2 + y^2 = 9 - z^2$ is a
    1. sphere
    2. a pair of planes
    3. None of (1) and (2)
    4 both (1) & (2)

12. The interior of the sphere $x^2+y^2+z^2 = 12$ is
    1. (4, 0, 0)
    2. (1, 1, 2)
    3. (1, 2, 3)
    4. (2, 3, 4)

13. $by + cz + d = 0$ is perpendicular to
    1. $by = cz$
    2. $x = 0$
    3. $by + cz = 0$
    4. $y = z$

14. The radius of the sphere $x^2+y^2+z^2-ax-by-cz=0$ is
    1. $\frac{a+b+c}{4}$
    2. $\frac{\sqrt{a}}{2} + \frac{\sqrt{b}}{2} + \frac{\sqrt{c}}{2}$
    3. $\frac{\sqrt{a^2+b^2+c^2}}{2}$
    4. $\frac{\sqrt{a} + \sqrt{b} + \sqrt{c}}{4}$

★ $|x| \geq k \Leftrightarrow x \geq k$ or $x \leq -k$

★ If $p < a < q$ and $\delta = \min \{ |a-p|, |a-q| \}$

★ **Finite and Infinite subsets of R:** A non-empty subset S of R is said to be finite if there exists a bijective function.

Ex: Q is considered to be a finite set. A subset of R which is not finite is called infinite set.

Z^+, Z, Q, R are infinite sets.

★ **Boundedness of subsets of R Aggregate:**

A non-empty subset A of R is called an aggregate.

★ **Upper Bound:** A subset S of R is said to be bounded above if there exists $k_1 \in R$, such that $x \in S \Rightarrow x \leq k_1$. The number k_1 is called an upper bound of S.

★ **Least upper bound or supremum:** If 'u' is an upper bound of an aggregate 'S' and any real number less than 'u' is not an upper bound of S, then 'u' is called least upper bound (or) supremum of (S) (l.u.b).

★ **Lower bound:** An aggregate S is said to be bounded below, if there exists $k_2 \in R$ such that $x \in S \Rightarrow x \geq k_2$. The number k_2 is called a lower bound of S.

★ **Greatest lower bound or infimum:** If 'v' is a lower bound of an aggregated 'S' and any real number greater than 'v' is not a lower bound of S, then 'v' is called greatest lower bound (g.l.b) or infimum of S.

Note: Supremum is defined only for the aggregates which are bounded above and infimum is defined only for the aggregates which are bounded below.

★ If an aggregate is bounded above and supremum exists, then it is unique.

★ **Boundedness:** An aggregate 'S' is said to be bounded if it is both bounded below and bounded above.

★ The aggregate S is bounded $\Leftrightarrow$ there exist u and $v \in R$ such that $v \leq x \leq u$ for all $x \in S$, or $\Leftrightarrow$ there exists $k \in R^+$ such that $|x| < k$ for all $x \in R$.

★ The difference u–v is called oscillation of an aggregate S.

Note: S is bounded set $\Leftrightarrow$ there exict u, $v \in R$ so that $S \subset (v, u)$.

★ If 'v' is a lower bound and 'u' is upper bound of an aggregate S then $v \leq u$.

★ If 'u' is an upper bound of an aggregate S and $u \in S$ then $u = \sup S$.

Note: If 'u' is a lower bound of an aggregate S and $v \in S$ then $v = \inf S$.

★ If 'u' is the supremum of 'S' and $y < u$ then there exists $x \in S$ such that $y < x \leq u$.

Note: If 'v' is infimum of 'S' and $y > v$ then there exists $x \in S$ such that $y > x \geq v$.

★ **Greatest and least members of an aggregate:** If the supremum of an aggregate 'S' is a member of S, then it is called the greatest member of S.

If the infimum of an aggregate 'S' is a member of S, then it is called the least member of S.

The greatest member of an aggregate 'S' is the supremum. But the supremum of 'S' need not be the greatest member.

Note: i. A bounded aggregate 'S' need not have the greatest or the least member.

ii. $S = \{x: 1 \leq x < 2\}$ has no greatest member though it is bounded above.

iii. $S = \{x: 1 < x \leq 2\}$, though bounded below has no least member.

★ **The Completeness Axiom:** Every non empty set of real numbers which is bounded above has supremum (This is also called least upper bound axioms).

★ The set 'R' satisfies

  i. Field axioms

  ii. Order axioms

  iii. Completeness axioms and hence 'R' is a complete ordered field.

★ Let A, B two non-empty subsets of 'R' such that $(a \in A \Rightarrow a \leq b \ \forall \ b \in B)$. If B has supremum then 'A' has supremum and $\sup A \leq \sup B$.

★ The set Z^+ of positive integers is unbounded above.

★ For every real rumber x there is a positive integer n such that $n > x$.

★ **Dedekind's theorem:** If L, U are two subsets of 'R' such that

  i. $L \neq \phi$, $U \neq \psi$ (each set has atleast one element).

  ii. $L \cup U = R$ (each real number is either in 'L' or in 'U')

  iii. $x \in L$, $y \in U \Rightarrow x < y$ (each member of 'L' is smaller than every member of U)

Then the subset 'L' has the greatest member or the subset 'U' has the least member, there exists $\alpha \in R$ such that $x < \alpha \Rightarrow x \in L$, $y > \alpha \Rightarrow y \in U$.

★ **Archimedian property:** If $x, y \in R$ and $x > 0$, there exists $n \in Z^+$ such that $nx > y$.

★ For every $x \in R^+$, there exist m, $n \in Z$ such that $m < x < n$.

★ For every $x \in R$, there exists unique $n \in Z^+$ such that $n \leq x < n+1$, i.e, every real number lies between two consecutive integers.

5. VECTOR DIFFERENTIATION-VECTOR CALCULUS

STUDY MATERIAL

★ **Intervals:**

$(a, b) = \{x \mid x \in R, a < x < b\}$

$(a, b] = \{x \mid x \in R, a < x \le b\}$

$[a, b) = \{x \mid x \in R, a \le x < b\}$

$[a, b] = \{x \mid x \in R, a \le x \le b\}$

$[a, \infty) = \{x \mid x \in R, x \ge a\}$

$(a, \infty) = \{x \mid x \in R, x > a\}$

$(-\infty, a) = \{x \mid x \in R, x < a\}$

$(-\infty, a] = \{x \mid x \in R, x \le a\}$

$(-\alpha, \alpha) = \{x \mid x \in R\}$

★ **Limit of a vector function:** Let f(t) be a vector function over the domain S and a∈S. If there exists a vector L such that for each ε > o, if is possible to find S > o where

$0 < \mid t - a \mid < S \Rightarrow \mid f(t) - L \mid < \varepsilon$

then the vector L is called the limit of f(t) as t tends to a. This is denoted as

$\underset{t \to a}{Lt} \; f(t) = L$

★ **Continuity of vector function:** Let f be a vector function on an interval I, and a∈I. Then f is said to be continuous as a, if.

$\underset{t \to a}{Lt} \; f(t) = f(a)$

★ If f and g are continuous then f ± g, f.g and f × g are also continuous.

★ **Derivative:** Let f be a vector function on an interval I and a∈I then

$\underset{t \to a}{Lt} \; \dfrac{f(t) - f(a)}{t - a}$

If it exists is called the derivative of at a

★ If f is differentiable at t = a then it is continuous at t = a

If f is continuous at t = a then it need not be differentiable at that point.

If f is differentiable on an interval I and t∈I then the derivative of f at t is denoted by $\dfrac{df}{dt}$

★ Let f be constant vector function in the interval I and a∈I.

Then $f^1(a) = a$

★ Let A and B be two differentiable vector functions of scalar variable t over the domain S, then

$$\dfrac{d}{dt}(A \pm B) = \dfrac{dA}{dt} \pm \dfrac{dB}{dt}$$

★ Let A and B be differentiable vector functions of scalar variable f over domain S, then

$$\dfrac{d}{dt}(A.B) = \dfrac{dA}{dt}.B + A.\dfrac{dB}{dt}$$

$$\dfrac{d}{dt}(A \times B) = \dfrac{dA}{dt} \times B + A \times \dfrac{dB}{dt}$$

★ Let A, B and C be three differentiable vector functions of scalar variable t over a domain S. Then.

1. $\dfrac{d}{dt}[ABC] = \left[\dfrac{dA}{dt}BC\right] + \left[A\dfrac{dB}{dt}C\right] + \left[AB\dfrac{dC}{dt}\right]$

2. $\dfrac{d}{dt}[A \times (B \times C)] = \dfrac{dA}{dt} \times (B \times C) + A \times \left(\dfrac{dB}{dt} \times C\right) + A \times \left(B \times \dfrac{dC}{dt}\right)$

★ Let f be differentiable vector function and φ a scalar differentiable function on a common domain S. Then φ f is differentiable on S and

$$\dfrac{d}{dt}(\phi f) = \phi \dfrac{df}{dt} + \dfrac{d\phi}{dt} f$$

★ If f = $f_1(t) i + f_2(t) j + f_3(t) k$, where $f_1(t), f_2(t)$ and $f_3(t)$ are the cartesian components of the vector f, then

$$\dfrac{df}{dt} = \dfrac{df_1}{dt}i + \dfrac{df_2}{dt}j + \dfrac{df_3}{dt}k$$

★ If A is a differentiable vector function of a scalar t over a domain S, then $\dfrac{d}{dt}(A^2) = 2A\dfrac{dA}{dt}$

★ **Vector with constant magnitude.** The necessary and sufficient condition that f(t) is a vector of constant magnitude is f. $\dfrac{df}{dt} = 0$.

★ Let s be a scalar function defined over the domain S and differentiable at t∈S. If t is a vector function differentiable at s(t) in the range of functions then the composite function f(s) is differentiable at t and

$f'[s(t)] = f'[s(t)]S^1t$

$$\dfrac{df}{dt} = \dfrac{df}{ds} \dfrac{ds}{dt}$$

6. GROUP THEORY

STUDY MATERIAL

★ **Natural Numbers (N):** The numbers which are starting with '1' and incremented by 1 are called as natural numbers.

$N = \{1, 2, 3, 4, - - - -\}$

★ **Whole numbers (W):** The numbers which are starting with '0' and incremented by '1' are called as whole numbers.

$W = \{0, 1, 2, 3, - - - -\}$

★ **Integers:** $Z = \{-, -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5, - - -\}$

★ **Rational numbers (Q):**

$Q = \{\frac{p}{q}, q \neq 0, p, q \in I\}$ **Ex:** $\frac{1}{2}, \frac{3}{4}, \frac{1}{4}, \frac{2}{3}, \ldots$

★ **Real numbers:** The combination of surds and rational numbers are called as real numbers

Ex: $\frac{1}{2}, \frac{3}{4}, \frac{1}{4}, \frac{1}{5}$

★ **Complex numbers:** $C = \{a + ib; i = \sqrt{-1}; a, b \in R\}$

Ex: $3 + i5, 4 + i6$

Surds (Q^1): The numbers which are not real numbers are called surds.

Ex: $\sqrt{2}, \sqrt{3}, \sqrt{5}, \sqrt{2} + \sqrt{3}$

★ **Closure Law:** o is a binary operation on a set S. If for a, b ∈ S, a o b ∈ S, then o is said to be closure in S.

Ex: (N, +), (I , +), (R, +) and (R, *) are satisfied the closure law.

★ **Commutative Law:** o is a binary operation in a non–empty set S. If for a, b ∈ S, aob = boa then o is said to be commutative in S.

Ex: (N, +), (N, *), (I, +), (R, +) and (R, *) are the examples for commutative law.

★ **Associative Law:** o is a binary operation in a non-empty set S. For a, b, c ∈ S, (aob)oc = ao (boc) then o is said to be associative in S.

Ex: (N, +), (N,*), (R, +), (I, +) and (R, *)

★ **Algebraic structure:** A non-empty set a equipped with one or more binary operations is called an algebraic structure or an algebraic system.

Ex: (N, +), (Q, –), (R, +) are algebraic structures.

★ **Semi group:** An algebraic structure (S, o) is called a semigroup if the binary operation o is associative in S.

1. (N, +) and (Q,–) are the examples for semigroup.
2. (P(s), n) is a semigroup where P(s) is the power set of non-empty set S.
3. (P(s), U) is a semigroup where P(s) is the power set of a non-empty set S.

★ **Identity element:** Let S be a non-empty set and o be a binary operation on S.

i. If there exists an element $e_1 \in S$ such that $e_1 oa = a$ for $a \in S$ then e_1 is called a left identity of S w.r.t. the operation o.

ii. If there exists an element $e_2 \in S$ such that $aoe_2 = a$ for $a \in S$ then e_2 is called a right identity of S w.r.t. the operation o.

iii. If there exists an element $e \in S$ such that e is both a left and a right identity of S w.r.t. o. Then e is called an identity of S.

e.g. 1. In the algebraic system (Z, +), the number 0 is an identity element

e.g. 2. In the algebraic system (R, •), the number 1 is an identity element.

★ **Monoid:** A semigroup (S, o) with the identity element w.r.t. o is known as monoid i.e., (S, o) is a monoid if S is a non-empty set and o a binary operation in S such that o is associative and there exists an identity element w.r.t. o

e.g: 1. (Z, +) is a monoid with the identity 0

e.g: 2. (Z, •) is a monoid with the identity 1

★ **Invertible element:** Let (S, o) be an algebraic structure with the identity element e in S w.r.t. o, an element $a \in S$ is said to be left invertible or left regular if there exists an element $x \in S$ such that xoa = e. Then x is called a left inverse of a w.r.t. o.

★ An element $a \in S$ is said to be right invertible or right regular if there exists an element $y \in S$ such that aoy=e, then y is called a right inverse of a w.r.t. o.

★ **Group:** If G is a non-empty set and o is a binary operation defined on G such that the following three laws are satisfied then (G, o) is a group.

OBJECTIVE BITS

1. In a group G, if o (ba b^{-1}) = m then 0 (a) =
   1. m-1   2. m+1   3. m   4. None

2. The order of cyclic (1, 2, 3 ...... (n-1), n) is
   1. n!   2. $\frac{n!}{2}$ 3. n   4. None

3. If G is a group and x∈ G such that o(x) = 36 then 0 (x^{10}) is
   1. 18   2. 10   3. 36   4. None

4. If G = {0, 1, 2, 3, ... 2002}$_{+2003}$ then 0 (2000) is
   1. 500   2. 1000   3. 2003   4. None

5. If H is a subgroup of a finite group G then the Index of H in G is
   1. 0(H) / 0(G)   2. 0(G) + 0(H)
   3. $\frac{0(G)}{0(H)}$ 4. 0(G). 0(H)

6. If G is a group of order P (prime) then the number of generators of G is
   1. p   2. p-1   3. p+1   4. 2

7. If G is a group of order 2n such that a∈ G, a ≠e then
   1. a^2 = a   2. a^2 = e   3. a^2 = 2n   4. a^2 = 4n

8. If G = {±1, ±i, ±j, ±k} then 0(-i.j.k.i) = ———
   1. 1   2. 2   3. 3   4. 4

9. The set of permutations on n > 2 symbols is
   1. abelian group of order n!
   2. Non-abelian group of order n!
   3. Cyclic group of order n!
   4. Non cyclic group of order n!

10. The number of generators of an infinite cyclic group
    1. 1   2. 2   3. 0   4. Infinite

11. Number of generators of a cyclic group of order 5 is
    1. 1   2. 2   3. 3   4. 4

12. The order of i in multiplicative group {-1, 1, i, -i} is
    1. 4   2. 3   3. 2   4. 1

13. Klein 4 group is
    1. abelian group   2. Non abelian group
    3. Normal subgroup   4. None of these

14. If a finite group of order n contains an element of order n then the group must be
    1. Cyclic group   2. Non cyclic group
    3. Quotient group   4. Non quotient group

15. The number of elements in the alternating group A$_4$ is
    1. 12   2. 8   3. 4   4. 5

16. A homomorphism G→G^1 is an isomorphism iff the kernel consists of
    1. The identity only   2. A normal subgroup of G
    3. A factor group of G   4. A quotient group of G

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Students List

SIR C. R. REDDY COLLEGE FOR WOMEN, ELURU

PG ENTRANCE   COACHING

2019-2020

SUB: MATHEMATICS

ATTENDANCE SHEET

S.NO	ROLL.NO	NAME OF THE STUDENT	CLASS	SIGNATURE OF THE STUDENT
1	171002	A. KALYANI	MPC-1	A. Kalyani
2	171011	K.SRI DEVI	MPC-1	K. Sridevi
3	171021	M.KRISHNA PRASANNA	MPC-1	M. Krishna Prasanna
4	171022	M.CHITTI	MPC-1	M. Chitti
5	171025A	V.NITYA SUBHA SRI	MPC-1	V. Nitya Subba sri
6	171028	A. NAGA JYOTHI	MPC-1	A. Naga Jyothi
7	171035	B . CHANDINI	MPC-1	B. Chandini
8	171036	B. SUJATHA	MPC-1	B. sujatha
9	171040	B. SIRISHA	MPC-1	B. sirisha
10	171041	CH. KUSUMANJALI	MPC-1	CH. Kusumanjali
11	171046	D.HARITHA	MPC-1	D. Haritha
12	171056	G. LEELA NAGA LAVANYA	MPC-II	G. L. N. Lavanya
13	171058	J. RAMYA	MPC-II	J. Ramya
14	171068	K. RAMA DEVI	MPC-II	K. Rama devi
15	171073	L.SRI HARIKA	MPC-II	L. Sri harika
16	171077	M.MANISHA	MPC-II	M. Manisha
17	171079	M.V.V. SANDHYA	MPC-II	M.V.V. Sandhya
18	171087	N. LAVANYA	MPC-II	N. Lavanya
19	171096	P. DURGA RANI	MPC-II	P. Durga Rani
20	171097	P. DIVYA	MPC-II	P. Divya .
21	171106	REHANA BEGUM	MPC-II	Rehana Begum
22	171112	SK. MUBEENA SULTANA	MPC-II	SK. Mubeena Sultana
23	171115	T. AKHILA	MPC-II	T. Akhila
24	171119	T. RAJYA LAKSHI	MPC-II	T. Rajya Lakshmi
25	171122	Y. RAJESWARI	MPC-II	Y. Rajeswari
26	172006	B.S.B.N. SINDHUJA	MPCS-I	B.S.B.N. Sindhuja
27	172009	B. NAGA SAMYUKTHA	MPCS-I	N. Naga Samyuktha
28	172017	P. LAKSHMI POLERAMMA	MPCS-I	P. Lakshmi Poleramma
29	172019	S.G.SAI MAHITHA	MPCS-I	S.G. Sai Mahitha.

30	171049	G. SUKUMARI	MPC-I	G. SUKUMARI
31	171118	T. JAYASRI	MPC-II	T. Jayasri
32	172035	B. LAVANYA	MPCS-I	B. Lavanya
33	172060	K. YAMUNA PRIYA	MPCS-II	K. Yamuna priya
34	172064	L.PRIYANKA	MPCS-II	L. Priyanka
35	172068	M.BHUVANA	MPCS-II	M. Bhuvana
36	172069	M.TEJO DEEPIKA	MPCS-II	M. TeJoDeepika
37	172071	M.NAGANJALI	MPCS-II	M. Naganjali
38	172075	J.NAGA LAKSHMI	MPCS-II	J. Naga lakshmi
39	172076	M.USHA RANI	MPCS-II	M. Usha rani
40	173027	B. MOUNIKA	MSCS-I	B. Mounika
41	173060	K.V. SUSHMA MOUNIKA	MSCS-II	k.v. sushma mounika
42	173081	N. SWAPNA	MSCS-II	N. Swapna
43	173107	M.PAVANI	MSCS-II	M. Pavani
44	171154	B. GNANA LAKSHMI DURGA	MCCS	B.G.L. Durga
45	175007	U. LAKSHMI SOWJANYA	MECS	U.L Sowjanya
46	175014	B. SHAROON KUMARI	MECS	B. Sharoon

SIGNATURE

Students Attendance Register

SIR C R REDDY COLLEGE FOR WOMEN , ELURU
CAREER GUIDANCE & PLACEMENT CELL
PG ENTRANCE COACHING   2019-2020
SUB: MATHEMATICS

S.NO	ROLL.NO	CLASS	NAME OF THE STUDENT
1	171002	MPC-1	A.KALYANI
2	171011	MPC-1	K.SRI DEVI
3	171021	MPC-1	M.KRISHNA PRASANNA
4	171022	MPC-1	M.CHITTI
5	171025A	MPC-1	V.NITYA SUBHA SRI
6	171028	MPC-1	A.NAGA JYOTHI
7	171035	MPC-1	B.CHANDINI
8	171036	MPC-1	B.SUJATHA
9	171040	MPC-1	B.SIRISHA
10	171041	MPC-1	CH.KUSUMANJALI
11	171046	MPC-1	D.HARITHA
12	171056	MPC-II	G.LEELA NAGA LAVANYA
13	171058	MPC-II	J.RAMYA
14	171068	MPC-II	K.RAMA DEVI
15	171073	MPC-II	L.SRI HARIKA
16	171077	MPC-II	M.MANISHA
17	171079	MPC-II	M.V.V.SANDHYA
18	171087	MPC-II	N.LAVANYA
19	171096	MPC-II	P.DURGA RANI
20	171097	MPC-II	P.DIVYA
21	171106	MPC-II	REHANA BEGUM
22	171112	MPC-II	SK.MUBEENA SULTANA

19

#	ID	Course	Name
23	171115	MPC-II	T.AKHILA
24	171119	MPC-II	T.RAJYA LAKSHI
25	171122	MPC-II	Y.RAJESWARI
26	172006	MPCS-I	B.S.B.N.SINDHUJA
27	172009	MPCS-I	B.NAGA SAMYUKTHA
28	172017	MPCS-I	P.LAKSHMI POLERAMMA
29	172019	MPCS-I	S.G.SAI MAHITHA
30	171049	MPC-I	G.SUKUMARI
31	171118	MPC-II	T.JAYASRI
32	172035	MPCS-I	B.LAVANYA
33	172060	MPCS-II	K.YAMUNA PRIYA
34	172064	MPCS-II	L.PRIYANKA
35	172068	MPCS-II	M.BHUVANA
36	172069	MPCS-II	M.TEJO DEEPIKA
37	172071	MPCS-II	M.NAGANJALI
38	172075	MPCS-II	J..NAGA LAKSHMI
39	172076	MPCS-II	M.USHA RANI
40	173027	MSCS-I	B.MOUNIKA
41	173060	MSCS-II	K.V.SUSHMA MOUNIKA
42	173081	MSCS-II	N.SWAPNA
43	173107	MSCS-II	M.PAVANI
44	171154	MCCS	B.GNANA LAKSHMI DURGA
45	175007	MECS	U.LAKSHMI SOWJANYA
46	175014	MECS	B.SHAROON KUMARI

SIGNATURE

LIST OF THE STUDENTS QUALIFIED IN MSC MATHEMATICS

ENTRANCE 2019-2020

S.no	Name of the student	Group
1	G. Sukumari	MPC
2	T. Jayasri	MPC
3	J. Nagalakshmi	MPCS
4	D. Haritha	MPC
5	Ch. Kusumanjali	MPC
6	B. Mounika	MSCS
7	Y. Rajeswari	MPC
8	K.Venkata sushma mounika	MSCS
9	N. Lavanya	MPC
10	M. Manisha	MPC

REPORT

PROGRAMME: PG Entrance COACHING FOR III B.Sc. Aspirants in Mathematics subject

  In association with IQAC &In accordance with the resolution made during the meeting and documented in the minutes, it was unanimously agreed to arrange PG entrance coaching classes for interested students pursuing III B.Sc. (Mathematics) This significant decision forms an integral part of the report on the PG entrance coaching classes in Mathematics subject conducted from 01-Aug-2020 To 30 -Aug-2020 from 9:30am to 12:30pm .These classes were conducted senior and expert faculty Mrs. V. D. Ratna Kumari(HOD) & Mrs. M.B. Rajyalakshmi in Maths department.

Approximately 46 motivated students actively participated in the coaching sessions these meticulously organized classes aimed to prepare the students comprehensively for the upcoming PG entrance examinations scheduled in the month of Oct 2020. The coaching sessions were diligently conducted from 9:30 AM to 12:30 PM, adhering to a structured curriculum meticulously designed to equip students with the essential skills and knowledge required for success in the examination.

The outcomes of these coaching classes have been highly encouraging. 10 students were qualified in the exam. Few students showcased exceptional performance, securing remarkable pg. ranks demonstrating both their commitment and the effectiveness of the coaching program.

The successful arrangement of these coaching classes aligns directly with the decision made during the meeting these sessions facilitated a conducive learning environment, significantly contributing to the preparedness and success of the students preparing for the PG entrance examination.

Their dedication has been instrumental in empowering our students for academic success.

RANK CARDS

ADIKAVI NANNAYA UNIVERSITY, RAJAMAHENDRAVARAM

NANNAYACET - 2020 :: RANK CARD

RegNo : 205383 Application No : 104863

Hall Ticket No : 061030080

Category : BCD

Name : SUKUMARI GEDDAM

Gender : Female

Date of Birth : 19-10-1999

Father's Name : GEDDAM SRINIVASA RAO

Test : 103-103-Mathematical Sciences

Marks Obtained:

46

RANK

173

G. Sukumari

Address :

DoorNo : 2-63

Street : MAIN ROAD

Town : M NAGULAPALLI

City : DWARAKA TIRUMALA

District : WEST GODAVARI

State : ANDHRA PRADESH
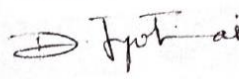
Pin : 534425

DIRECTOR , DOA

NANNAYACET-2020

Note :

* Admission into any course is subject to fulfilment of eligibility criteria for that course.
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Certificates to be submitted at the verification center

(i) NANNAYA CET - 2020 Rank Card & Hall Ticket and Counseling fee of Rs. 500/- (Rs.250/- for SC and ST and PH) should be paid by ON-LINE. Payment receipt should be submitted at the registration counter of certificate verification center. No cash payment is allowed at verification center.

(ii) Degree/Provisional Pass Certificate.

(iii) Consolidated Marks statement of the Qualifying Examination.

(iv) Transfer and Conduct Certificate from the institution where the candidate last studied. Candidates who have completed /studied already or discontinued and seeking admission to second PG or professional course should submit TC relating to first PG course only. Duplicate TC relating to UG / PG degree should be accompanied by proper evidence of loss of original TC, Police complaint with not traceable and Affidavit. Candidates submitting false TC are liable for cancellation of seat at any stage and are liable for prosecution. (Admission will not be given if T.C of the institution where the candidate studied last is not submitted).

(v) Migration Certificate (for other Universities candidates).

(vi) Date of Birth Certificate (SSC/Matriculation or equivalent Certificate).

(vii) Study Certificates for the last seven years or Residence Certificate for preceding seven years of the qualifying examination.

(viii) Intermediate original certificate.

(ix) Integrated Community Certificate issued by the competent authority in case of SC/ST/BC/EBC/Minority candidates.

(x) Valid latest income certificate issued by M.R.O./Thasildar if fee concession is claimed / white ration card (the validity of income certificate is for one year from the date of issue).

(xi) 4 recent passport size Photos.

(xii) Candidates opting for admission under NCC/Sports/CAP/PH/NSS quota must produce relevant original certificates, in addition to the above. PH certificate must be issued by the concerned medical board in the Govt. hospital.

(xiii) Discharge certificate and service certificate of the parent in case of a child of armed personnel.

(xiv) Physical fitness certificate from an Asst .Civil Surgeon.

(xv) One set of Photostat copies of all the above certificates.

(xvi) After verification of the certificates, at the helpline centre, the candidate will get all his/her Original certificates back except T.C., C.C. and Migration certificate. The receipt of original certificates shall be given to the candidate.

Candidates attending for certificate verification should register online by paying the counselling fee by online.

I Phase Counseling:

S.No.	I Phase counseling for All Ranks - All Categories	Venue (Attend at any of the centers)	Date & Time
1.	Physical Verification of Certificates and issue of scratch cards for web options for LIFE SCIENCES (101).	1. Government (A) College, Rajamahendravaram	25-11-2020 09:00AM - 01:00 PM
2.	Physical verification of Certificates and issue of scratch cards for web options for PHYSCIAL SCIENCESS (102) TELUGU(203) & GEOLOGY(105)		25-11-2020 02:00PM - 05:30 PM
3.	Physical verification of Certificates and issue of scratch cards for web options for CHEMICAL SCIENCES (104)	2. Ch.S.D.St.Theresa College for Women (A), Eluru	26-11-2020 09:00AM - 01:00 PM
4.	Physical verification of Certificates and issue of scratch cards for web options for CHEMICAL SCIENCES (104),HINDI(204) and M.P. Ed.(205)		26-11-2020 02:00PM - 05:30 PM
5.	Physical verification of Certificates and issue of scratch cards for web options for HUMANITIES & SOCIAL SCIENCES (201) AND ENGLISH (202)	3. D.N.R College (A), Bhimavaram	27-11-2020 09:00AM - 01:00 PM
6.	Physical verification of Certificates and issue of scratch cards for web options for MATHEMATICAL SCIENCES(103) AND COMPUTER SCIENCE(106)	4. AKNU M.S.N Campus, Kakinada	27-11-2020 02:00PM - 05:30 PM

Candidates seeking admission under any Special Category should also attend for the Physical Verification of their general Certificates.

Web options enrollment and seat allotment dates will be notified shortly. Check website regulary for web-options schedule.

RegNo : 201887

Application No : 111399

Hall Ticket No : 061030026

Category : BCB

Name : JAYASRI THIYYALA
Gender : Female
Date of Birth : 04-02-2000
Father's Name : SRINIVASA RAO

Address :
DoorNo : 20A-13-2
Street : PEDDINTI VARI STREET
Town : ELURU
City : ELURU
District : WEST GODAVARI
State : ANDHRA PRADESH
Pin : 534002

Test : 103-Mathematical Sciences

Marks Obtained:

30

RANK

535

T. Jayasri

DIRECTOR , DOA
NANNAYACET-2020

Note :
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* Any correction in biodata should be brought to the notice of the Director at the time of Certificate verification.

Certificates to be submitted at the verification center

(i) NANNAYA CET - 2020 Rank Card & Hall Ticket and Counseling fee of Rs. 300/- (Rs.250/- for SC and ST and PH) should be paid by ON-LINE. Payment receipt should be submitted at the registration counter of certificate verification center. No cash payment is allowed at verification center.

(ii) Degree/Provisional Pass Certificate.

(iii) Consolidated Marks statement of the Qualifying Examination.

(iv) Transfer and Conduct Certificate from the institution where the candidate last studied. Candidates who have completed /studied already or discontinued and seeking admission to second PG or professional course should submit TC relating to first PG course only. Duplicate TC relating to UG / PG degree should be accompanied by proper evidence of loss of original TC, Police complaint with not traceable and Affidavit. Candidates submitting false TC are liable for cancellation of seat at any stage and are liable for prosecution. (Admission will not be given if T.C of the institution where the candidate studied last is not submitted).

(v) Migration Certificate (for other Universities candidates).

(vi) Date of Birth Certificate (SSC/Matriculation or equivalent Certificate).

(vii) Study Certificates for the last seven years or Residence Certificate for preceding seven years of the qualifying examination.

(viii) Intermediate original certificate.

(ix) Integrated Community Certificate issued by the competent authority in case of SC/ST/BC/EBC/Minority candidates.

(x) Valid latest income certificate issued by M.R.O./Thasildar if fee concession is claimed / white ration card (the validity of income certificate is for one year from the date of issue).

(xi) 4 recent passport size Photos.

(xii) Candidates opting for admission under NCC/Sports/CAP/PH/NSS quota must produce relevant original certificates, in addition to the above. PH certificate must be issued by the concerned medical board in the Govt. hospital.

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(xiv) Physical fitness certificate from an Asst .Civil Surgeon.

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2.	Physical verification of Certificates and issue of scratch cards for web options for PHYSICAL SCIENCESS (102) TELUGU(103) & GEOLOGY(105)		25-11-2020 02:00PM - 05:30 PM
3.	Physical verification of Certificates and issue of scratch cards for web options for CHEMICAL SCIENCES (104)	2. Ch.S.D.St.Theresa College for Women (A) Eluru	26-11-2020 09:00AM - 01:00 PM
4.	Physical verification of Certificates and issue of scratch cards for web options for CHEMICAL SCIENCES (104,HINDI(204) and M.P. Ed.(205)	3. D.N.R College (A), Bhimavaram	26-11-2020 02:00PM - 05:30 PM
5.	Physical verification of Certificates and issue of scratch cards for web options for HUMANITIES & SOCIAL SCIENCES (201) AND ENGLISH (202)		27-11-2020 09:00AM - 01:00 PM
6.	Physical verification of Certificates and issue of scratch cards for web options for MATHEMATICAL SCIENCES(103) AND COMPUTER SCIENCE(106)	4. AKNU M.S.N Campus, Kakinada	27-11-2020 02:00PM - 05:30 PM

Candidates seeking admission under any Special Category should also attend for the Physical Verification of their general Certificates.
Web options enrollment and seat allotment dates will be notified shortly. Check website regularly for web-options schedule.

RegNo : 202968

Application No : 102174

Hall Ticket No : 061030044

Category : BCD

Name : NAGA LAKSHMI JANAPAREDDY

Gender : Female

Date of Birth : 19-03-1998

Father's Name : SRINIVASA RAO

Address :

DoorNo : 20A-5-7

Street : DASARI YARRAYYA VARI STREET

Town : ELURU

City : ELURU

District : WEST GODAVARI

State : ANDHRA PRADESH

Pin : 534001

Test : 103-103-Mathematical Sciences

Marks Obtained : 39

RANK 313

DIRECTOR , DOA
NANNAYACET-2020

Note :
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Certificates to be submitted at the verification center

(i) NANNAYA CET - 2020 Rank Card & Hall Ticket and Counseling fee of Rs. 500/- (Rs.250/- for SC and ST and PH) should be paid by ON-LINE. Payment receipt should be submitted at the registration counter of certificate verification center. No cash payment is allowed at verification center.

(ii) Degree/Provisional Pass Certificate.

(iii) Consolidated Marks statement of the Qualifying Examination.

(iv) Transfer and Conduct Certificate from the institution where the candidate last studied. Candidates who have completed /studied already or discontinued and seeking admission to second PG or professional course should submit TC relating to first PG course only. Duplicate TC relating to UG / PG degree should be accompanied by proper evidence of loss of original TC, Police complaint with not traceable and Affidavit. Candidates submitting false TC are liable for cancellation of seat at any stage and are liable for prosecution. (Admission will not be given if T.C of the institution where the candidate studied last is not submitted).

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(vi) Date of Birth Certificate (SSC/Matriculation or equivalent Certificate).

(vii) Study Certificates for the last seven years or Residence Certificate for preceding seven years of the qualifying examination.

(viii) Intermediate original certificate.

(ix) Integrated Community Certificate issued by the competent authority in case of SC/ST/BC/EBC/Minority candidates.

(x) Valid latest income certificate issued by M.R.O./Thasildar if fee concession is claimed / white ration card (the validity of income certificate is for one year from the date of issue).

(xi) 4 recent passport size Photos.

(xii) Candidates opting for admission under NCC/Sports/CAP/PH/NSS quota must produce relevant original certificates, in addition to the above. PH certificate must be issued by the concerned medical board in the Govt. hospital.

(xiii) Discharge certificate and service certificate of the parent in case of a child of armed personnel.

(xiv) Physical fitness certificate from an Asst .Civil Surgeon.

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DIRECTORATE OF ADMISSIONS
ADIKAVI NANNAYA UNIVERSITY, RAJAMAHENDRAVARAM
NANNAYACET - 2020 :: RANK CARD

RegNo : 206507

Hall Ticket No : 061030091

Application No : 114351

Category : BCD

Name : **HARITHA DUMPALA**
Gender : Female
Date of Birth : 03-06-2000
Father's Name : Radhakrishna

Address :

DoorNo : 4-16
Street : KVK PURAM
Town : NAYUDUGUDEM
City : ELURU
District : WEST GODAVARI
State : ANDHRA PRADESH
Pin : 534437

Test : 103-Mathematical Sciences

Marks Obtained:

42

RANK

258

D Haritha

DIRECTOR , DOA
NANNAYACET-2020

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5.	Physical verification of Certificates and issue of scratch cards for web options for HUMANITIES & SOCIAL SCIENCES (201) AND ENGLISH (202)	3. D.N.R College (A), Bhimavaram	27-11-2020 09:00AM - 01:00 PM
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RegNo : 202246

Application No : 101980

Hall Ticket No : 091030005

Category : BCA

Name : KUSUMANJALI CHALAPAKA

Gender : Female

Date of Birth : 25-11-1999

Father's Name : SAMBASIVA RAO

Test : 103-Mathematical Sciences

Marks Obtained:

44

RANK

211

Address :

DoorNo : 5-97/2

Street : KUMMARI STREET

Town : KANUMOLU

City : KANUMOLU

District : KRISHNA DISTRICT

State : ANDHRA PRADESH

Pin : 521106

DIRECTOR , DOA
NANNAYACET-2020

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(vi) Date of Birth Certificate (SSC/Matriculation or equivalent Certificate).

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(xii) Candidates opting for admission under NCC/Sports/CAP/PH/NSS quota must produce relevant original certificates, in addition to the above. PH certificate must be issued by the concerned medical board in the Govt. hospital.

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(xiv) Physical fitness certificate from an Asst .Civil Surgeon.

(xv) One set of Photostat copies of all the above certificates.

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S.No.	I Phase counseling for All Ranks - All Categories	Venue (Attend at any of the centers)	Date & Time
1.	Physical Verification of Certificates and issue of scratch cards for web options for LIFE SCIENCES (101).		25-11-2020 09:00AM - 01:00 PM
2.	Physical verification of Certificates and issue of scratch cards for web options for PHYSCIAL SCIENCESS (102) TELUGU(203) & GEOLOGY(105)	1. Government (A) College, Rajamahendravaram	25-11-2020 02:00PM - 05:30 PM
3.	Physical verification of Certificates and issue of scratch cards for web options for CHEMICAL SCIENCES (104)	2. Ch.S.D.St.Theresa College for Women (A), Eluru	26-11-2020 09:00AM - 01:00 PM
4.	Physical verification of Certificates and issue of scratch cards for web options for CHEMICAL SCIENCES (104),HINDI(204) and M.P. Ed.(205)		26-11-2020 02:00PM - 05:30 PM
5.	Physical verification of Certificates and issue of scratch cards for web options for HUMANITIES & SOCIAL SCIENCES (201) AND ENGLISH (202)	3. D.N.R College (A), Bhimavaram	27-11-2020 09:00AM - 01:00 PM
6.	Physical verification of Certificates and issue of scratch cards for web options for MATHEMATICAL SCIENCES(103) AND COMPUTER SCIENCE(106)	4. AKNU M.S.N Campus, Kakinada	27-11-2020 02:00PM - 05:30 PM

Candidates seeking admission under any Special Category should also attend for the Physical Verification of their general Certificates.

Web options enrollment and seat allotment dates will be notified shortly. Check website regulary for web-options schedule.

COLLEGE OF SCIENCE & TECHNOLOGY
ANDHRA UNIVERSITY
VISAKHAPATNAM-530 003

Ph Nos
0891-2844000
2844001

STUDENT IDENTITY CARD

Regd.NO   : 720211326046

Name   : BEZAWADA MOUNIKA

Course   : M.Sc

Department : MATHEMATICS

Batch   : 2020-2022

Principal

SIR C R REDDY COLLEGE, ELURU
PG COURSES
(Aided & Autonomous)

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2020 - '22

Yarlagadda Rajeswari

Unique ID	:	2020CRP33101022
Course & Group	:	M.Sc Mathematics
Regd. No.	:	4200122
Father Name	:	Y Venkateswara Rao
Date Of Birth	:	10-10-1999
Mobile No.	:	6281123314

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2021-2023

K VENKATA SUSHMA MOUNIKA

Unique Id	:	2021CRP033120003
Course & Group	:	M.Sc Mathematics
Regd. No.	:	4210108
Father Name	:	K Venkata Subbarao
Date Of Birth	:	26-09-2000
Mobile No.	:	9491084692

PRINCIPAL

ADIKAVI NANNAYA UNIVERSITY
UNIVERSITY COLLEGE OF SCIENCE AND TECHNOLOGY
RAJAMAHENDRAVARAM - 533296

NERUSU. LAVANYA

DEPARTMENT	: MATHAMATICS
COURSE	: M.Sc MATHAMATICS
ADMIT .NO	: 203138
ADMIT BATCH	: 2020 - 2022
CELL. NO	: 8501911342

Principal

ACHARYA NAGARJUNA UNIVERSITY

Nagarjuna Nagar, Guntur - 522 510. A.P.

UNIVERSITY COLLEGE OF SCIENCES
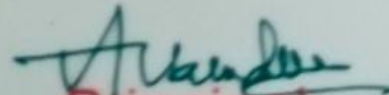
MATTHE MANISHA

DOB   : 04-05-2000

Course   : M.Sc.

Regd No. : Y21MA20028

B. Group : B+Ve

A Adher No : 354926738636

Principal

Dept of MATHEMATICS

Res: # 2-63,RAMAPURAM,NANDHIVADA (M),KRISHNA (D),PIN:521321.

Photo Gallery

PG Entrance Coaching given by Mrs. M.B.Rajya   Lakshmi