NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

PROCEEDINGS

INTERNATIONAL VIRTUAL CONFERENCE ON

PERSPECTIVES FROM BASIC SCIENCES AND HUMANITIES

NEC-IVCPBSH-2023

26th & 27th May, 2023

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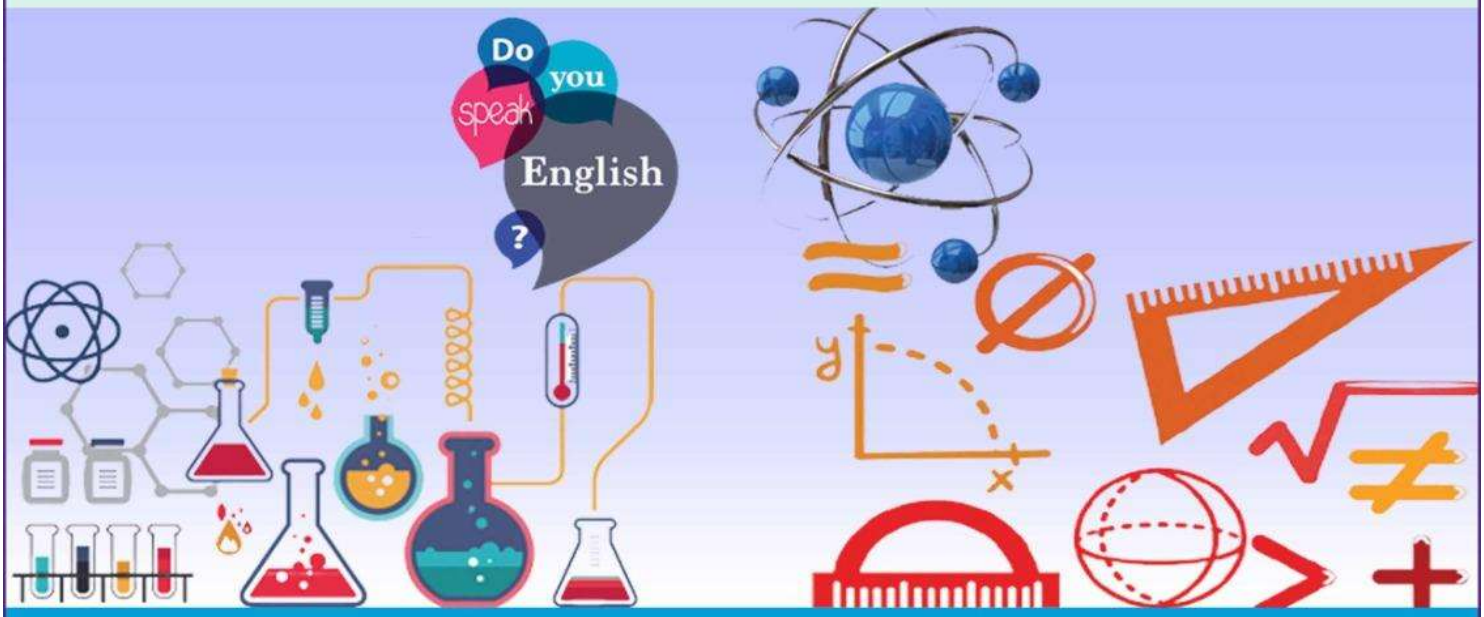

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Department of Basic Sciences & Humanities

Proceedings of

International Virtual Conference

on

Perspective form Basic Sciences and Humanities

(NEC-IVCPBSH–2023)

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Professor&Head

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NARASARAOPETA ENGINEERING COLLEGE,

NARASARAOPET- 522 601,

Andhra Pradesh, INDIA

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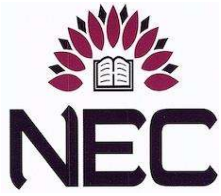

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ACKNOWLEDGEMENT

I would like to express my profound gratitude and deep respect to my beloved parents, Sri K. Pandu Ranga Rao (late) and Smt. K. Lakshmi Samrajyamma (late) who have been the driving force behind all my endeavors and will forever remain so.

I take great pleasure in extending my heartfelt thanks to Mr. M. S. Chakravarthi, Hon'ble Vice Chairman of the NEC Group, for his invaluable guidance and unwavering encouragement throughout the conference proceedings. I am also sincerely grateful to Dr. M. Sreenivasa Kumar, Principal of NEC, and Dr. D. Suneel, Vice Principal of NEC, for their wholehearted administrative support.

I consider it a privilege to express my gratitude to the Keynote Speakers, Invited Speakers, and Chairpersons of the various sessions for their invaluable contributions in organizing this event. I am deeply appreciative of the individual members of the Advisory Committee and Organizing Committee for their constructive ideas in designing the Conference Program. Special thanks are due to Dr. Justin James, Dr. Sujatha Mukiri, Dr. A. Parandhama, Dr. Chakravarthula S. K. Raju, Dr. G. Bhagavanarayana, Dr. Halubi Sekhar, Dr. Kommana Balarama Kumar, and Dr. J. V. Shamukha Kumar for generously sparing their valuable time. I am also grateful to all the participants who submitted their research papers and shared their insightful ideas.

I must acknowledge that the success of the **NEC-IVCPBSH–2023** conference would not have been possible without the support of academicians and researchers. I am deeply thankful for their contribution. I extend my thanks to the management, Sri M. V. Koteswara Rao garu, Chairman, and Sri M. Ramesh Babu garu, Secretary, for their kind support and encouragement towards the conference.

My heartfelt appreciation goes to all my colleagues and research team members whose dedicated efforts and hard work were instrumental in organizing and managing the conference. I would also like to express my gratitude to the co-conveners and the organizing committee for their unwavering support.

I sincerely thank M/S Spectrum Publications Hyderabad for their timely efforts in producing the Souvenir and Pre-Conference Proceedings.

Lastly, I would like to express my gratitude to all the individuals and organizations directly and indirectly involved in organizing the conference.

I thank one and all

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PREFACE

Exposure to novel ideas, concepts, and experiences serves as the most effective method for comprehending advanced research in English, Mathematics, Chemistry, and Physics. These fields, encompassing Basic Sciences and Humanities, possess a vast potential to expand beyond their boundaries and delve into advanced realms, creating immense opportunities for researchers. The International Virtual Conference on **Perspectives from Basic Sciences and Humanities (NEC-IVCPBSH-2023)** aims to provide a platform for unveiling and discussing scientific research, igniting the minds of young individuals, and sustaining the flow of knowledge. By bringing together scholars, researchers, academicians, and students from diverse disciplines, the conference fosters the exchange of ideas, knowledge sharing, and the exploration of different perspectives and approaches to address contemporary challenges. It offers a vital platform for researchers to grow, leveraging their global perspectives and diverse experiences, while also promoting the optimal utilization of research findings. The conference encompasses a wide range of cutting-edge fields in applied sciences and humanities, catering to the needs of academicians, students, and faculty members alike. It is anticipated that the insights gained from the deliberations of international and national experts during the conference will greatly benefit researchers in the long run.

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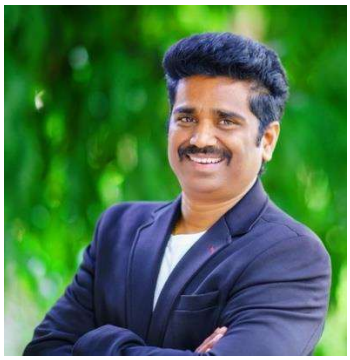
Message from Vice Chairman



I am glad to know that Department of Basic Sciences and Humanities of Narasaraopeta Engineering College is organizing “International Virtual Conference on Perspectives From Basic Sciences and Humanities (NEC-IVCPBSH-2023). This e-conference is a congregate comprising academicians, industry personnel and research scholars to share their findings and insights about innovations in Sciences and Humanities. The conference provides a crucial opportunity for researchers to expand their knowledge, drawing upon their diverse experiences and global perspectives. Additionally, it serves as a platform to encourage the effective application of research findings. I hope this initiative by Department of Basic Sciences and Humanities will pave way to exceptional deliberations and other activities to enhance the power of knowledge and ideology in the field of Science and Humanities.

I wish the organizers great success for the conference.

Mr M.S.Chakravarthi
Vice Chairman
NEC-Group

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Message from Principal

I am glad to know that the Department of Basic Sciences and Humanities Narasaraopeta Engineering College is organizing an "International Virtual Conference on Perspectives From Basic Sciences and Humanities (NEC-IVCPBSH-2023) during 26th & 27th May, 2023.

The unprecedented ongoing pandemic situation prevailing all over the globe has driven the professionals to continue their research and knowledge dissemination virtually. I believe that such virtual conferences will be one of the finest opportunities for academicians, scientists, professionals, students and researchers from all over the globe to share and express their views, discuss the practical challenges and possible solutions in Science & Humanities.

The conference nurtures the flow of ideas, facilitates the sharing of knowledge, and encourages the exploration of diverse viewpoints and methodologies to tackle present-day obstacles in basic sciences and humanities. I hope the scientific deliberations, discussions and other activities that happen during the conference will enrich the participants and definitely leave new milestones.

I wish the organizers the very best for the success the Conference

Dr. M.Sreenivasa Kumar,
Principal,
Narasaraopeta Engineering College

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Message from Vice Principal

It gives an immense pleasure and feel privileged to write a message for the "International Virtual Conference on Perspectives From Basic Sciences and Humanities (NEC-IVCPBSH-2023)" organized by Department of Basic Science and Humanities, Narasaraopeta Engineering College (Autonomous) during 26th & 27th May, 2023. There are truly amazing innovations and breakthrough nowadays in this emerging area. I hope that this conference would certainly induce innovative ideas among the participants paving way for new inventions and technologies in Science and Humanities. I have gone through some of the abstracts and could see their rich qualitative academic content. It is my humble wish that the professional dialogue among the key note speakers, Session Chairs, research scholars, faculty and students continues beyond this event and the collaborations forged will linger and prosper for many years to come.

It is important to inculcate an attitude towards research in the minds of younger generation and this conference would be a stepping stone towards this attainment in the field of Science and Humanities.

I congratulate the organizers and wish the conference a great success.
I am sure the conference be a grand scientific extravaganza and great feast for the student community.

Dr D.Suneel
Vice Principal

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Message from Head of the Department

I am delighted to extend a warm welcome to the delegates of the International virtual Conference on "Perspectives from Basic Sciences and Humanities (NEC-IVCPBSH-2023)" scheduled for May 26th and 27th, 2023. The pursuit of knowledge has been ingrained in humanity since time immemorial, and its true value lies in its dissemination and practical application for the betterment of mankind.

This conference serves as a platform to unite academics and researchers, fostering collaboration to explore the scope, challenges, opportunities, and solutions encountered in the fields of mathematics, physics, chemistry, and English. Our plenary sessions encompass a diverse range of topics within these domains, promoting intellectual discourse and exchange of ideas.

As the conference Convener, I am well aware that the success of this event hinges upon the efforts of numerous individuals who have contributed to the planning and organization of both the technical program and virtual deliberations. I express my sincere gratitude to the review and advisory committee for their invaluable guidance and insightful suggestions in shaping the program. Additionally, I extend my appreciation to the Program Committee for their meticulous and timely review of the papers, ensuring their inclusion in the conference proceedings.

I anticipate that this intellectual exchange will foster future collaborations among universities, research institutions, and industries worldwide, driving advancements in both scientific research and in humanities.

Dr. K. Ponnari Lakshmi
Prof & Head, Department of BS&H

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Approved by AICTE, Permanently Affiliated to JNTUK, Kakinada,
Accredited 'A+' Grade by NAAC, Accredited by NBA (Tier-1), NIRF Rankings 2022 (251-300 Band)

INTERNATIONAL VIRTUAL CONFERENCE ON
PERSPECTIVES FROM BASIC SCIENCES AND HUMANITIES
NEC-IVCPBSH-2023
26th & 27th May, 2023

ABOUT THE CONFERENCE

The objective of the international virtual conference on Perspectives from Basic Sciences and Humanities is to provide a platform for scholars, researchers, academicians and students from diverse fields to exchange ideas, share knowledge and discuss perspectives and approaches to address contemporary challenges. The conference will offer a vital platform for the growth of researchers with global and varied knowledge and experiences, as well as for encouraging the best possible use of research findings. The conference will provide participants a taste of keynote talks delivered by distinguished speakers from Maths, Science and English. The scope of the conference covers all cutting-edge fields in applied basic sciences and humanities that will be useful to participants.

IMPORTANT DATES

Last date for abstract submission	: 15th May, 2023
Acceptance intimation	: 17th May, 2023
Author registration	: 18th May, 2023
Full length paper submission	: 20th May, 2023
Conference dates	: 26th & 27th May, 2023

SUBMISSION GUIDELINES

Authors intending to present papers are requested to send Abstract of research paper and full length paper not exceeding 5 pages or 2,500 words & send to necivcpbsh2023@nrtec.in

- Each author should register separately.
- E-certificate will be issued only to the registered participants.
- Selected Papers will be published in conference Proceedings with ISBN Number.

REGISTER NOW

Paper Submission Link:
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THEMES OF THE CONFERENCE

(Not limited to)

ENGLISH
* Feminist studies
* Innovative Teaching methods in ELT
* Soft Skills & Communication Skills
* Cultural studies – Ethnicity, Diversity & Identity
* Post-Modernism in Literature
* Effective use of digital tools in teaching and Learning English Language

PHYSICS
* Nano materials
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* Glass science
* Solar Cells
* Biophysics

CHEMISTRY
* Material Science
* Nano Science and Technology
* Synthetic Organic Chemistry
* Energy Storage-Fuel Cells and Hydrogen storage
* Electro Chemistry
* Green Chemistry

MATHEMATICS
* Applied Mathematics
* Fluid Dynamics
* Fuzzy Set Theory
* Mathematical and Statistical Modelling
* Mathematics applied to other fields of Knowledge.
* Algebra
* Graph Theory
* Soft Sets

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Categories	Registration Fees
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LIST OF FULL LENGTH PAPERS SELECTED FOR PROCEEDINGS

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Impact of Mass Suction And Viscous Dissipation on Newtonian Fluid Flow in a Porous Medium Over a Shrinking Sheet in the presence of Magnetic Field and Heat Transfer

Dr. S. Balakrishna[1], Dr. G. Vinod Kumar[2*], N. Mallikarjuna Reddy[3]
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ABSTRACT: The impact of viscous dissipation and magnetic field on the MHD boundary layer flow of Newtonian fluid flow through a porous medium over a linearly shrinking sheet with mass suction (S>0) is discussed. Similarity transformations transform the governing partial differential equations into non-linear ordinary differential equations. The differential equations can be solved using the R.K. shooting technique of the bvp4c package. The effects of different parameters on the velocity and temperature fields are examined and depicted through graphs. Also, the local skin friction and the heat transfer rate are derived and extended through tabulation for specified values.

Keywords: MHD boundary layer, Shrinking sheet, viscous dissipation, heat transfer, mass suction, Eckert number, Magnetic field, porous medium.

NOMENCLATURE:

B_0	Constant applied magnetic field	**Greek symbols**	
c	Shrinking constant	ρ	Density of the fluid
K	Permeability of the porous medium	μ	Viscosity of the fluid
M	Magnetic parameter	σ_e	Electrical conductivity
c_p	Specific heat of the fluid	η	Dimensionless similarity variable
f	Dimensionless stream function	κ	Thermal conductivity
Q	Volumetric rate of heat generation	υ	Kinematic viscosity
S	Suction parameter	Ψ	Stream function
Pr	Prandtl number	λ	Heat source/sink parameter
Ec	Eckert number	θ	Dimensionless temperature

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T	Temperature of the fluid
T_w	Temperature at the wall
T_∞	Free stream temperature
u, v	Velocity component of the fluid along the x and y directions, respectively.
x, y	Cartesian coordinates along the surface and Normal to it, respectively.

Superscript

′	Derivative with respect to η

Subscripts

w	Properties at the plate
∞	Free stream condition

1. Introduction: Almost all the researchers in the field of engineering are ready to study the boundary layer flow of an incompressible fluid over a shrinking sheet, which has prominent applications in the field of the polymeric process. MHD is one of the important fluid dynamics subfields with significant applications in many science and technology branches. Lewis and Whitman, in 1924, covered the way to think about the transfer of mass that may occur simultaneously with a heat transfer process. Many fields, such as mechanical engineering, chemical engineering, physical and biological science, etc., happen in the porous medium and have been determined as an important branch of fluid mechanics. Many scholars have researched the fluid flow of porous fluid of porous medium under different physical situations along with the effects of distinct parameters. Analyzing hydro-magnetic incompressible viscous flow involving heat and mass transfer is important in the petrochemical industry, cooling of nuclear reactors, geophysics and magneto-hydrodynamic power generation systems.

Abbas and Hayat [1] studied the magnetic hydrodynamic boundary layer flow in a porous space. Fang and Zhang [2] investigate the heat transfer characteristic of the shrinking sheet with linear velocity. After Noor et al. [3] analysed the MHD viscous flow through the shrinking sheet using (ADM) a domain solution Method, and the generating series solution. Maidya [4] examined the MHD viscous flow and heat transfer over a linearly shrinking porous medium. [5] Maidya obtained a closed form of analytical solution for the distribution of reactant solute in an MHD boundary layer flow over a shrinking sheet. Soundalgekar [7] studied the viscous dissipative effect of unsteady free convective flow past a vertical porous plate with constant mass suction. To recall the works of Miklav'ci' and Wang [5] and Fang

and Zhang [8], who examine the flow due to linear shrinking sheets in a Newtonian fluid. The word hydromagnetic or Magneto-hydrodynamic (MHD) was first studied by Alfen [9]. MHD viscous flow and heat transfer induced by a permeable shrinking sheet with prescribed heat flux are discussed by Ali et al. [6]. The investigation of both heat and mass transfer in MHD natural convection over a vertical surface with viscous and joules dissipations was studied by Chen [10]. Midya [11] has recently studied heat transfer in an electrically conducting viscoelastic flow over a shrinking sheet subject to the transverse magnetic field. The viscous dissipation effects on MHD non-linear flow and heat transfer past a porous surface with prescribed heat flux have been examined by Devi and Ganga [12]. Reddy and Reddy [13] have investigated the effects of mass transfer and heat generation on MHD-free convection flow past an inclined vertical surface in a porous medium.

Many researchers, such as Gupta and Gupta [14] and Dutta et al. [15], extended the work of Crane [16] by including the effects of heat and mass transfer analysis under various physical situations. Yih [17] numerically analyzed the effect of transpiration velocity on the heat and mass transfer characteristic of mixed convection about a permeable vertical plate embedded in a saturated porous medium. Elbashbeshy [18] studied the effect of surface mass flux on mixed convection along a vertical plate embedded in a porous medium. Sattar et al. [19] studied unsteady free convection flow along a vertical porous plate embedded in a porous medium.Heat source/sink and viscous dissipation change the temperature can play a significant role in energy source which leads to an impact on heat transfer rate. The present paper is to define the various practical and particular uses for recent life in the research field.

2. Mathematical formulation: In this problem, the two-dimensional flow of an incompressible, viscous fluid at a steady state over a linear shrinking sheet with the bottom of fluid, saturated porous medium and having mass suction to be considered. The suction is applied normal to the sheet and measure the rate of rotational spin in a fluid as illustrated in Fig 1.

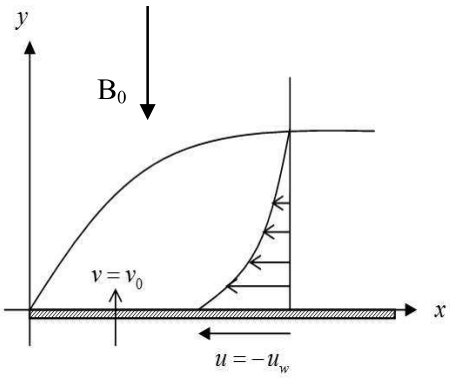


Fig 1. Physical Flow Analysis.

The Newtonian Viscous fluid flows of an electrically conducting fluid with the effect of viscous dissipation on the energy equation is considered. The viscous fluid flow is carried over a penetrable linearly shrinking sheet, making it possible for an electric current to pass through in two dimensions. The horizontal axis (X-axis) is taken along the sheet on the plane, whereas the vertical (Y-axis) is perpendicular to the surface. It is strictly positive, and the Magnetic field B_0 is transverse to X-axis. The fundamental dimensionless group of Magnetic Reynolds number of the flow is taken very small to account of this induced magnetic field and should be ignored. The governing equation of the Linear momentum equation involving the porous medium and Energy equation contains viscous dissipation by a non-linear second-order differential equation.

The essential governing equations like Continuity, Linear momentum and Energy for fluid motion are written with the usual representation are described as follows [20].

Continuity Equation

$$\frac{\partial u}{\partial x}+\frac{\partial v}{\partial y}=0 \tag{2.1}$$

Momentum Equation

$$u\frac{\partial u}{\partial x}+v\frac{\partial u}{\partial y}=\nu\frac{\partial^2 u}{\partial y^2}-\frac{\sigma_e B_0^2}{\rho}u-\frac{\nu}{K}u \tag{2.2}$$

Energy Equation

$$u\frac{\partial T}{\partial x}+v\frac{\partial T}{\partial y}=\frac{k}{\rho c_p}\frac{\partial^2 T}{\partial y^2}+\frac{Q_0}{\rho c_p}(T-T_\infty)+\frac{\nu}{\rho c_p}(\frac{\partial u}{\partial y})^2 \tag{2.3}$$

Appropriate boundary conditions for the velocity components (u, v) and the temperature for

the governing equations are represented as:

$u = -u_w = -cx$, V=V_w, $T = T_w$ at y=0. (2.4)

$u \to 0$, and $T \to T_\infty$ at $y \to \infty$ (2.5)

From equations (2.1-2.3) contains parameters like u and v are velocity components along horizontal (X-axis) components and vertical (Y-axis) components respectively, $\nu = \mu/\rho$ is the kinematic fluid viscosity, μ is the coefficient of the fluid viscosity, ρ is the fluid density, σ_e is the electrical conductivity of the fluid, B_0 is the applied magnetic field, T is the temperature, T_∞ is the free stream temperature of fluid, κ is fluid thermal conductivity, C_p is the specific heat, Q_0 is the volumetric rate of the heat generation or absorption, E_c is Eckert number, K is the permeability of the porous medium.

3. Solution of the problem:

To establish the stream function (ψ) with satisfying the fundamental governing equations from (2.1-2.3). Now the velocity components can be composed by

$$u = \frac{\partial \psi}{\partial y} \quad \text{and} \quad v = -\frac{\partial \psi}{\partial x} \tag{3.1}$$

The velocity component clearly satisfies the equation of continuity. In this connection, the momentum equation and energy equations can be converted into the ordinary non-linear differential equation by using the following similarity variables are

$$\eta = y\left(\sqrt{\frac{c}{\nu}}\right), \quad \psi = \sqrt{c\nu}\, xf(\eta), \theta = \frac{T - T_\infty}{T_w - T_\infty}, E_c = \frac{(u_w)^2}{\rho c_p}, k = \frac{\upsilon}{Kc} \tag{3.2}$$

Where η is the independent similarity variable f(η) is the dimensionless stream function and θ(η) is the dimensionless temperature. We notice that the plate is shrinking with a velocity varies with the distance. Using (3.1-3.2), the transformed non-linear sets of ordinary differential equations are

$$f''' + ff'' - (M + K)f' - (f')^2 = 0 \tag{3.3}$$

$$\theta'' + P_r(f\theta' + \lambda\theta) + P_r E_c (f'')^2 = 0 \tag{3.4}$$

The transformed boundary conditions are

$$f(0)=\mathrm{S};\ f'(0)=\text{-}1;\ \theta(0)=1 \text{ and } f'(\infty)\to 0;\theta(\infty)\to 0; \tag{3.5}$$

Where 'S' is the constant mass transfer parameter with S>0 for suction and S<0 for injection. In the equations (3.3-3.4), primes denote differentiation with respect to η and other parameters defined as follows that $\lambda=\frac{Q}{c\rho c_p}$ is heat source (λ<0) or sink (λ>0) parameter, $P_r=\frac{\mu c_p}{k}$ is the prandtl number, $M=\frac{\sigma_e B_0^2}{\rho c}$ is the Magnetic parameter, S=$\frac{v_w}{\sqrt{c\upsilon}}$ is the mass suction parameter, $E_c=\frac{(u_w)^2}{(T_w-T_\infty)c_p}$ is Eckert number. The physical quantities of Engineering interest to study the Skin friction coefficient (C_f) and the local Nusselt number (Nu_x) is stated that

$$C_f=\frac{\tau_w}{\rho u_w^2}\ ;\qquad Nu_x=\frac{xq_w}{k(T_w-T_\infty)} \tag{3.6}$$

Where the wall shear stress τ_w, and the local heat flux q_w .

$$\tau_w=\mu(\frac{\partial u}{\partial y})_{y=0}\ ;\ q_w=-k(\frac{\partial T}{\partial y})_{y=0}\quad \mathrm{Re}_x=\frac{c}{\upsilon}x^2 \text{ Implies } \sqrt{\mathrm{Re}_x}=\sqrt{\frac{c}{\upsilon}}x \tag{3.7}$$

With this notations μ and k being dynamic viscosity and thermal conductivity. Using similarity variables (7), we obtain $\sqrt{\mathrm{Re}_x}\,C_f=f''(0)$ and $\frac{Nu_x}{\sqrt{\mathrm{Re}_x}}=-\theta'(0)$ (3.8)

The transformed non-linear ordinary differential equations (3.3 - 3.4) with boundary conditions (3.5) are solved numerically using the shooting Technique of the bvp4c package. The analysis of the skin friction coefficient and the local Nusselt number for the appropriate values permeability parameter (K), Prandtl number (Pr), Magnetic parameter (M) and Eckert number (Ec), and Mass suction parameter (S>0) etc.

4. Results and Discussion:

In this problem, Numerical solutions of Magnetic field and heat transfer effects on

Newtonian fluid flow through a porous medium over a shrinking sheet with mass suction (S>0) and viscous dissipation is considered. The porous media is popularly utilized to protect the heated body to maintain its temperature. The main focus is to bring out the effects of the permeability of the plate and plate temperature on the fluid flow phenomena. The system of non-linear ordinary differential equations (3.3-3.4) with the transformed boundary conditions (3.5) is solved numerically by the R.K. method with the shooting technique of the bvp4c package.

The influence of different dimensionless parameters on the fluid velocity and temperature are communicated through the summarized graphs. In addition to verifying the authenticity and accuracy values obtained, the physical quantities for the local skin friction and the change in heat transfer rate are presented in tabular form. The parameters are varied with different ranges listed below, and convergence is taken up to 10^{-5}. For the infinity conditions are appropriate large but finite values of η in the velocity and temperature profiles.

From figure (2-8) to determine the results are acquired by allocate the different values of physical parameters like M, K, λ, S and E_c . In throughout graph, the symbolize notations are outlined as followed that $f'(\eta)$ and $\theta(\eta)$ are the distribution of velocity and temperature.

Fig-2. illustrate the influence of the Magnetic field parameter (M) on the fluid flow fields to the velocity $f'(\eta)$. The analysis is to initiate the velocity inside the boundary layer is rising with increasing at walls to their magnetic fields and mass (S>0), consequently the thickness of the momentum boundary layer reduces because for the Lorentz force, make an effort on a charged particle moving with velocity through electric and Magnetic fields in every part of the motion of fluid, slow down and resistance is offered to the flow. **Fig-3,** is to develop the graph for the effect of Magnetic field parameter (M) on the temperature profile $\theta(\eta)$. Due to the Lorentz force, some external heat energy will be presented in the flow, which will enhance the temperature distribution. In the visual record, the temperature reduces $\theta(\eta)$, increasing the Magnetic parameter (M). It opposes the parameter effects on heat transfer cause the temperature asymptotically comes towards very less (i.e. zero) in the stream region.

Fig-4, the graphical representation of velocity profiles, refers to various values of permeability parameters. We regard the fluid as taken away from the boundary layer. Effects of distinct values of the permeability parameter are increased with the velocity profile raised.

Fig-5, Represents the graphs of fluid flow temperature profiles $\theta(\eta)$ with different values of

heat source parameter (λ). We notice that temperature enhances for the various values, it develop the strength of the heat source (λ>0). Consequently the thickness of thermal boundary layer degrades which improves the parameter of heat source. The heat source parameter makes the temperature of fluid is increased. Due to the energy contained in the boundary layer is absorbed by the heat source, causes the temperature will be raised. **Fig-6** shows the variation of the velocity profiles $f^{'}(\eta)$ for dissimilar values of suction parameter (S>0). We observe that increase in the dimensionless velocity of fluid flow as raises the mass suction parameter (S>0), therefore the momentum boundary layer becomes delicate. **Fig-7,** The graphical representation for distinct values of Eckert number (Ec) on the temperature profiles $\theta(\eta)$. We notice that the temperature is accelerated as a result of dissipation effects. The physical important of Eckert number is explains the measured kinetic energy of the flow relative to the enthalpy against the thermal boundary layer. With the effects of this Eckert number is increasing with raised values in temperature profiles. And also noticed the energy is stored in the fluid with viscosity and elastic deformation. **Fig-8,** is to develop the graph for the effects of the various values of suction parameter (S>0) on the temperature profile $\theta(\eta)$. We observed the suction parameter is enhancing the result of temperature profile is reduces due to thickness of thermal boundary layer.

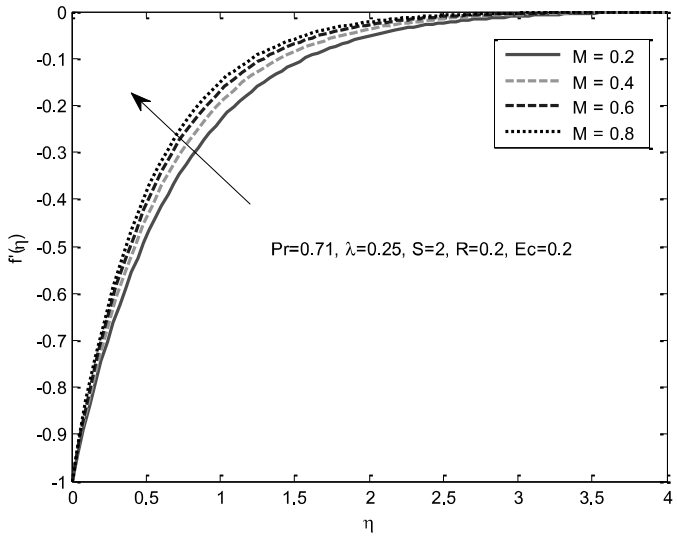


Fig.2 Velocity profiles for different values of Magnetic parameter (M).

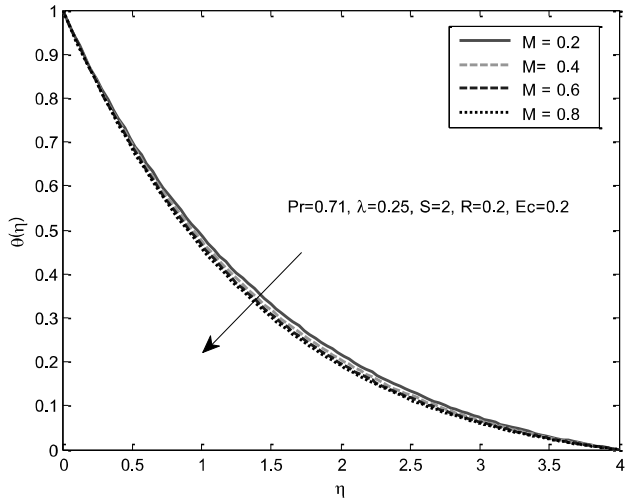


Fig.3 Temperature profiles for different values of Magnetic parameter (M).

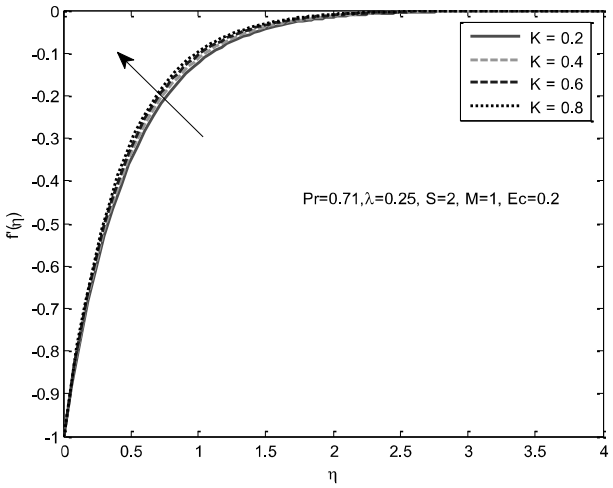


Fig.4 Velocity profiles for different values of Permeability parameter (K)

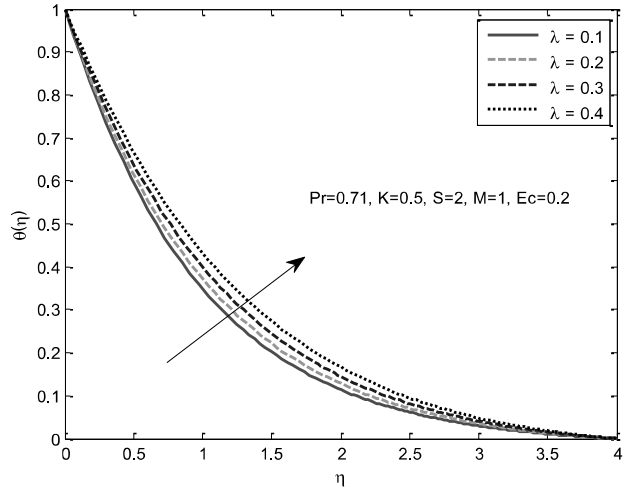


Fig.5 Temperature profiles for different values of Heat source parameter (λ).

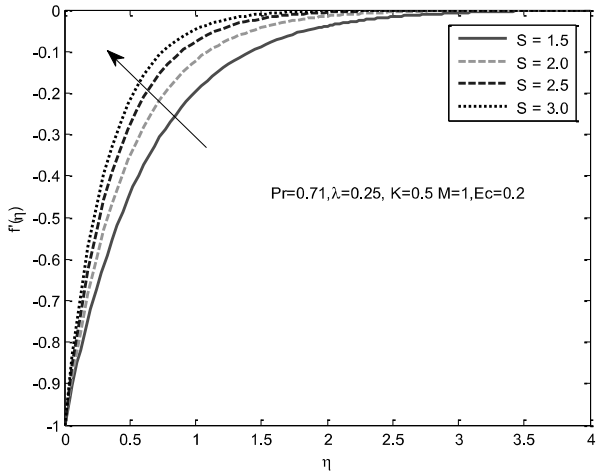


Fig.6 Velocity profiles for different values of suction parameter (S).

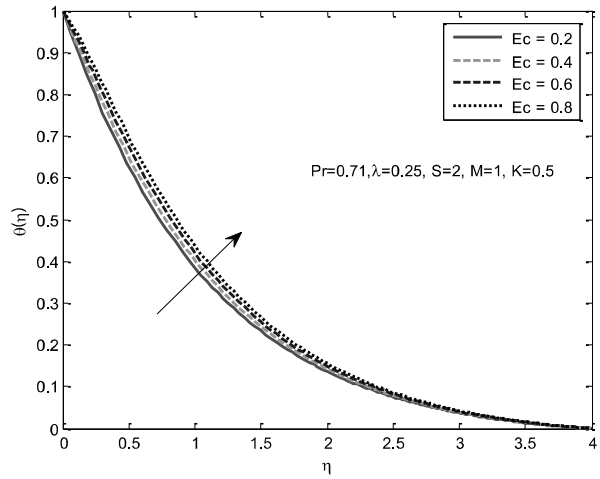


Fig.7 Temperature profiles for different values of Eckert Number (Ec).

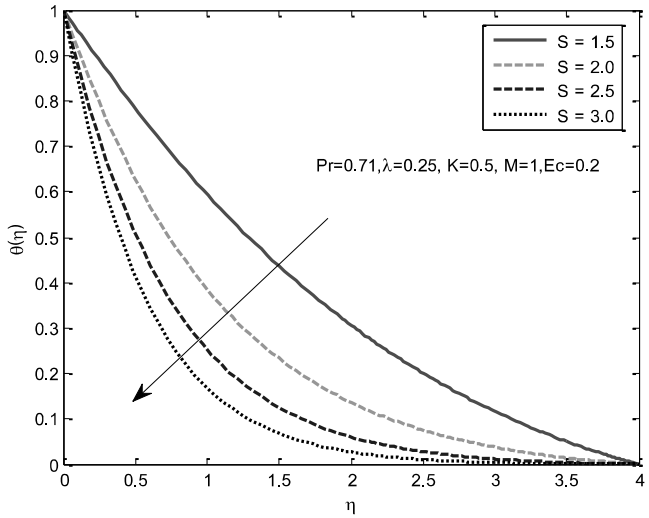
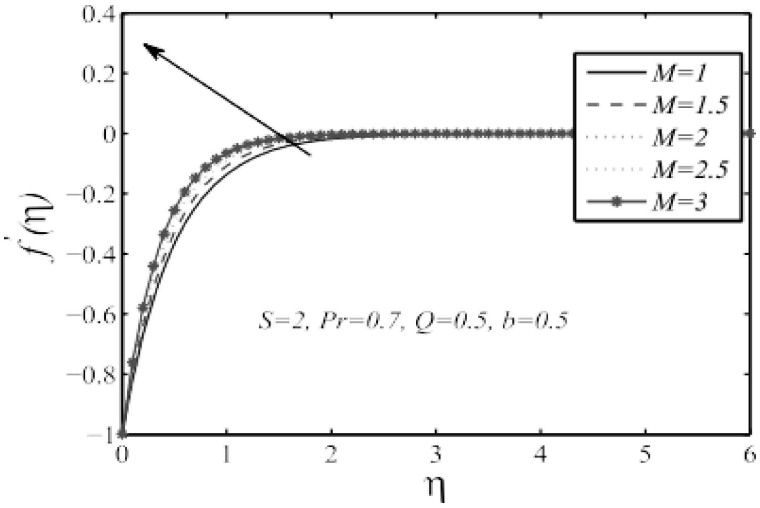


Fig.8 Temperature profiles for different values of suction parameter (S).



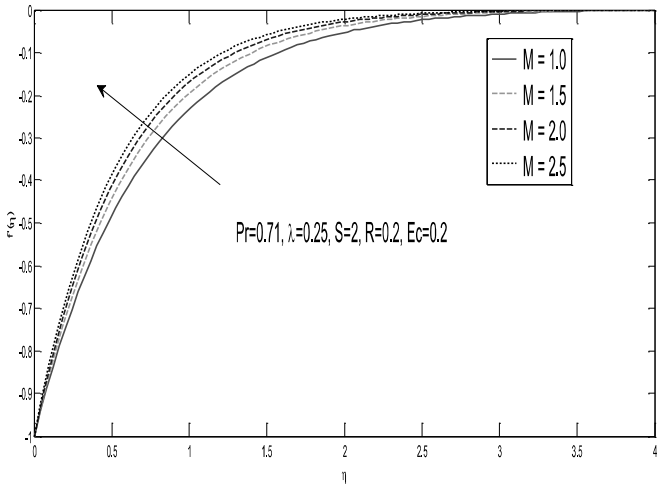


Fig .(9 a &.9 b) Velocity profiles for different values of Magnetic parameter (M).

From Figures 9 (a) & 9 (b) is noticed that the presence of the Permeability parameter, the absence of the Eckert number and the radiation parameter on velocity profiles in our graph are in good agreement with the graph of Saeed Ahmed et al. and remaining parameters have taken with definite range.

Table. 1: Analysis Skin - Friction co-efficient & Nusselt number

M	λ	K	Pr	Ec	S	$f''(0)$	$-\theta'(0)$
0.2						-1.634646	0.864621
0.4						-1.775438	0.872488
0.6						-1.894801	0.877514

0.1					-2.095539	0.996630
0.2					-2.095539	0.923083
0.3					-2.095539	0.840789
	0.2				-2.095539	0.883176
	0.4				-2.183269	0.884720
	0.6				-2.264941	0.885722
		0.1			-2.095541	0.285839
		0.2			-2.095541	0.338784
		0.3			-2.095541	0.410447
			0.2		-2.095539	0.883176
			0.4		-2.095540	0.723359
			0.6		-2.095540	0.563542
				1.5	-1.623578	0.440058
				2.0	-2.095539	0.883176
				2.5	-2.577613	1.288926

Table explains the physical parameters Magnetic parameter (M), heat source parameter (λ), Suction parameter (S>0), permeability parameter and Eckert number for different values, we calculate the local skin friction and Nusselt number. The skin friction coefficient will be decreases for the parameter like Magnetic parameter, permeability parameter of porous medium and suction parameter is increased. For the parameter like heat source parameter, prandtl number and Eckert number remains unchanged due to the momentum boundary thickness is suppressed. The rate of heat transfer coefficient is rising with various values of the parameter like permeability parameter of porous medium, Magnetic parameter, prandtl number and suction parameter are increases. Similarly heat source parameter and Eckert number are increase with decreasing the Nusselt number.

The table explains the physical parameters Magnetic parameter (M), heat source parameter (λ), Suction parameter (S>0), permeability parameter and Eckert number for different values, and we calculate the local skin friction and Nusselt number. The skin friction coefficient will decrease for a parameter like the Magnetic parameter, and the permeability parameter of the porous medium and suction parameter will increase. For parameters like the heat source parameter, the Prandtl and Eckert numbers remain unchanged due to the suppressed momentum boundary thickness. The rate of heat transfer coefficient rises with various values of the parameter like permeability parameter of the porous medium, Magnetic

parameter, Prandtl number, and suction parameter increases. Similarly, the heat source parameter and Eckert number increase with decreasing the Nusselt number.

5 Conclusion: The original system of non-linear ordinary differential equations are transformed with suitable boundary conditions solved numerically by the R.K. method using shooting Technique with the bvp4c package. We find the numerical solutions for the local skin friction and Nusselt number with various local parameters.

Some special characteristics are listed in the present investigation.

(i) All the velocity and temperature profiles tend to zero asymptotically, satisfying the boundary conditions.

(ii) The Skin friction coefficient and heat transfer coefficient are reduced by increasing the values of the permeability parameter.

(iii) We noticed as the Prandtl number values increased, the Nusselt number enhanced.

(iv) The Nusselt number can be decreased by increasing the values for the Eckert number.

(v) The suction parameter ($S>0$) is increased in an appropriate range of values in the local skin friction is decreased, and the Nusselt number is increased.

(vi) It is noticed that the Skin friction Coefficient is independent of the Prandtl number, and the Eckert number is negligible.

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