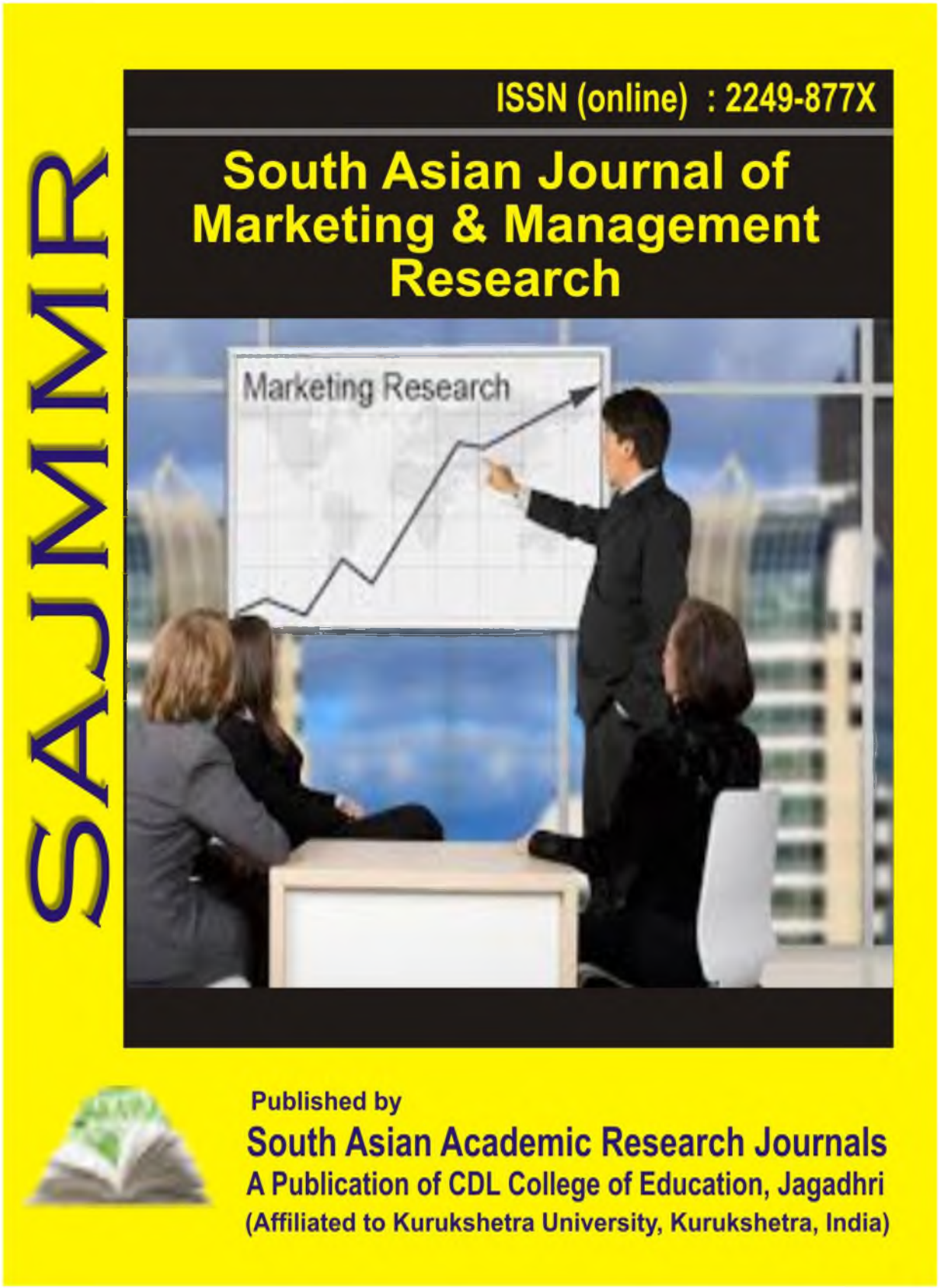
SAJMMR
ISSN (online) : 2249-877X
South Asian Journal of Marketing & Management Research
Marketing Research
Published by
South Asian Academic Research Journals
A Publication of CDL College of Education, Jagadhri
(Affiliated to Kurukshetra University, Kurukshetra, India)

SAJMMR ISSN (online) : 2249 –877X

Editor-in-Chief : Dr. Dalbir Singh

Impact Factor	:	SJIF 2020 = 7.11
Frequency	:	Monthly
Country	:	India
Language	:	English
Start Year	:	2011

Indexed/ Abstracted : Scientific Journal Impact Factor(SJIF 2020 - 7.11), Google Scholar, CNKI Scholar, EBSCO Discovery, Summon(ProQuest), ISC IRAN, Primo and Primo Central, I2OR, ESJI, IIJIF, DRJI, Indian Science and ISRA-JIF.

E-mail id: saarjjournal@gmail.com

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ISSN: 2249-877X Vol. 10, Issue 11, November 2020, Impact Factor: SJIF 2020= 7.11

South Asian Journal of Marketing & Management Research (SAJMMR)

(Double Blind Refereed & Peer Reviewed International Journal)

DOI: 10.5958/2249-877X.2020.00088.0

TECHNOLOGY FOR THE DEVELOPMENT OF STUDENTS 'EDUCATIONAL AND CREATIVE ACTIVITIES IN SOLVING PROBLEMS IN MOLECULAR PHYSICS

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ABSTRACT

The Molecular Physics section of the Physics course encourages students to think, analyze, and visualize physical processes by solving problems. In this way, it serves as a basis for shaping the creative activity of students

KEYWORDS: *Position, Ability, Reflexive-Perceptual Ability, Project Ability, Combination, Technical Matter, Experiment, Concentration.*

INTRODUCTION

The pedagogical position of modern teachers is directly related to the level of development of their pedagogical abilities.

Ability is a characteristic of a person in the successful solution of tasks in one or more areas.

Ability is not passed down from generation to generation, but some physiological-anatomical aspects can be inherited. Abilities develop. Ability is determined not by cognitive skills but by speed, deep creativity and solid reliability in work style. Abilities are a set of individual skills related to the object of training, the means, the conditions of activity, and the elegant ways in which effective ways are needed to achieve a high result.

Science is divided into general and special abilities.

General skills are distinguished by mental operations, sharp observations, interesting communication, easy mastery of social experiences, and high results in the desired field.

Special skills determine the high results of a particular direction in areas that require special skills, such as music, fine arts, mathematics, theater.

Thus, skills are a set of individual skills related to the object of a person's upbringing, the means, the conditions of activity, and the elegant ways in which effective ways are needed to achieve a high result.

There are two interrelated levels of pedagogical ability:

1."Reflexive-perceptual abilities" in their direction are focused on the "object-subject" relationship and require the development of personal experience of the teacher.

2. Project Capability "will focus on the subject-subject relationship. It embodies aspects that help the teacher to strive for excellence in the professional field, while shaping the need for the development of thinking in the student, the desire to find their place. This is determined by the development of modular knowledge and skills related to the design of the educational system.

One of the ways to develop skills in students in a physics course is to solve this problem. By solving problems, students determine in which section of physics the problem is related to the topic. He cited the formulas based on the condition of the matter on the subject. Reads the problem and visualizes the processes in the problem condition. Analyzes the process. Finds ways to work on the issue.

Problem-solving in higher education should be as clearly planned as any other subject. In preparation for the session on the topic indicated in the program, the teacher selects the problems and determines the sequence of their solution. The system of issues selected must meet a number of requirements. The main didactic requirement is the gradual complication of the relationship between the magnitude and concepts that characterize the process or event described in the problem.

It is a good idea to start solving problems on some of the topics in the Molecular Physics section of the physics course by practicing. This is followed by more complex computational, experimental, and other issues that are chosen sequentially, with an increasing number of connections between the magnitudes and concepts that characterize the phenomenon. Combinations of more complex, incomplete information in a technical context may be the culmination of a system of questions selected on a particular topic.

Exercise. Dust particles with mass m = 10^{18}g are suspended in the air. Determine the air layer in which the difference in the concentration of dust particles does not exceed 1%.? The air temperature is the same throughout the volume and is T = 300K.

Solution: From the distribution of dust particles in equilibrium, the concentration depends only on the coordinate along the axis in the vertical direction.

In this case, the Boltsmann formula can be used for the distribution of dust particles.

$$n = n_0 \cdot e^{W/kT} \quad (1)$$

Because the force of gravity in a homogeneous field

$$W = mgh \quad (2)$$

We form (2) $n = n_0 \cdot e^{\frac{mgh}{kT}}$ (3) based on (1).

According to the condition of the matter, the change in concentration depending on the altitude is very small with respect n $\left|\frac{\Delta n}{n}\right| = 0{,}01$ Therefore, the concentration change Δn can be replaced by the differential dn. (3) - differentiating the expression by z, we obtain the following

$$dn = n_0 \frac{mg}{kT} \cdot e^{\frac{mgZ}{kT}} dZ \qquad (4)$$

Here $n_0^{\frac{mgZ}{kT}} = n$ (5), since $dn = \frac{mg}{kT} \cdot ndZ$ (6). From this equation we find the change in coordinates of interest to us.

$$dZ = \frac{kT\Delta n}{mgn} \qquad (7)$$

Here, the negative sign indicates that a change in the positive coordinates ($dZ > 0$) leads to a decrease in concentration. Since the negative sign in this case is insignificant, the differentials dZ and dn are replaced by the completed addition of ΔZ and Δn. We find $\Delta Z = \frac{-kT}{mg} \cdot \frac{\Delta n}{n}$ (8). We express the quantities (8):

$\left|\frac{\Delta n}{n}\right| = 0{,}001$; $k = 1{,}38 \cdot 10^{-23}\ J/K$; $m = 10^{21}\ kg$; $g = 9{,}81\ m/s^2$; $\Delta Z = 4{,}23mm$.

Based on the results obtained, the following can be said. Concentrations of very small dust particles also change very rapidly with altitude.

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