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CURRENT AFFAIRS

Date: 25 August 2023

C. R. RAO

This article covers "Daily Current Affairs" and the topic details "C. R. Rao". The topic "C. R. Rao" has relevance in the "Science and Technology" section of the UPSC CSE exam.

For Prelims:

Who is C. R. Rao?

What are his significant works?

For Mains:

GS3: Science and Technology

Achievement of Indians in Science and Technology

WHY IN THE NEWS?

C. R. Rao (Calyampudi Radhakrishna Rao), renowned as one of India's finest mathematicians and statisticians, passed away in the United States on the morning of August 23, just a couple of weeks prior to his 103rd birthday.

WHO IS C R RAO?

- Addressed as Dr. Rao by both his peers and students, the esteemed individual who had previously served as the director of the Indian Statistical Institute (ISI) gained widespread attention earlier this year. This attention was a result of his recognition with the International Prize in Statistics 2023, an accolade often likened to the prestigious Nobel Prize.
- C R Rao is an esteemed Indian-American mathematician and statistician whose achievements are widely recognized.
- He holds the position of professor emeritus at Pennsylvania State University and serves as a Research Professor at the University at Buffalo. Rao's contributions have garnered numerous accolades, including colloquia, honorary degrees, and festschrifts. Notably, he was bestowed the US National Medal of Science in 2002.
- The American Statistical Association aptly characterizes him as a "living legend" whose profound impact extends across disciplines like economics, genetics, anthropology, and medicine, among others.
- Rao's standing as one of India's preeminent scientists is evident, as The Times of India acknowledges him as one of the top 10 Indian scientists of all time.

SEMINAL RESEARCH OF C R RAO

- In 1945, C R Rao authored a seminal research paper titled “Information and accuracy attainable in the estimation of statistical parameters,” which found its place in the Bulletin of the Calcutta Mathematical Society.
- This paper introduced a fundamental concept—the lower limit on the variance of an unbiased estimate for a finite sample.
- This concept has since become a cornerstone of mathematical statistics and a touchstone for subsequent research.

KEY CONTRIBUTIONS OF HIS RESEARCH RAO'S 1945 PAPER DELIVERS THREE PIVOTAL OUTCOMES:

- **Cramer-Rao Bound**
 - The first breakthrough, now recognized as the Cramer-Rao lower bound, provides a way to determine the point at which an estimation method for a quantity becomes as good as any possible method.
- **Rao-Blackwell Theorem**
 - The second discovery, named the Rao-Blackwell Theorem (credited to prominent statistician David Blackwell due to its independent discovery), offers a method to enhance an estimate into a better, or more precisely, an optimal one.
 - Together, these discoveries lay the foundation for a significant part of the field of statistics.
- **Information Geometry**
 - The third revelation introduces insights that have pioneered an emerging interdisciplinary domain known as “information geometry.” These combined findings empower researchers to effectively extract information from data.
- **Impact of his work**
 - The reach of the Rao-Blackwell process extends across diverse domains including stereology, particle filtering, and computational econometrics.
 - Simultaneously, the significance of the Cramer-Rao lower bound spans a broad spectrum of fields such as signal processing, spectroscopy, radar systems, risk analysis, multiple image radiography, and even quantum physics.
 - The applicability of information geometry has notably contributed to enhancing the understanding and optimization of measurements in the realm of the Higgs boson at the renowned Large Hadron Collider.
 - Moreover, this paradigm has found practical applications in contemporary research fields such as radars and antennas. It has also significantly influenced the advancements in artificial intelligence, data science, signal processing, as well as areas including shape classification and image segmentation.

C R Rao's exceptional contributions have left an indelible mark on the field of statistics, and his recognition with the prestigious International Prize further underscores his remarkable legacy.

ABOUT INTERNATIONAL PRIZE IN STATISTICS

- The International Prize in Statistics is a **biennial award** granted through **collaboration among five prominent global statistics organizations.**

- This prize commends significant accomplishments within the realm of statistics, either by an individual or a team. It particularly recognizes those whose innovative ideas have translated into practical applications and groundbreaking advancements across diverse fields.
- Following the esteemed tradition of the Nobel Prizes, Abel Prize, Fields Medal, and Turing Award, the International Prize in Statistics holds a position of prestige.

PREVIOUS AWARDEES

- The first award in 2017 was granted to David R. Cox for his creation of the Cox proportional hazards model. This model has fundamentally transformed the analysis of patient survival rates in complex studies.
- In **2019, Bradley Efron** claimed the honor for his pioneering work on the **bootstrap method**—a computational technique that astutely assesses uncertainty in applied statistics.
- In **2021, Nan Laird** was recognized for her instrumental role in developing robust methods that have enabled the **analysis of intricate longitudinal studies**.

Sources:

[Legendary statistical scientist CR Rao dies | India News - The Indian Express](#)

Q1. With reference to C.R. Rao, consider the following statements:

1. C R Rao, one of India's finest statisticians, was recently awarded with the International Prize in Statistics 2023.
2. International Prize in Statistics is a biennial award granted by the Royal Swedish Academy of Sciences.
3. Dr. Rao was the recipient of the first-ever International Prize in Statistics.

Which of the statements given above is/are **NOT** correct?

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 3 only
- (d) None

Answer: (b)

Q2. Discuss the remarkable achievements and contributions of Dr. C. R. Rao in the realm of Mathematics and Statistics. How have his pioneering insights in statistics influenced various fields?

TAGS:

[C. R. Rao](#), [C. R. Rao upsc](#), [cr rao](#)

Gaurav Nikumbh

NATIONAL CURRICULUM FRAMEWORK (NCF)

This article covers "Daily Current Affairs" and the topic details "National Curriculum Framework (NCF)". The topic "National Curriculum Framework (NCF)" has relevance in the Governance section of the UPSC CSE exam.

For Prelims:

About National Curriculum Framework (NCF)?

For Mains:

GS 2: Governance

Key Aspects of the National Curriculum Framework (NCF)?

Why in the News:

The National Council of Educational Research and Training (NCERT) has recently unveiled the final version of the National Curriculum Framework (NCF), marking a significant step towards educational reform in accordance with the National Education Policy (NEP) 2020. These changes are specifically targeted at Grades 3 to 12 within the Central Board of Secondary Education (CBSE) system.

About National Curriculum Framework (NCF):

The NCF forms a fundamental component of NEP 2020, contributing to the realization of transformative changes in the education system. It is deeply rooted in the principles, aims, and approach of NEP.

This iteration of the NCF marks the fifth revision, following updates in 1975, 1988, 2000, and 2005.

Objective:

- The primary goal of the NCF is to facilitate positive alterations in the curriculum and pedagogy, aligning with the transformative vision of NEP 2020.
- It strives to provide high-quality education to all students, in line with the ideals of equity, inclusivity, and pluralism enshrined in the Indian Constitution.

Key Aspects of the National Curriculum Framework (NCF):

Language Learning:

- Students in Classes 9 and 10 will now be studying three languages, out of which at least two must be native Indian languages.
- As for Classes 11 and 12, the curriculum entails the study of two languages, one of which must be of Indian origin.
- The primary aim is to ensure that students attain a "literary level" of linguistic proficiency in at least one Indian language.

Board Exams and Evaluation:

- A noteworthy alteration pertains to the frequency of Board exams, where students will have the opportunity to appear for these exams at least twice within a single school year.
- Of these multiple attempts, only the highest score will be retained, promoting a more relaxed examination environment.

Alignment with NEP 2020:

- The NCF closely aligns with the guidelines of NEP 2020 and plays a pivotal role in the creation of new textbooks for Grades 3 to 12 under the CBSE.

- The curriculum material for Classes 3-12 is carefully tailored to cater to the demands of the 21st century.
- While nurturing a sense of connection with the present, the NCF also encourages forward-looking perspectives.

Changes in Mandatory and Optional Subjects:

- The composition of mandatory subjects has undergone a change. For Classes 9 and 10, students are now required to study seven mandatory subjects, while for Classes 11 and 12, the number is six. This marks an increase from the previous model where students had five mandatory subjects and the option to choose an additional one.

Optional Subjects:

The concept of optional subjects is revamped and categorized into three groups:

- Group one: This includes art education, physical education, and vocational education.
- Group two: This incorporates subjects like Social Science, Humanities, and interdisciplinary areas.
- Group three: This encompasses Science, Mathematics, and computational thinking.

Flexibility and Choice for Students:

- The redesigning of the “Secondary Stage” is aimed at providing students with a more flexible and customizable academic journey.
- This new approach dissolves the rigid boundaries between academic and vocational subjects, as well as between different academic streams such as Science, Social Science, Art, and Physical Education.
- With this transformation, students gain the liberty to select varied subject combinations for their School Leaving Certificates.

Environmental Education:

A special emphasis is placed on cultivating environmental consciousness and nurturing sustainability.

- Environmental Education is now seamlessly integrated throughout all stages of schooling.
- Additionally, a distinct area of study dedicated to environmental education is introduced during the Secondary Stage.

Distribution of Content for Social Science Curriculum (Classes 6-8):

- The Social Science curriculum for Classes 6 to 8 sees a new approach to content distribution, with the following breakdown:
 - 20% content is sourced from the local level.
 - 30% content is drawn from the regional level.
 - 30% content reflects the national level.
- The remaining 20% encompasses global perspectives.

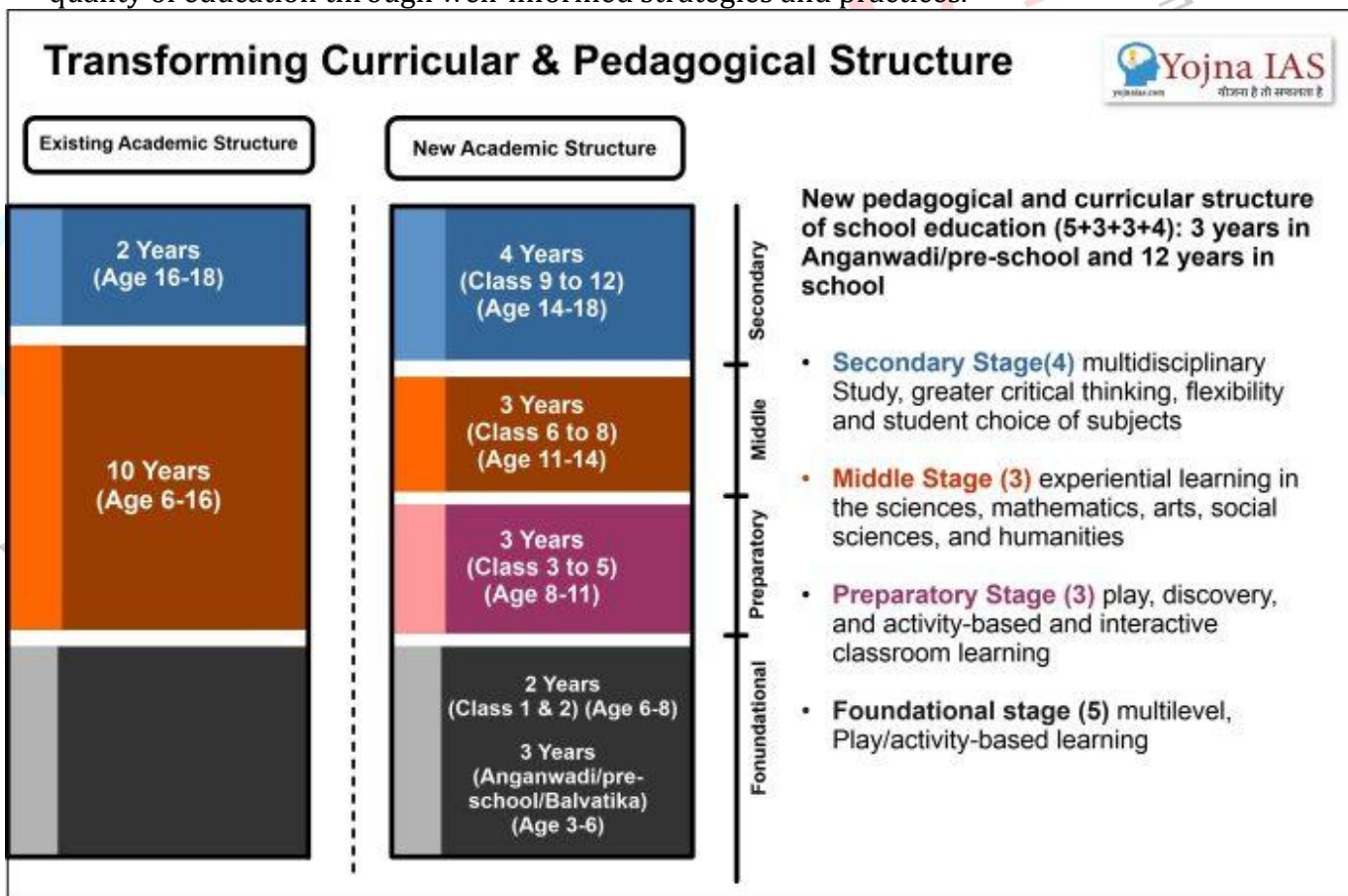
What is the National Education Policy 2020?

The National Education Policy (NEP) 2020 is an all-encompassing blueprint for educational reform in India. Approved in the year 2020, its fundamental purpose is to usher in significant

transformations within the Indian education system. This policy seeks to achieve this by adopting a holistic and interdisciplinary approach to education, focusing on a diverse range of aspects.

Key Features of the NEP 2020:

- **Universal Education:** The NEP 2020 aims to universalize education across different age groups, encompassing the span from preschool to the secondary level. This inclusive approach is geared towards ensuring that education is accessible to all.
- **Revamped Pedagogical and Curricular Structure:** A novel pedagogical and curricular framework is introduced, which is rooted in the cognitive and socio-emotional development of students. This shift in perspective seeks to create a more comprehensive and relevant educational experience.
- **Foundational Skills:** The policy places a heightened emphasis on fostering foundational literacy and numeracy skills during the primary education years. The objective is to provide students with a strong educational base upon which they can build further knowledge and skills.
- **Research and Development Focus:** The NEP 2020 places a greater focus on research and development within the field of education. This initiative is geared towards advancing the quality of education through well-informed strategies and practices.



SOURCE:

<https://www.thehindu.com/education/schools/board-exams-twice-a-year-class-11-12-students-to-study-2-languages-moes-new-curriculum-framework/article67226492.ece>

Q.1 Consider the following statements National Curriculum Framework (NCF):

1. The NCF has undergone five revisions, with the most recent one being in 2005.
2. The primary objective of the NCF is to bring positive changes to curriculum and pedagogy, in line with the vision of National Education Policy (NEP) 2020.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

ANSWER: C

Q.2 Consider the following statements National Curriculum Framework (NCF):

1. The NCF encourages students to study at least two native Indian languages in Classes 9 and 10.
2. The NCF emphasizes environmental education and sustainability across all schooling stages.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

ANSWER: C

Q.3 “National Curriculum Framework (NCF) and the National Education Policy (NEP) 2020 constitute crucial components of India’s educational landscape, working in tandem to bring about transformative changes.” Elucidate.

Rishabh

