

# PUBLICATIONS IN 1970-71

## AERONAUTICAL ENGINEERING

Title	Author	Journal ~
Aseismic design of structures in the inelastic range	N. C. Nigam	ZAMM 51, 245-254 (1971)
Gortler's series solution of laminar boundary layer equations with suction or injection	K. R. Menon	J. Aero. Soc. India 23, 59-61 (1971)
Jain	A. C.	J. Fluid Mech. 41, 653-654 (1970)
Approximate analytical solutions of boundary layer equations with suction	A. C. Garg	Int. J. Heat Mass Transfer 14, 279-292 (1971)
Corrections to Symm's results for this, yawed wedges	N. L. Arora	J. Eng. Mech. Div. A. S. C. E, EM5 687-709 (1970)
Laminar boundary layer on a flat plate at low R. Prandtl numbers	Narsimha Afzal	Proc. 4th symp. on E.Q. Engg. Roorkee 1; 262-265 (1970)
Yielding in framed structures under dynamic loads	N. C. Nigam	

Title	Author	journal
<b>CHEMICAL ENGINEERING</b>		
Self Diffusion of Ions inside Ion Exchange Resins	M. Gopala Rao M. M. David	Trans of I. I. Ch. E. Vol. 12 No.1, p 1-6, (1970)
Study of Collisional Life Time of 001 Level of $CO_2$ with a Q-switched $CO_2$ Laser	V. S. Rao Y. V. C. Rao D. R. Rao	4th National Symposium on Combustion, December, 1970
Ideal Gas Thermodynamic Properties of Xenon Compounds	S. A. Kudchadker A. P. Kudchadker	Proc. Indian Academy of Sciences, Vol. LXXIII, No.5, Sec. A." 1971
Ideal Gas Thermodynamic Properties of Chlorine, Bromine and Iodine Pentafluorides	A. P. Kudchadker S. A. Kudchadker P. M. Agarwal	Ind. J. of Chern. Vol. 9, No.7, 1971
Effect of Molecular Size on Excess Function	M. Dutta	I. J. Ch. E. Trans, July 1971
The Limiting Behaviour of the Turbulent Transverse Velocity Component Close to a Wall	K. K. Sirkar T. J. Hanratty (Univ. of Ill.)	J. Fluid Mech. (1970) Vol. 44, part 3, pp. 605- 614
Relation of Turbulent mass transfer to a wall at high Schmidt numbers to the Velocity field	-do-	J. Fluid Mech. (1970) Vol. 44, part 3, pp 589- 603
Two-Phase Flow Through a Non-Circular Capillary at Low Reynolds Numbers .	A. K. Singhal W. H. Somerton (Univ. of Calif.)	J. of Canadian Petroleum Technology, July- Sept. 1970
. Study of Pore and Matrix Anisotropies of Porous . Rocks	W. H. Somerton R. Masonheimer A. K Singhal	Proc., 2nd International Congress on Rock Mechanics, Belgrad, Yugoslavia, Sept. 1970

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On the Mass Distribution Model Populations	for Cell G. Subramanian D. Ramkrishna A. G. Fredrickson H. M. Tsuchiya	Bulletin of Mathematical Biophysics, Vol. 32, 1970, P 521-537
On the Solution of Statistical Models of Cell G. Subramanian Populations	D. Ramkrishna	Mathematical Biosciences. Vol. 10, 1971, p. 1-23
Solution of Population Balance Equations	D. Ramkrishna	Chemical Engineering Science. Vol. 26 1971
The Necessity of Including Structure in Mathematical Models of Unbalanced Microbial Growth	A. G. Fredrickson D. Ramkrishna H. M. Tsuchiya	Chemical Engineering Symposium Series Vol. 108, 1971, P 53-59
Pressure Drop in Archimedian Spiral Coils	C. V. Seshadri Shaukat Ali	IEE, July 1971
<b>Books and Review Articles:</b>		
Elements of Fluid Mechanics	S. V. Patankar C. V. Seshadri	Prentice Hall of India Ltd., (1971)
<b>Symposia Publications:</b>		
Solution of Population Balance Equations by the Method of Weighted Residuals	G. Subramania D. Ramkrishna	23rd Annual General Meeting of the I.I.Ch.E. at Hyderabad, (December, 1970.)
Vapor-Liquid Equilibria of Methanol-Methylene Chloride System at 550 mm Hg. Pressure	S. K. Chhotray A. P. K udchadker	Photographic Conference, Hindustan Photo Films, Ootacamund
A Pilot Plant for Mass Culture of AI~ae	C. V. Seshadri	All India Solar Energy Working Group, IIT-Kanpur, (Dec. 1970)

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1	Kinetic investigations of the reaction of Brilliant Green with alkalies. Influence of permittivity and temperature	S. S. Katiyar	Trans. Faraday Soc. 66, 2305 (1970)
2	Kinetic studies of the reaction of triphenylmethane dyes in acid and alkaline media I. Ethyl violet in alkaline media	S. S. Sinha S. S. Katiyar	J. Phys. Chem. 74, 1382 (1970)
3	Kinetic investigations of the reaction of brilliant green with alkalies. Influence of ionic strength	S. S. Katiyar	Bull. Chem. Soc. Japan, 43, 601 (1970)
4	Kinetics and thermodynamics of oxidation of Pr <sub>2</sub> O <sub>3</sub> and Tb <sub>2</sub> O <sub>3</sub> to non-stoichiometric oxides	S. Ramdas K. C. Patel	J. Chem. Soc. 64, (1970)
5	Electric transport in metal oxides	C. N. R. Rao.	Phys. Stat. Solidi 1a, 597 (1970)
6	Molecular orbital studies of the hydrogen bond	C. N. R. Rao G. V. Subba Rao	J. Chem. Soc. 1251 (1970)
7	Configuration; protonation and hydrogen bonding in secondary amides	A. S. N. Murthy S. N. Bhat C. N. R. Rao	J. Am. Chem. Soc. 92, 3544 (1970)
8	Infrared and Electronic spectra of rare earth Perovskites	A. S. N. Murthy K.G. Rao C. N. R. Rao	Appl. Spec. 24, 436 (1970)
9	Charge-transfer spectra of vapour phase iodine complexes	G. V. Subbarao J. R. Ferraro C. N. R. Rao	J. Mol. Spec., 33, 554 (1970)
10	Electronic spectroscopy of radical ions	C. N. R. Rao C. C. Chaturvedi S. N. Bhat C. N. R. Rao V. Kalyanaraman M. V. George	Appl. Spec. Revs. 3, 153 (1970)

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A spectrophotometric study of iron (III) p-cresotic acid chelate	S. S. Katiyar V. B. S. Chauhan	Jour. Indian Chern. Soc. <b>47</b> , 796 (1970)
Behaviour of structure-making and structure breaking solutes near temperature of maximum density of water	T. S. Sarma	J. Phys. Chem. <b>74</b> , 3547 (1970)
E. S. R. Investigation of some O-phenylenebis complexes of cobalt and nickel	P. T. Manoharan (dimethylar,sine) Max T. Rogers	J. Chern. Phys. <b>53</b> , 1682 (1970)
Mechanism of tetracyanonickelate formation from mono (amino carboxylate) nickel (II) complexes	P. C. Nigam . D. W. Margerum L. Coombs	Inorg. Chern. <b>9</b> , 2081 (1970)
Syntheses and solution equilibria of some nickel (II) chelates	T. S. Kannan A. Chakravorty	Inorg. Chern. <b>9</b> , 1153 (1970)
Hydrogen bonding and Isomerism in aryl-azo oximes	K. C. Kalia A. Chakravorty	J. Org. Chern. <b>35</b> , 2231 (1970)
Some observations on triazene I-oxide complexes of Bivalent nickel, palladium and copper	B. Behera A. Chakravorty	Inorg. Chern. Acta <b>4</b> , 372 (1970)
Stereochemical study of sodium-ammonia reduction of acyclic allenes	G. Nagendrappa R. K. Srivastava D. Devaprabhakara	J. Org. Chern. <b>35</b> , 347 (1970)
Recent progress in the hydroboration reaction (A Review) Hydroboration of diphenylketene	D. S. Sethi D. Devaprabhakara D. S. Sethi I. Mehrotra D. Devaprabhakara	J. Sci. Ind. Res. <b>29</b> , 2EG (1970) Tetrahedron Letters 2765 (1970)

Title	Author	Journal
Dimide reduction of allenes	G. Nagendrappa D. Devaprabhakara	Tetrahedron Letters 4243 (1970)
Hydroboration of medium-ring dienes. A convenient stereospecific synthesis of cis-cyclic Diols	I. Mehrotra D. Deveprabhakara	Tetrahedron Letters 4493 (1970)
Stereospecific cyclization of cis, cis-cyclononadiene to cis-hexahydroindane derivatives	G. Nagendrappa D. Devaprabhakara	Tetrahedron Letters 4607 (1970)
Plasma resonance in $\text{ThO}_2$ , $\text{VO}_2$ and $\text{NbO}_2$	C. N. R. Rao W. E. Wahnseidler J. M. Honig	J. Solid State Chem. 2,315 (1970)
Electrical transport in rare earth oxides	G. V. Subba Rao P. N. Mehrotra S. Ramdas C. N. R. Rao	J. Solid State Chem. 2, 377 ~1970)
$\text{Pm } 3_m - \text{Fm } 3_m$ transitions in alkali halides	M. Natarajan K. J. Rao C. N. R. Rao	Trans. Faraday Soc. 66, 2497 (1970)
Phase transition in silver halides	M. Natarajan C. N. R. Rao	J. Chem. Soc. A, 3087 (1970)
Electron-transfer mechanism in the reaction of benzene diazonium cation with iodide ion	P. R. Singh R. Kumar	Proc. Ind. Sci.: Congo Assoc. Part III, 210(1971)
Chemical and Spectroscopic studies in metal-beta diketones-a novel intermolecular charge-transfer system involving metal acetylacetonates (donor) and iodine (acceptor)	P. R. Singh R. Sahai	Austr. Jour. Chem. 23, 69 (1970)

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F.	Title	Author	Journal
	Chemical and spectroscopic studies in metal beta diketones-acetylation and formylation of chromium (III), 1, 3-diketones	P. R. Singh and R. Sahai	Indian J. Chem. 8, 178 (1970)
	Ultra violet absorption spectra of acetone and acetone-d <sub>6</sub>	C. N. R. Rao G. C. Chaurvedi H. S. Randhawa	Chem. Phys. Letters 7, 563 (1970)
	Distorted hydrogen bonds in water dimer	A. Goel A. S. N. Murthy C. N. R. Rao	J. Chem. Soc. A, 190 (1971)
	Electrical Transport in rare-earth ortho chromite, manganites and Ferrites	G. V. Subba Rao B. M. Wanklyn C. N. R. Rao	Intern. J. Phys. Chem. Solids 32, 345 (1971)
	Effects of urea-Guanidium class of protein denaturants on water structures: Heat of solution and proton chemical shift studies	D. Subramanian E. S. Sarma D. Balasubramanian J. C. Ahluwalia	J. Phys. Chem. 75, 1515 (1971)
	Partial molal enthalpies, excess partial molal heat capacities and structural effects of BuOH and NaBr in highly aqueous binary solvent mixtures	R. K. Mohanty T. S. Srirama S. Subramanian J. C. Ahluwalia	Trans. Faraday Soc. 67, 305 (1971)

#### Books and Review Articles

/ Modern Aspects of Solid State Chemistry (Book)	C. N. R. Rao (Editor)	A. Plenum Press, New York & London (1970)
( High resolution nuclear magnetic resonance in inorganic chemistry	Chakravorty	A chapter on the book entitled, "Spectroscopy in inorganic Chemistry, Editors: C. N. R. Rao and J. R. Ferraro Academic Press 1970

<b>Title</b>	<b>Author</b>	<b>Journal</b>
Spectroscopy in Inorganic Chemistry (Book)	C. N. R. Rao J.R. Ferraro (Editors) 1970	Academic Press, New York & London
Basic Physical Chemical data (Book)	L. S. Kothari C. N. R. Rao	Affiliated East-West Press, New Delhi 1970
Spectroscopy in Inorganic Chemistry Vol. II (Book)	C. N. R. Rao J.R. Ferraro (Editors) (1971)	Academic Press, New York, and London

### **Symposia Publication**

Allene-meta] (silver I), copper (I) and mercury (II) complexes  
 G. Nagendrappa  
 R. Vaidyanathaswamy  
 D. Devaprabhakara  
 Third Internl. Symp. on org. metallic compds. Proceedings D-4 (1970)

### **CIVIL ENGINEERING**

The Direct step method in Gradually varied Flow	K. Subramanya	Irrigation and Power, CBIP (India), Vol. 27, NO.4, Oct. 70 pp 401-408
Rheological Behaviour of Bentonite Clay-water Suspension	K. Subramanya M. R. Madhav	The Journal of Indian National Soc. of Soil Mech. & Foundation Engg. Vol. 9, No.4, Oct. 1970, pp 417-426
Effect of clay on the accuracy of the Hydrometer Method	M. R. Madhav K. Subramanya	Sedimentology, Vol. 16, March 1971, pp 119-123
A study on air Stripping of Ammonia	G. Ramprasad A. V. S. Prabhakara	Environmental Health. Vol. 13, No.2, Page 105, 1971 Rao

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Structural Behaviour of Bituminous Concrete over-  
Cement Concrete Pavement

Highway Research Board, Special Report  
116, pp 215-226

Nomograms for Computations of Wheel Road  
Pavements

Journal of Indian Roads Congress, Vol. 33, NO.2

Application of Limit Design to R. C. Building  
Structures

Proceeding of Institution of Civil Engineers  
London, No. (XVII), Dec. 1970

Model for Machine-pile Foundation-Soil System

N. S. V Kameswara Journal of the SM Division, Proc: ASCE, ,  
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Variational Approach to Beams on Elastic Foundations

Laterally Loaded piles in Elastic-plastic Soil

Madhav Foundations, Japanese Society of  
N. S. V. Kameswara SMFE, June, 1971, pp 1.15  
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Journal of the EM Division, Proc. ASCE April  
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Reissner's plate Equation in Polar Coordinates

N. S. V. Kameswara  
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Y. C. Das  
M. Anandkrishnan

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N. S. V. Kameswara pp 141-145 Rao

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Journal of AIAA, Oct. 1970, pp 1798-1804



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Discussion of Numerical Method of Computing S, Surya Rao Flow Profiles (A paper by Ramanand Prasad, Paper No. 7005, Proc. ASCE, Jan. 1970)		Journal of the Hydraulics Division, ASCE, Vol. 6, paper 7439, August 1970
Discussion of Designing Sill way Crests for High- S. Surya Rao ~ead Operation (A paper by John J. Cassidy)		Journal of the Hydraulics Division. ASCE, Vol. 96, papa 7641, November 1970
Variational Approach to Beams on Elastic Foundations	N. S. V. Kameswara Rao Y. C. Das M. Anandkrishnan	Journal of Engineering Mechanics Division, ASCE, Vol 97, pp 1-39, April 1971
Non-Linear Consolidation Characteristics of Thick T. Kuppusamy Clay Layer with General Variation of Parameters	M. Anandkrishnan	Indian Geochemical Journal. Vol. 1, No. 3, pp 237-248. July 1971
Role of Active Clay in the Shrinkage Behaviour in Multicomponent Clay Sand Systems	K. V. G. K. Gokhale M. Anandkrishnan	Soils and Foundations Journal of the Japanese Society of Soil Mechanics and Foundation Engineering. Vol. 10, pp 60-66
Depth Iependent Permeability Ratio	P. Basak M. Anandkrishnan	Soil Science (U.S.A.), Vol. 109, pp351-354, July 1970
Discussion on Settlement of . Building on Deep Compressible Soil	M. Anandkrishnan T. Kuppuswamy	Journal of Soil Mechanics and Foundations Division, ASCE, Vol. 96, pp 772-773
Studies on thermal dissociation of carbonate minerals	K. V. G. K. Gokhale t. C. Rao	Journal of Thermal Analysis, Hungarian Academy of Sciences, Budapest, V. 2, 1970, 83-87
Effect of solid-solution on thermal stability of Zircon	S. S. Ramakrishnan E. C. Subba Rao	Materials Research Bulletin (U. S. A.) Vol. 5, 11, 965-969, Nov. 1970

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Buckling of Fully and Partially Embedded Piles	A. Siva Reddy A. J. Valsangkar	Journal of the Soil Mechanics and Foundations Division, Proc. ASCE, Vol. 96, No. SM6 Proc. Paper 7688, Nov. 1970, pp 1951-1965
Generalized solutions for Laterally Loaded Piles in Elastoplastic soils	A. Siva Reddy A. J. Valsangkar	Soils & Foundations, The Japanese Society of Soil Mechanics & Foundation Engg., Vol. 10, No.3, Sept. 1970, pp 60-88
Simulation Analysis for Estimation and Control of Floods	S. Ramaseshan	Irrigation and Power, July 1970, pp 263-269
Stochastic Modelling of Storm Precipitation	S. Ramaseshan	Art 24. Mordoc Hydrology, Vol. II, No.2, June. 1971
Discrete Methods in the Analysis of Plate Systems	J. K.	Journal of Aeronautical Society of India, Feb. 1971 pp 22-13
Sridhar Rao	P. Paramasivam	Transactions, Engineering Institute of Canada, Engineering Journal, Montreal, Aprl 1971
Discrete Flexural Ana(ysis of Strip Flat Slabs with Fixed Columns	P. Paramasi vam J. K. Sridhar Rao	
Modern Trends in Minimum Weight Plastic Design of Sted Structures	J. K. Sridhar Rao O. B. Abhat C. V. S. K. Rao	Civil Engineering and Public Works Journal, Bombay, May-June 1971
Role of active clay in the shrinkage behvaiour in multicomponent clay-sand systems	K.V.G K. Gokhale	Soil & Foundations (Japanese Journal of M. Anandakrishnan Soils Mech & Foundation Engg. Society) Vol. X, No.3, 1970, 91-9J.

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<b>Symposia Publications:</b>	General Report Yudhbir	Water Resources Symposium IISco Bangalore, 1971
Geochemical basis for understanding engineering behaviour of clays		
Ground Water and its exploration	K. V. G. K. Gokhale	Indian Geochemical Society, Patna, Special Symposium
Flow over Side-weirs		
*On the Accelerated Motion of a Sphere in a Viscous Fluid	K. Subramanya S. C. Awasthy	International Symposium on Hydrometry, Koblenz, W. Germany Sept. 1970
□ An Analytical Study of Sedimentation	N. S. V. Kameswara Rao S. P. Dasgupta	Proc. Annual Conference of Aeronautical Society of India, Kanpur, FeD. 1971, Paper No. 71fA, II 8/104
Characteristics of stream erosion in Himalayan region of India	N. S. V Kameswara Rao S. P. Dasgupta	P roc. Symposium in Water Resources Bangalore, May 1971, pp E 8-1-E g-6 Prototype Equipment Development
Geochemical aspects of sedimentation at a fluvial mouth	B. C. Raymahashay	Abstract Proc. International Symposium on Hydro-geochemistry and Bio-geochemistry, Tokyo. September. 1970, p. 8
A Suggested Programme in Development of Technology	B. C. Raymahashay	Proc. Symposium on Water Resources I.I.Sc. Bangalore May, 1971 pp .. E 5-1-7
	J. K. Sridhar Rao	Seminar on Reorientation of Technical M. Anandakrishnan Education for Industrial Development in the Decade 1970-80, Madras. Feb. 1971

- Equipment for the study of the phenomenon of vibrofloatations.
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Design Charts for Mat Foundations	M. Anandkrishnan T. Kuppusamy N.R. Krishnaswamy	Proceedings of the Symposium on Shallow Foundations Indian National Society of Soil Mechanics and Foundation Engineering. Bombay, Vol. 1, p. 133-141, Dec. 1960
The Effect of Friction on the Dynamic Response of Soil Foundation Systems	M. Anandkrishnan T. N.	Proc. of Second S. E. Asian Conference on Soil Engineering, Singapore, YoU, p. 107-119, June, 1970
Consolidation under Construction Type of Loading	M. Anandkrishnan T. Kuppusamy	Proc. of Second S. E. Asian Conference on Soil Engineering Singapore, Vol. 1, p. 335-345, June, 1970
Buckling of fully and Partially Embedded Tapered Piles	A. Siva Reddy A. J. Valsangkar G. C. Mishra	Proceedings. IVth Asian Regional Conference on Soil Mechanics and Foundation Engineering, Bangkok. July 1971
General Report on Session IV, Hydrology,	S. Ramaseshan	40th Annual Research Session of the Central Board of Irrigation and Power, June, 1970
A tWQ Parameter, optimal time in variant linear system model for prediction of run off from Small Watersheds	P. B. S. Sarma	Seventh Symposium on water resources, by the Civil and Hydraulics Engineering Department, Indian Institute of Science, Bangalore-12, May 11-16, 1971
Effects of urbanization runoff	A. R. Rao J. W. Delleur	52nd Annual meeting of the American Geophysical Union, Washington, April 16-22, 1971
Sulphurdioxide Pollution near Chemical industry in urban area.	C. Venkobachar Rao	Seminar on Environmental Pollution in T. H. Venkatachalam Madras Sponsored by UNICEF in collaboration with 'The 77 Society' and I. I. T. Madras

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<b>Title</b>	<b>Author</b>	<b>Journal</b>
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Aerial Photographic Exploration of Ground Water	Yudhbir	Proc. Water Resources Symposium, IISc. Bangalore, 1971
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Influence of porosity on the kinetics of reduction of hematite by hydrogen	A. Ghosh	J. Electrochem. Soc. (New York), 117 (1970), 1024
Thermodynamics of liquid copper silver alloys by the solid electrolyte cell method	A. Ghosh	J. I. S. I. 208, 298, 1970
Some aspects of the deformation in an age-hardened austenitic steel	L. K. Singhal Y. R. Mahajan	Phys. Stat. Sol. (a) 3, K 116, 1970
Critical resolved shear stress for the movement of partial dislocations in material containing ordered precipitates	L. K. Singhal	Met. Trans. 1, 1044. 1970
Generation of dislocations in a Precipitation hardened alloy	L. K. Singhal M. L. Vaidya	Scripta Metallurgica, 4, 953, 1970
Shear Modulus Interaction in ordered, Cu <sub>3</sub> Au alloy	Y. R. Mahajan	Mat. Sci. and Engg., 7, 175, 1971
Comments on Serriated Yielding in an agehardened aluminum base alloy	L. K. Singhal G. L. Mishra	

Title	Author	Journal
Stress Dependence of activation energy for creep deformation of Nimonic PE 16 at 650°C	L. K. Singhal	Scripta Metallurgica <b>5</b> , 9, 1971
Yield Strength of dispersion hardened bodycentred Fe- ThO <sub>2</sub>	L. K. Singhal	Int. J. Powder Met., January 1971
Effect of the nature of imperfections on M <sub>23</sub> C <sub>6</sub> precipitation	L. K. Singhal	Metallurgical Transactions
Effect of solid solution on thermal stability of zircon	S. Ramakrishnan E. C. Subbarao K. V. G. K. Gokhale	Met. Res. Bull. <b>5</b> , 965-972, 1970
Monoclinic-Tetragonal Phase Transition in Zirconia : Mechanism, Pretransformation and Coexistence	R. N. Patil E. C. Subbarao	Acta Cryst. A26, 535-542 (1970)
Mossbauer studies on lead zirconate TitanateStannate	V. S. Sundaram E. C. Subbarao	J. Phys. Soc. Japan 28 Suppl. 134-136 (1970~)
Bismuth Phosphate Glasses	A. N. Tiwari E. C. Subbarao	J. Am. Ceram. Soc., 53, 258-261 (1970) Chapter 5 in Modern Aspects of Solid
Dielectric Properties	E. C. Subbarao	State Chemistry, ed. C. N. R. Rao, Plenum Press N. Y. 1970
The Effect of Zinc and Silicon on vacancy diffusion in aluminium	T. R. Ramachandran	Philosophical Magazine
Thermodynamic analysis on the structural anomaly in gold-tin alloys	T. R. Ramachandran	Met. Trans. October, 1971 in liquid

Title	Author	Journal
<b>Symposia Publications :</b>		
Computations of Theoretical free-settling characteristics for spherical particles	A. K. Biswas	IXth International Mineral Processing Congress Prague, June 1970, Proceedings pp 125-133

### PHYSICS DEPARTMENT

Exact Optimal Indices in the Resonance Region	D. C, Khan	Am. J. Phys, <b>38</b> , 1258' (1970)
Cps-Quadrupole Resonance in $\text{Ca}(\text{ClO}_4)_2$	A. Mahendra	
	D. V. Kumar	Physics Status Solidi, March 1971
$27t\text{-}X2_n$ system of $^{14}_n\text{78S}_e$	B. D. Nageswara	
	D. V. Kumar	
New Electronic Emission from $\text{SiF}_2$	K. V. Subba Ram	Jour. of Mole. Spect. <b>36</b> , 163 (1970)
The Crystal Structure of Bis (H-pyrole-2-alimine) Cu II	D. Ramachandra Rao	
The Crystal and Molecular Structure of Bis (1-Methyl-3-Orthochlorophenyl triazene-1-oxide) Co II	D. Ramachandra Rao	J our. of Mole. Spect. <b>34</b> (1970)
Reaction Matrix Calculation for the Absorption of Pions followed by single Nucleon Emission	R. Tewari	Acta Crystal!. B
	R. C. Srivastava	
	G. L. Dwivedi	Acta Crystal!. B
	R. C. Srivastava	
	R. S. Kaushal	Phys. Letts. <b>31B</b> , 637 (1970)
	Y. R. Waghmare	

Title	Author	Journal
On the Relative Strength of Central, Spin-orbit and Tensor parts of Sussex Interaction	I. Kakkar Y. R. Waghmare	Phys. Rev. 2, 1191 (1970)
Configuration Mixing Calculations in HartreeFock Representation	I. Kakkar G. K. Mehta Y. R. Waghmare	Nuc. Phys. A 156 199 (1970)
Nuclear Energy. Gap calculations using Realistic and Delta-function Forces	M. C. Jain Y. R. Waghmare	J. Phys. A3 274 (1970)
Effective Interaction and level structure of nuclei with the free nucleon interaction	M. C. Jain G. K. Mehta Y. R. Waghmare	Phys. Rev. March 1971
Electron Paramagnetic Resonance of Mn <sup>2+</sup> in ferrous ammonium sulphate hexahydrate	R. Janakiraman	Chem. Phys. Letts. 4, 550 (1970)
Electron Paramagnetic Resonance of Mn <sup>2+</sup> in Ni (CH <sub>3</sub> COOH)·4H <sub>2</sub> O and NiSO <sub>4</sub> ·7H <sub>2</sub> O single crystals	G. C. Upreti	
Ferroelectric Phase Transition in NaNO <sub>2</sub> as studied by EPR		
Electron Paramagnetic Resonance of Mn <sup>2+</sup> in the Ferroelectric Phase of NaNO <sub>2</sub>	R. Janakiraman	J. Chem. Phys. 54, 2336 1971
Forbidden Hyperfine Transitions Along the Principal Axes in the EPR of low symmetry complexes	G. C. Upreti S. D. Pandey	Phys. Stat. Sol. (a) 1, K69 (1970)
Scattering of Phonons from an Off-centre impurity	M. Yussoufi G. C. Upreti S. D. Pandey	Proc. Ind. Acad. Sci. 76A, 85 (1970)
Anomalous Transmission of Particles through Perfect Crystals	A. P. Pathak G. C. Upreti S. D. Pandey M. Yussoufi G. C. Upreti	Phys. Rev. B2, 4723 (1970) Phys. Letts. 33A, 504 (1970)

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Title	Author	Journal
N Charge Exchange Polarisation in Veneziano Model	J. Maharana R. Ramachandran	Phys. Rev. D2, 2713 (1970)
Scale Invariance and External Mass Dependence of Regge Residue in a Multi-Veneziano Model	R. Ramachandran	Nucl. Phys. B26, 1335 (1971)
A note on Adler's Test for <b>CVE</b> in Weak Interactions	H. S. Mani	Nuovo Cim. Letters 4, 45 (1970)
Violation of Adler Theorem in Scalar Theories of Weak Interaction	H. S. Mani J. S. Vaishya	Nucl. Phys. B24, (1970) Phys. Letts. 33A, 463 (1970)
Positron Lifetimes in Some Ionic Compounds	K. P. Singh R. M. Singru	Phys. Letts. 32A, 10 (1970)
Positron Annihilation in Defect KCl Crystals	K. P. Singh R. M. Singru M. S. Tomar C. N. R. Rao	J. Phys. (Lond. B) 4, 261 (1971)
Positron Lifetime Studies in Organic Media	K. P. Singh R. M. Singru C. N. R. Rao	Phys. Letts. 34A, 377 (1971)
Positron Lifetimes in Rare Earth Oxides	K. P. Singh R. M. Singru V. G. Kulkarni R. G. Lagu	J. Phys. (Lond.) C 3, 1225 (1970)
Dynamics of Point Defects in Crystals	M. Sachdev	J. Phys. (Lond.) C 3, LIB (1970)
Correlation Function of Point Defects	J. Mahanty	

Title	Author	Journal
The Koster-Slater Method for F centre levels	K. Krishan J. Mahanty	J. Phys. (Lond.) C 3, LI13 (1970)
Optical absorption of Co <sup>2+</sup> in zinc acetate dihydrate single crystal	P. Venkateswarlu P. A. Narayana	J. Chem. Phys. 53,281 (1970)
EPR of VO <sup>2+</sup> in nitrate single crystals : NH <sub>4</sub> NO <sub>3</sub> and Ba (NO <sub>3</sub> ) <sub>2</sub>	K. V. Subba Rao M. D. Sastry P. Venkateswarlu	J. Chem. Phys. 52, 4082 (1970)
Electronic absorption of Ni <sup>2+</sup> doped in NH <sub>4</sub> Cl	P. A. Narayana P. Venkateswarlu	J. Chem. Phys. 52, 5159 (1970)
Vacuum Ultraviolet Spectrum of iodine molecule	P. Venkateswarlu	Can. J. Phys. 48, 1055 (1970) 1. Chem. Phys. 54, 496, 1971
EPR of Cd <sup>3+</sup> in some Rare earth trifluoride single crystals Angular variation of Intensities of forbidden lines in MgO : Mn <sup>2+</sup> N. Sastry	V. K. Sharma P. A. Narayana K. V. L.	J. Chem. Phys. 54, 2281 (1971) Spectrochim. Acta. 26A, 845 ( 1970)
Planar vibrations in the Ground State from an Analysis of 2699 Å Electronic Band system of Chlorobenzene		Applied Spectroscopy 24, 292 (1970)
The 2699 Å Electronic Band System of Chlorobenzene. The planar Modes in the Excited State		Chem. Phys. Letters 4, 15 (1970)
H. D. Bist V. N. Sarin A. Ojha' Y. S. Jain		
H. D. Bist V. N. Sarin A.Ojha	Y. S. Jain	
The Molecular Geometries of Chlorobenzene in the Vapour Phase	A. L. Verma H. D. Bist	

Title	Author	Journal
PR Separations and Relative Q-branch Intensities in Infrared Band Contours of Mono-substituted Benzenes	V. N. Sarin M. M. Rai H. D. Bist D. P. Khandelwal	Chem. Phys. Letters 6,473 (1970)
Vibrational Spectra of Uranyl Compounds in Solutions	H. D. Bist	Ind. J. Chem. 8, 1 n (1970)
Infrared Spectrum of Potassium Oxalate Monohydrate at Liquid Nitrogen Temperature	V. S. Tomar H. D. Bist D. P. Khandelwal	Applied Spectroscopy 24, 0000 (1970)
Fluctuation Theory of Dilute Magnetic Alloys	T. V. Ramakrishnan	Phys. Rev. 31, 38, )1 (1970)
Localized Dynamic Perturbations in Metals	E. Muller Hartmann T. V. Ramakrishnan G. Toulouse	Phys. Rev. B 3, 1104 (1971)
Inelastic Effects in Scattering from Metal Surfaces	-do-	Solid State Communications 9, 99 (1971)
Screening of a fixed charge in electron liquid	A. P. Pathak	Phys. Rev. 82, 3021 (1970)
Screening of a fixed charge in metals	A. P. Pathak	Phys. Stat. Vol. 43, 551 (1971)
Emission of charged particles from crystals	A. P. Pathak M. Yussouff	Phys. Rev. 83, 3702 (1971)
On Separating sheet crystals of silver halides stuck to substrates	D. Saran A. S. Parasnis	J. Phys E: Sci. Instrum. 3, 580, 1970
<b>Symposia Publications</b>		
Lectures on Electron Theory of Alloys	J. Mahanty	Proc. Winter College of Imperfect Crystalline Solids, Trieste 1970 (IAFA Vienna 1970)
Lattice Dynamics	J. Mahanty	-do-

<b>Title</b>	<b>Author</b>	<b>Journal</b>
Electron Paramagnetic Resonance of $\text{Cu}^{2+}$ in CsCl single crystal	P. Venkateswarlu B. V. R. Chowdry S. K. Banerjee	Proc. Ind. Acad. Sci. <b>71A</b> , 49 (1970)
Optical absorption of $\text{Co}^{9+}$ : $\text{NH}_4\text{Cl}$ : Phase transformation studies	P. A. Narayana P. Venkateswarlu	Proc. Ind. Acad. Sci. <b>72</b> , 249 (1970)
Surface energy anisotropy of silver chloride	A. S. Parasnis	Proc. Coaf. Photographic Science Ootacamund

### **Review Articles**

(i) Published in the book "Modern Aspects of Solid State Chemistry" Edited by C. N. R. Rao, Plenum Press, New York (U. S. A.) 1970.

(1) Lattice Dynamics - J. Mahanty

(2) Neutron Diffraction and Solid State Properties

(3) Magnetostriction in Materials (4) Positron Annihilation in Solids (5) Dislocations and Solid State Reactions

D. C. Khan

R. K. Ray

R. M. Singru

### **Others**

(ii) Nuclear Spin Relaxation B. D. Nageswara Rao by Double Resonance

A. S. Parasnis

Advances in  
Magnetic Resonance (1970)

# SUMMER SCHOOLS, SHORT/INTENSIVE COURSES, CONFERENCES

## Symposia, Seminars and Colloquia

The following sequential summer schools, advanced/intensive courses, seminars and conferences were conducted during the period involving a sizeable number of participants from a cross section of industries, educational institutions and other organizations in India and abroad:

### AERONAUTICAL ENGINEERING.

1. Characteristics of a gas turbine with C. S. Moorthy dissociating gas as the working substance
2. Asymmetric flow in a compressor C. S. Moorthy
3. Flame stabilization in the wake of airfoils and plates R. K. Sullerey
4. Transition phenomena in the creep of thick walled cylinder under internal pressure and rotating disc N. G. R. Iyengar  
P. N. Murthy
5. Shock structure of a monatomic gas with M. Krishnamurthy ionization S. M. Ramachandra
6. Shock structure of a diatomic gas with T. G. Pai vibrational relaxation S. M. Ramachandra

7. Hypersonic Rarefied flow past the sharp leading edge of a flat plate A. C. Jain  
Prabhamani Patel (Mrs.)
  8. Optimum design for random vibration environment N. C. Nigam
  9. Reporters Summary Session on Vibration analysis N. C. Nigam
  10. Ground motion simulation during earth- quakes N. C. Nigam
- f*
11. Probabilistic design for earthquakes N. C. Nigam
  12. Laminar compressible boundary layer flow of a low Prandtl number fluid with arbitrary thermal properties Noor Afzal
  13. Asymptotic theory of heat transfer in turbulent shear flows Noor Afzal  
K. Yajnik
  14. Asymptotic theory for fully developed turbulent pipe flow at large Reynolds numbers K. Yajnik

#### CHEMICAL ENGINEERING

1. Fourth National Symposium on Combustion (December 1970) V. Subbarao
2. A short course on "Computer Applications in Chemical Engineering" (October 1970.) D. Ramkrishna A.  
P. Kudchdkar
3. A short course on "Strategy of Process Design" M. Gopala Rao
4. An Advanced Summer School on Technical Economics for Chemical Engineering Educators (Sponsored by I. S. T. E.) M. Gopala Rao

#### CHEMISTRY

1. Some Recent advances in chemistry of steroids D. Ranganathan (Mrs)

## ANNUAL REPORT

- |  |  |
|--|--|
| 2. Metal ion catalysed rearrangements<br>Vacuum UV spectra of Iodine Bromine<br>Molecules-Rydberg States | G. Nagendrappa<br>and P. Venkateswarlu               |
| 5. Photochemistry without light  | R. K. Singh  |
| 6. The unit of life  | A. V. S. Prabhakara Rao                              |
| 6. Allene oxide-cyclopropanone valence <i>iso</i> -<br>merisation  | S. N. Murthy   |
| 7. The chemistry of some 10-7t Electron<br>R. C. Munjal monocycles                                       | R. C. Munjal   |
| 8. Martensitic Transformation of Oxides  | E. C. Subbarao                                       |
| 9. Observable Cations  | G. Mehta   |
| 10. Chemistry of Cyclononadienes   | D. Devaprabhakara                                    |
| 11. Chemistry of Some Mesoionic Compounds  | B. S. Holla  |
| 12. A Versatile Aldehyde Synthesis   | N. C. Joshi  |
| 13. Vinyl Cations  | M. M. Bhagwat  |
| 14. Neutrinos from the Sun   | Prem Sagar   |
| 15. Dielectric Polarisation and loss   | A. K. Shukla   |
| 16. Some Aspects of Solvation Spectra  | K. G. Rao  |
| 16. Catalytic Homogeneous Hydrogenation of<br>Unsaturated Compounds using Rh (I)<br>complexes            | I. P. Khullar  |
| 18. Spectroscopic Studies on some 1:3 di-<br>their Metal Complexes                                       | G. A. Webb (UK)                                      |
| 19. Polypeptide Chain Conformations in<br>Solutions  | D. Balasubramanian                                   |
| 20. Mossbauer Effect and Biological Applica-<br>tions  | G. Lang (UK)   |
| 21. Some Aspects of Terpenoid Chemistry  | S. C. Bhattacharya, I.<br>I. T., Bombay              |
| 22. Planar Carbon  | S. Ranganathan                                       |
| 22. Electronic Phase Transitions at High Pressure  | A. Jayaraman-<br>Bell Telephone<br>Laboratories, USA |
| 24. Exchange Phenomenon and Magnetism  | D. C. Khan   |

SUMMER SCHOOLS/SHORT/INTENSIVE COURSES,  
CONFERENCES. 147

25. Some 4-Quinoline-3-carboxylates with R. H. Mizzoni  
properties CIBA, USA
26. Noblesse Oblige: Cavendish to Bartlett D. A. Devenport  
Purdue University, USA
27. Some Aspects of Hems Synthesis of Diphenyl S. Swaminathan,  
Ethers University 'of Madras
28. Single Electron Transfer Mechanism In P. R. Singh  
Nucleophilic Substitutions
29. Some 4-Quinoline-3-Carboxylates with R. H. Mizzoni  
Anticidal Properties CIBA

SHORT COURSES

1. Modern Physical Methods in Chemistry P. T. Narasimhan  
(Dec. 10-24, 1970) C. N. R. Rao  
Sponsored by NCSE Winter School
2. Electronics Workshop For Chemists P. K. Ghosh  
(May 24-June 25, 1971)  
Sponsored by NCSE/NSF

CIVIL ENGINEERING

1. "Slope Stability" Research Staff (at the Kerala Yudhbir  
Engg. Research Institute. Peechi)
2. "Engineering Investigation Through Aerial Yudhbir  
Surveys", (local Kanpur Centre of Institute of  
Engineers, India)
- 3 "Contribution of Engineering Geology in the Yudhbir  
Understanding of Natural Behaviour of Soil  
and Rocks" (to the Faculty of Civil  
Engineering, Asian Institute of Technology,  
Bangkok., Thailand)
4. Intensive Course on Water Resources P. B. S. Sarma  
Revolution in October 1970 Convener
5. Geochemical Aspects of Ground Water B. C. Raymahashay  
Investigation.
6. Five invited lectures on «Minimum Weight M. P. Kapoor , Design"  
Roorkee University

7. Linear Programming and applications to M. P. Kapoor  
Ultimate Load Design" (IIT Kanpur)
8. "Microstructural investigation in SoilBeha- K. V. G. K. Gokhale viour  
Problems", (Motilal Nehru Regional  
Engg. College, Allahabad)
9. Pred,ictive Testing of Materials. (Attantri J. K. Sridhar Rao City.  
New Jersey, USA) .
10. Fibre-Reinforced Concrete, (Asian Insti- J. K, Sridhar Rao tute of  
Technology, Bangkok)
11. Statistics, Probability and Decision theory J. K. Sridhar Rao for  
Engineers, (Stanford University)

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## ELECTRICAL ENGINEERING

## Summer School

Third Summer Sequential School in Electrical Engineering

## Intensive Course

1. Intensive Course on Solid State Power Controllers and Frequency  
Converters.
2. Winter School in Solid State Devices.
- 3.' Winter School in Communication Satellite System Design.

## Seminars and Conferences

Communication Satellite System Design

## Symposia, SelUinars and Colloquia

1. "Recent Trends and Developments III C. R. Muthukrishnan Computer  
Language" (Bombay Chapter of  
the Computer Society of India on 1st  
July, 1971)
2. "Mini Computer Design" (Tata Institute C. R. Mutllukrishnan of  
Fundamental Research on 28th June,  
1971.)
3. Course on "Operations Research and C. R. Muthukrishnan Computer  
Methods" (August 26 to  
September 16. 1970.)

4. "Digital Systems Engineering" (in Sequential - C. R. Muthukrishnan School in Electrical Engineering, 10th May to 5th June, 1971.)
6. "Programming and OR applications" (in C. R. Muthukrishnan Advanced Summer School in Mechanical Engineering, 17th May to 5th June 1971.)
6. "Fortran Programming" and 'Numerical C. R. Muthukrishnan Analysis' (in 19th, 20th and 21st Intensive Courses on Computation, Nov. '70, March, '71 and July '71.)
7. A series of six invited lectures on "Pursuit- U. R. Prasad Evasion Problems" (at the School of Automation, Indian Institute of Science, Bangalore-12 during the Summer 1971.)
8. Economic Load Scheduling of Hydro- L. P. Singh Thermal System (Agra University Extension lecture at the Engineering College, Dayalbagh, Agra Sept. 1970)
9. Introduction to Dynamic programming L. P. Singh and its application to power System. (B.P.A. Portland (ORE) USA, March 1971.)
10. Economic-load Scheduling of Hydro- L. P. Singh thermal System using dynamic programming (B.P.A., Portland (ORE) USA, March 1971. )
11. Lecture on Programming in the short L. P. Singh Intensive course in Computer programming with Application to machine design (to "HEL engineers-Aug '71.)
12. 'Use of Gunn Oscillators as pump sources K. C. Gupta for parametric amplifiers', A paper presented at Symp. on Solid State Microwave Devices (Univ. of Roorkee, March 1971.)
13. 'Travelling Wave" Antennas' (Central K. C. Gupta Electronics Engineering Research Institute, Pilani July 23, 31, 1971.)

14. "Characterization of planar Transistors M. M. Hasan using Digital Computer". (the 14 Technical Convention of the Institution of Telecommunication Engineers (India), New Delhi during Jan. ' 71.)
15. Computer Aided Characterization of Planar M. M. Hasan Epitaxial Transistor. (Symp. on Electronic held at the IIT Madras during March 1971.)
16. Electrical and Electronics Technique N. S. Gehlot (Small-Industries Service Institute, Kanpur during May 1971.)
17. Identification of Systems (Regional Engineering College, Warangal on 21-5-1971.)
18. Radio Exploration of Space (Institution of Engineers, U. P. Section June 1971.)
19. Channel Characterisation (Winter School in Communication Satellite System Design, IITK in Dec. 1970-Jan 1971. )
20. Advanced software engineering, (Tata H. N. Mahabala Consultancy Services, Bombay.)
21. Symbol manipulation-(Seminar on Mathematics in Computer Research Department of Atomic energy, IIT Kanpur)
22. Programming for the intensive course on Computer methods in operations Research-(conducted jointly with Indian Institute of Management, Calcutta.)
23. Tuned Amplifier Stages, (presented at the S. Venkateswaran Department of Electrical Engineering Monash University, Australia, August 1970.)
24. Active R. C. Synthesis, (presented at the S. Venkateswaran Department of Electrical Engineering, Monash University, Australia, August 1970.)

25. Active R. C. Synthesis, (presented at the S. Venkateswaran Department of Electrical Engineering, Adelaide University, Australia, August 1970.)
26. Engineering Education in India, (presented S. Venkateswaran at the Department of Electrical Engineering, Adelaide University Australia, August 1970.)

### Seminar

1. Modern Aspects of Electromagnetics Raj Mitra  
Univ. of Illinois
2. Thin Film Technology in Micro-electronic A. V. S. Satya  
Development and Metal Semiconductor IBM  
Contacts
3. Curriculum Development in Electrical A. G. Jordan,  
Engineering (Carnegie-Mellon University, Carnegie-Mellon  
Pittsburgh) Univ., Pittsburgh
4. Fluctuation Phenomena and Noise in Gunn A. G. Jordan  
Devices Carnegie-Mellon  
Univ. Pittsburgh
5. Noise in Impact Devices and Systems A. G. Jordan  
Carnegie-Mellon  
Univ., Pittsburgh
6. Morphology of Organizations P. N. Rastogi
7. Some Aspects of Pattern Recognition by AdolfoGuzman-Arenas  
Computer Project MAC; MIT
8. Role of Epitaxial Growth in Modern Semi- M. S. Tyagi  
conductor Technology
9. Observations of Earth Resources from M. D. Grossi  
Aircraft and Spacecraft S. A. Observatory  
Cambridge, Mass
10. Radio Telescopes around the World N. C. Mathur
11. Introduction to the Problem of Absolute J. H. Taylor  
Stability II Sc Bangalore

12. Requisite Stability Theory J. H. Taylor  
II .Sc Bangalore
13. The Popov Criterion and Related Criteria J. H. Taylor  
II Sc Bangalore
- It** Nonlinear Time-Varying Systems; Cordu- J. H. Taylor  
neanu's Theorem and Applications II Sc Bangalore
15. History of Costing Theory . Ellie Roubine  
Univ. of Paris
- 16 Current Research Activities at the Hydro M. P. Sarma  
Quebec Research Institute
17. Biomaths J. N. Kapur
18. Statistical Characteristics of Atmospheric P. J. Joglekar  
Noise IIT Delhi
19. Thyristor Controlled Induction Motors K. M. Hebbar  
KREC .
5. 20. Digital Desk Calculator!> R. K. Gupta
21. Fault Diagnosis of Combinational Cellular S. C. Seth  
Arrays

#### HUMANITIES AND SOCIAL SCIENCES

1. Logic and Ontology (Centre for Advanced M. Mullick Study in  
Philosophy, Vishvabharti Santi  
Niketan, July 1971)
6. Mobility, Networks and charge' K. N. Sharma  
(Department of Anthropology, University of  
California. Berkeley)
3. Hindu Religion and Indian Civilization. K. N. Sharma (Centre for  
South Asia Studies, University  
of Minnesota, Minneapolis)
4. Is Indira Gandhi's Election Success a K. N. Sharma Masked Conflict  
Between Moral Tokenism  
and moral Rigorism. (Centre for South  
Asia Studies, University of Minnesota,  
Minneapolis)

6.

SUMMER SCHOOLS/SHORT/INTENSIVE COURSES,  
CONFERENCES

5. Resource Networks and Resource Groups K. N. Sharma In the Social Structure (in' the Department of Sociology, Case-Western Reserve University, Ohio)
7. Indian and Western Civilizations-A K. N. Sharma Comparison (in the Department of Anthro-pology, University' of Illinois, UrbJna)
7. Indian Caste System, The Changing Caste K. N. Sharma System, Hindu Religion and Society, Social Change in India, The Status of Women in India Seminars given (in the Department of Sociology, Winthrop College, South Carolina)
8. The Study of Technology and Social K. N. Sharma Change in Kota, Rajasth~n (held at the University of Minnesota, Minneapolis)
9. Choosing Alternative Projects-(Financial K. Prasad Aspects, Small Industries Service Institute~ Kanpur
10. Financial Management (Department of K. Prasad Mechanical Engineering, I. I. T. Kanpur)
- II. Survey of Research in Economics (held at K. Prasad Delhi, Feb. 1971 by the Indian Council of Social Science Research)
12. Role and Functions of ICSSR (at Banaras K. Prasad Hindu University, February 1971, organised by the Indian Council of Social Science Research, New Delhi
13. Viability of Industries (at Gandhian K. Prasad Institute of Studies, Varanasi)
14. Review of Psychology in India,-(ICSSR iri U. Kumar' Delhi in August)
15. Psychology of Learning and Training U. Kumar of Managers-(Small Industry Extension Training, Hyderabad)

16. Man-work management (National Institute U. Kumar of Community Developments in Hyderabad)
17. Development of curriculum for Poly- U. Kumar techniques (in Regional Institute of Technical Training, Bhopal)
18. Psychological Process underlying effective U. Kumar work performance (National Institute of Community Development Delhi)
19. Sensitivity Training Programme for Leadership Development (Delhi Junior Chamber)
20. Effective Performance for Productivity, U. Kumar and Creativity Organizations and Productivity (Mechanical Engineering Department in I. I. T. Kanpur)
21. 15 lectures delivered to the students in the U. Kumar Indian Railways School for Mechanical and Electrical Engineers in Jamalpur on Man-Machine Systems in July
22. Cybernetic Approach to Organisational Systems (Deptt. of Electrical Engineering, I. I. T. Kanpur)
23. Structure, function and process: the P. N. Rastogi Cybernetic Approach to Social Phenomena (American Cybernetic Society, Washington)
24. The Dynamics of Governmental Stability: P. N. Rastogi A Cybernetic Analysis; International Political Science Association on Qualitative Methods and Political Substances
25. The Theme of Alienation In Modern Drama. (Paper read at the XXI Session of the All-India English Teachers Conference)

## MATHEMATICS

## Seminars

1. Exact bounds for the continuous spectrum of certain non-definite partial differential Eigen value problems A. Pleijel
2. Stochastic integral equation of Volterra type B. L. S. Prakasa Rao
3. International Congress of Mathematicians held at France and the Conference on Analysis held in Finland: Univalent. spiral Functions R. S. L. Srivastava
4. On sum functions in a topological vectors space M. K. Singhal
5. Numerical solution of Laplace Equation R. D. Bhargava
6. Mathematics Education in Science and Technology A. C. Bajpai
7. Factorization theorems and invariant subspaces G. D. Lakhani
8. Dynamical and semi-Dynamical systems
9. Invariant sets, Minimal sets, Limit sets, Prolongation N. P. Bhatia  
N.P. Bhatia
10. Stability and Attraction
11. Liapunov Function and Structure stability N. P. Bhatia
12. Asymptotic, Almost periodicity and existence of Almost periodic solutions I N. P. Bhatia  
N. P. Bhatia
13. Asymptotic, Almost periodicity and existence of Almost periodic solutions II N. P. Bhatia
14. Perturbed Linear Systems
15. The coefficients of certain power series and Dirichlet series K. N. Das  
J. M. Anderson
16. Certain Banach spaces of analytic functions J. M. Anderson and a conjector for univalent functions
17. The range of Lacunary functions analytic J. M. Anderson in  $|z| < 1$
18. Growth Theorems for Entire functions J. M. Anderson

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|---|---|
| 19. Unified approach to matrization theorems  | S. A. Naimpally                                     |
| 20. Maximum likelihood estimation under constraints                                     | J. D. Borwankar                                     |
| 21. Intuitionist determination of dual spaces of certain spaces of functions            | Ashvini Kumar                                       |
| 22. Compactly packed Dedekind domains   | T. M. Viswanathan                                   |
| 23. Pseudometric approach to proximities  | P. L. Sharma  |
| 24. A fixed point theorem and its applications  | P. C. Das   |
| 25. Moments of order statistics   | P. C. Joshi   |
| 26. A systematic theory of sequence spaces In intuitionism                              | S. L. Shukla  |
| 27. Idempotent measures on locally compact semi-groups                                  | U. B. Tewari  |
| 28. Computations involving sparse matrices  | R. P. Tewarson                                      |
| 29. The coefficients of entire functions of slow growth represented by Dirichlet series | G. S. Srivastava                                    |
| 30. On the coefficients of an entire series   | G. P. Kapoor  |
| 31. Mathematics Education and Research in India   | J. N. Kapur   |
| 32. Biomathematics  | J. N. Kapur   |
| 33. Absolute summability  | T. Pati   |
| 34. Univalent functions   | V. D. Singh   |
| 35. Integral functions of several complex variables                                     | S. K. Bose  |
| 36. Categorical Topology (three lectures)   | S. P. Franklin                                      |
| 37. Applications of Mathematics to social sciences                                      | R. S. L. Srivastava                                 |
| 38. The generalized continuum hypothesis and its Intuitionist solution                  | Ashvini Kumar                                       |
| 39. Subinvariant integrals and Means on Topological semigroups                          | U. B. Tewari  |
| 40. Compliments in Finite groups  |   |
| 41. Spaces of High power  |   |
| 42. Intuitionist determination of dual spaces of certain catalogued linear spaces       | B. M. Puttaswamiah<br>A. K. Misra<br>S. L. Shukla - |

### Summer School

All-India Summer Institute in Mathematics (Analysis) was held at Indian Institute of Technology, Kanpur under the Directorship of Prof. R. S. L. Srivastava from 31st May to 11th July, 1971. It was sponsored by the University Grants Commission in Collaboration with the National Council for Science Education for Post-graduate college and university teachers to improve teaching of analysis and other related topics in Mathematics.

### MECHANICAL ENGINEERING

#### Summer School

III Sequential Summer Institute in Mechanical Engineering

#### Short Intensive Course

1. Intensive Course on design of Turbomachinery
2. Winter Institute on Phase Transformation

### METALLURGICAL ENGINEERING

#### Seminars

- |  |                              |
|--|------------------------------|
| 1. Solubility of Hydrogen in Zr-Nb Alloys                      | K. P. Singh P.               |
| 2. A Single-shot Derivation of the Grinding Laws               | C. Kapur                     |
| 3. Structure of Splat Cooled Materials.                        | T. R. Ramachandran H.        |
| 4. Oxidation kinetics in iron carbon alloys                    | D. Merchant                  |
| 5. Structural Anomaly in Liquid Gold-tin Alloys                | A. K. Jena                   |
| 6. Thin films Technology in Micro-Electronics Development      | A. V. S. Satya<br>IBM Corpn. |
| 7. Metal-Semiconductor Contacts: Schottky and Bardeen Barriers | A. V. S. Satya<br>IBM Corpn. |

#### Summer Schools

Advanced Summer School in Materials Science

#### Intensive Courses

Heat Treatment Principles-2 weeks

## ANNUAL REPORT

### Symposium. & Conferences

1. Powder and Sintered Products-organised by BARC
2. Conference on Process Metallurgy
- 3.<sup>v</sup> Kinetic Studies *using* solid electrolytes G. K. Bandyopadhyay *cell* at the Eighth Seminar on Electro- H. S. Ray chemistry Karaikudi, Nov. '70
4. Electrochemical Studies on Kinetics of Oxygen DissolutiOn in Molten Lead  
G. K. Bandyopadhyay  
H. S. Ray
5. On some secondary Effects, at the Annual Technical Meeting IIM, Roorkee, 1970  
I. K. Bandyopadhyay  
J. S. Ray
6. Pyromet. Sep. of Hf from Zr.  
S. Maiumdar  
H. S. Ray
7. Measurement of Diffusion Coeffl. of Oxygen *in* Lead  
G. K. Bandyopadhyay  
H. S. Ray

Dr. A. K. Biswas attended the Ninth International Mineral Processing Congress, Prague, Czechoslovakia, June, 1970 ..

### PHYSICS DEPARTMENT

#### Symposium. and Conferences

- Indo- U. S. Conference on Physics Education.  
Srinagar  
J. Mahanty  
P. Venkateswarlu
- XVI International Conference on High Energy  
Physics  
H. S. Mani
- Nuclear Physics and Solid State Physics  
Symposium (DAE), Madurai  
J. Mahanty  
P. Venkateswarlu  
B. D. Nageswara Rao  
D. Ramachandra Rao T.  
M. Srinivasan  
G. N. Rao  
R. N. Singru  
H~ D. Bist
- Annual Seminar on Crystallography, Madras  
Indian Science Congress, Bangalore  
R. C. Srivastava  
B. S. Mathur

## Seminars

SUMMER SCHOOLS/SHORT/INTENSIVE COURSES, CONFERENCES

Optical properties of semiconductors An	
Introduction to Nuclear Matter Ion	R. Sharan
channeling in semiconductors Laser	R. Rajaraman
scattering Raman effect Neutron stars	R. P. Sharma
Positron Annihilations in Solids	P. Venkateswarlu
Applications of variational principles	G. Mohan
Lasers & Masers	- R. M. Singru.
Lessons from Hydrogen atom A-	K. Krishna D.
N scattering	R. Rao
Nucleosynthesis and Neutron cross-sections	T. Dass
Teaching Physics through programmed instructions	Y. Prakash
Electron states in disordered alloys of Noble metals	Kondiah
K-mesic atoms	M. Yussouff
Physical Axiod	
Magnetism	M. M. Pant
Spin relaxation in liquids	
Gaint resonances and Isospin violation	Chatterjee
Spectrum of Elementary particles	P. Sharan
Geometrical Thermodynamics	P. K. Iyengar
Io.n channeling in solids	B. D. Nageswara Rao G.
IEED Intensity calculations	K. Mehta
Relativistic Quantum Mechanics	B. K. Agra wal
Laser pumped Masers	A. S. Parasnis
Nuclear Astrophysics	Anderson
Localised Collective electron transitions In solids	M. Yussouff
Conference on Photographic Science held at Ootacamund, April 1971	G. Mohan
	B. S. Mathur
	K. K. Sharma Y.
	R. Waghmare C.
	N. R. Rao
	A. S. Parasnis