

(AG203) FARM POWER AND RENEWABLE ENERGY SOURCES

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UNIT I

Sources of farm power -conventional & non-conventional energy sources. Classification of tractors and IC engines. Review of thermodynamic principles of IC (CI & SI) engines and deviation from ideal cycle. Study of engine components their construction, operating principles and functions.

UNIT II

Engine systems: valves & valve mechanism. Fuel & air supply, cooling, lubricating, ignition, starting and electrical systems. Study of constructional details, adjustments & operating principles of these systems.

UNIT III

IC engine fuels - their properties & combustion of fuels, gasoline tests and their significance, diesel fuel tests and their significance, detonation and knocking in IC engines, study of properties of coolants, anti freeze and anti-corrosion materials, lubricant types & study of their properties. Engine governing systems.

UNIT IV

Energy sources, Introduction, Classification, Energy from Biomass, Types of biogas plants, constructional details, Principles of combustion, pyrolysis and gasification, Types of gasifiers, Briquetting , Types of Briquetting machines, Wind energy, Types of wind mills, Constructional details and application of wind mills; Modern applications and future potential of renewable energy sources.

UNIT V

Solar energy, Solar flat plate and focusing plate collectors, Solar air heaters, Solar space heating and cooling, Solar energy applications / Solar energy gadgets, Solar cookers, Solar water heating systems, solar grain dryers, Solar Refrigeration system, Solar ponds, Solar photo voltaic systems, solar lantern, Solar street lights, solar fencing, Solar pumping systems.

TEXT BOOKS:

1. Ballaney, P.L. (1985). Thermal Engineering. Khanna Pulishers, Delhi.
2. Donnel Hunt. Farm Power Machinery and management. Iowa State University Press, Ames, USA.
3. Gill Paul, W., Smith James, H., and Ziurys Eugene, J. (1967). Fundamentals of Internal Combustion Engines. Oxford & IBE Publishing Company, New Delhi.
4. Gupta, R.B., and Gupta, B.K. (1987). Tractor Mechanic, Theory, Maintenance and Repair. Sathya Prakashan and Tech India Publications, New Delhi.
5. Jain, S.C., and Rai, C.R. (1984). Farm Tractor - Maintenance and Repair. Tata Mc Graw-Hill Publishing Company Ltd, New Delhi.
6. John Twidell and Tony Weir. (1986). Renewable energy resources. . E & F.N Spon Ltd., New York.
7. John Twidell and Tony Weir. (1986). Renewable energy resources. E & F.N Spon Ltd., New York.

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1. Liljedahl John, B., Casleton Walter, M., Turnquist Paul, K., and Smith David, W. (1951). Tractors and Their Power Units, . John Wiley & Sons, New-York.

2. Lysen, E.H. (1983). Introduction to Wind Energy. CWD, Netherlands.
3. Mathur, M.L., and Sharma, R.P. (1994). A Course in Internal Combustion Engines. Danpat Rai & Sons, Delhi.
4. Mathur,A.N and Rathore,N.S. Renewable energy and environment. Himanshu Publications.,Udaipur. Monga,G.S and Sanctis,V.J. Non-conventional Energy: Growth. Resources and policies.
5. Sukathme, S.P. (1996). Solar Energy. Tata McGraw Hill Publishing Company Ltd., New Delhi.