UPPSC Agricultural Engineering Syllabus

Paper-1

1. Fluid Machanics: Fluid properties, units and dimensions, mass, momentum and energy conservationprinciples: Special cases of Navier-stoke equation, vorticity. Flow of fluids in pipes and channels, frictionsfactors: Turbulence; instruments and measurement systems.
2. Heat and Mass Transfer: Thermal propertiesof materials units and dimensions steady state and transient heat conduction natural and forced convection; boiling, condensation, thermal radiation exchange; heat exchangers, heat-mass transfer analogy: Fickslaws, psychrometrics; analysis of heat and mass transfer processes: Instruments and measurments systems.
3. Surveying, Levelling and land Development: Linear measurements; different surveyingdevices and methods land grading and levelling; controuring and terracing earth work estimation, landand development budgeting earth moving machinery
4. Pumps: Design, construction, performancecharacterization. Selection, installation, Servicing and maintenance of reciprocating, centrifugal, gear, turbine, submersible, propeller, jet and lift pumps and hydraulic ram; renewable and non renewable power sources for pumps.
5. Process and food Engineering: Unit operation in post-harvest processing (cleaning, grading, drying, size reduction, evaporation, pasteurization, distillation) : Processing of foodgrains, animal feed, seeds, frutis & vegetables, flowers, spices, dairy products, eggs and meat, designof processing equipment and systems.
6. Storage and Handling Engineering: Changes in stored productsduring storage: Storage of food grains & their products, feed fruits and vegetables, flowers, spices, dairyproducts, eggs and meat, air right ventilated, refrigerated, modified atmosphere

and controlleed atmospherestorage systems; packaging, conveyors; design and management of storage and handling systems.

7. Rural Engineering: Buliding materials and their properties. Design of beams, slabs, columns andfoundations: Fencing: Planning and design of rural houses, farm roads, village drainage systems wastedisposal and sanitary structures, material and cost estimation in construction; integrated rural energyplanning and development: Rural electrification.

Paper-II

1. Thermodynamic and Heat Engines: Concept of energy temperature and heat Equation of State Lawsof thermodynamics; pure substances and properties; entropy. Boilers; boiler efficiency steam, engine andturbines; rankine, air standed otto, diesel and joule cycles, indicator diagrams; I C Engines
2. FarmPower: Sources of power on farm; farm power and agricultural productivity relationship; comparison oftractor/engine power with animal power, operation and constructional features of l. C. Engines. Varioussystems present in I C engines viz. Carburation, ignition cooling lubrication. Starting and electrical system, valves and valve timings; special features of diesel engines. Tractors; their classification, powertransmission, clutch, drawbar, three-point hitch. p. t. o belt and pulley: Tractor controls; tractor chassis, stability, trouble shooting, repair and maintenance of tractors, tractor testing economics of tractor utilization, small tractors and power tillers: Their economics and suitability
3. Farm Machinery: Design, construction, operation, repair and maintenance of primary and secondary tillage tools: Implements and machines viz. m. b. Plough, disc plough, hoe, harrow and cultivator; seeding, planting and transplanting machines, weeders; sprayers and dusters; forage harvesters and movers: Harvesters, threshers, winnowers and combines, crop and soil factors affecting machine performance and energy requirements, economics of tractorization, combining and other machanized operations; selection of farm machines.
4. lrrigation Engineering: Water resources of India; soil water plant relationship permeability infiltration; percolation; evaporation; water requirements of crops and irrigation scheduling, direct and indirect mothdos of soil mositure measurements; measurements of irrigation water, weirs and notches, orific, parshall flumes. H-flumes, etc water conveyance and control; design of fields channels and canals; lacey and kennedy's theoriesmost economical challel cross section; selection of underground pipe line structures and their design; irrigation methods-their hydraulics and design viz. border furrow, flood drip & sprinkler methods; concepts in irrigation efficiencies.
5. Drainage Engineering: Benefits of drainage; hydraulic conductivity, drainable porosity, drainagecoeffecient; surface drainage: Drainage of flat and sloping lands; design of open ditches, their alignmentand construction; design and layouts of sub surface

drains: Depth and spacing of drains and drainageoutlets. Installation of drains and drainage wells. Drainage of salt affected areas

6. Soil and Water Conservation Engineering: Forms of precipitation: Hydrologic scycle; point rainfall analysis, frequency analysis, watershed definition and concept agricultural watersheds. Prediction of peak runoff; factorsattecting run-off hydrograph, concept of unit and instantaneous hydrogaphs erosion control meaasureson various classes of lead viz controur cultivation, strip cropping, terracing afforestation, pastures, etc. a critical analysis of the role of vegetation in soil and water conservation; grassed waterway and itsdesign; design of gully control measures including permanent structures, viz. chute spill way, drop spillway, drop inlet spillway; retards and steam bank erosion; flood routing; flood amelioration through soil and watermanagement in upstream zone mechanics of wind and water erosion, wind erosion control.