

द्वितीय पत्र :- एगू. इन्जिनियरिङ्ग सम्बन्धी विषय

Section A– 20 Marks

1. **Soil and Water Engineering** **20%**
- 1.1 Water Conveyance and Control**
- 1.1.1 Design of open channels ,channel linings, drop structures and spillways, water control and division structures
- 1.1.2 Design of under ground pipe conveyance system
- 1.2 Land Development**
- 1.2.1 Land leveling- grading design methods ,estimation of earthwork quantities, leveling and grading procedures, equipment for land grading and field layout
- 1.3 Ground Water , Irrigation Wells and Pumps**
- 1.3.1 Design of wells
- 1.3.2 Wells construction procedures
- 1.3.3 Indigenous water lifting devices, positive displacement pumps, centrifugal pumps, vertical turbine pumps, submersible pumps, propeller and mixed flow pumps, selection of pumps and their performances, repaired and maintenance
- 1.4 Water erosion and control measures**
- 1.4.1 Soil losses and its measurement
- 1.4.2 Erosion control measures (engineering and bioengineering methods)
- 1.4.3 Conservation structures, watershed management and water harvesting techniques

Section B– 30 Marks

2. **Farm power and Machinery** **30%**
- 2.1 Farm Tractor and its operation, repair and maintenance**
- 2.1.1 Farm tractor types
- 2.1.2 Different parts and components of farm tractor
- 2.2 Tillage and tillage implements**
- 2.2.1 Minimum and zero tillage implements
- 2.2.2 Testing and selection of tillage implements
- 2.2.3 Operation and maintenance of tillage implements
- 2.3 Seeding, harvesting and threshing machineries**
- 2.3.1 Rice trans-planters ,vertical conveyor, reaper and its components, combine harvester, different type of threshers(rice thresher ,multi-crop thresher) and winnowing machine) with their repair and maintenance
- 2.4 Mechanical weeding and chemical application equipment**
- 2.4.1 Manual and power weeders, sprayers (its types, components, nozzle types, application), dusters, with their operation , maintenance and selections of mechanical weeding and chemical application equipment

Section C– 20 Marks

3. **Post Harvest Engineering** **20%**
- 3.1 **Grain Drying**
- 3.1.1 Grain drying needs, methods and theory
- 3.1.2 Mechanical dryers (batch and continuous type), grain pressure theory
- 3.2 **Processing of Rice, wheat, Maize, Sugarcane, Legume and Oilseeds**
- 3.2.1 Milling, hulling, expelling
- 3.2.1 Equipments for hulling, milling, and expelling
- 3.3 **Preservation of Horticultural and Livestock Commodities**
- 3.3.1 Principles of cold storage design
- 3.3.2 Refrigeration and air conditioning
- 3.3.3 Seed processing equipments
- 3.3.4 Dairy machinery(heaters and coolers , pasteurization, can washer, Cream separators, butter churns, steam boilers)

Section D– 30 Marks

4. **Farm Structure Development** **20%**
- 4.1 Planning of farmstead, farm residence, water supply and sanitation
- 4.2 Farm road, farm fencing, farm ponds, farm irrigation and drainage
- 4.3 **Animal Shelters**
- 4.3.1 Dairy barn(housing requirements, stanchion and loose housing barns with equipments and accessories, milking barn, pen barn)
- 4.3.2 Poultry housing (housing requirements, types of poultry house, brooder house, poultry equipments and accessories)
- 4.3.3 Ship and goat housing (types, housing requirements, construction material, layout, equipment and accessories in goat and sheep housing etc.)
- 4.3.4 Swine housing (types, housing requirements, construction materials, layout, equipment and accessories in swine housing)
- 4.3.5 Aqua cultural engineering.
- 4.4 **Storage Structures**
- 4.4.1 Fodder storage structure, feed storage structure, food grain storage structure (digenous storage structure, bag storage structure, grain bins, modern go downs), farm machinery storage structure and farm workshop
- 4.5 **Farm and Rural electrification**
- 4.5.1 Power transmission and distribution, house wiring and its components
- 4.5.2 AC motor (single phase and poly phase) , starters, selection of electric motors, care and maintenance of electric equipments
- 4.5.3 Micro- hydro power plants
5. **Rural Engineering** **10%**
- 5.1 Green roads
- 5.2 Water supply
- 5.3 Sanitation
- 5.4 Bio engineering measures
- 5.5 Renewable energy

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लोक सेवा आयोग
नेपाल कृषि सेवा, एगू. इन्जिनियरिङ्ग समूह, राजपत्राङ्कित तृतीय श्रेणीका पदहरूको खुला र आन्तरिक
प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम

द्वितीयपत्रका पाठ्यक्रमका एकाईहरूबाट सोधिने प्रश्नहरूको संख्या निम्नानुसार हुनेछ :

द्वितीय पत्रका खण्ड	A	B	C	D	
द्वितीय पत्रका एकाई	1	2	3	4	5
प्रश्न संख्या	2	3	2	2	1

विषयगत नमूना प्रश्नहरू (Sample questions)

1. Compare the diesel and petrol engine
2. Differentiate two and four stroke cycle engines
3. Calculate the break horse power of a 2-cylinder 4 stroke cycle internal combustion engine 15 x 16 cm. The mean effective pressure is 1.5 kg/sqcm and the speed of the crank shaft is 1200 rpm. The mechanical efficiency is 75%.
4. What different parts constitute the differential of a tractor? What is the function of differential?
5. Explain how the electricity is distributed on a farm. What precautions should be taken when doing this?
6. Make a list of various instruments placed on the switch board of a three phase motor installed in the workshop or on the tube well.
7. What is steel? Give few examples of the applications of a) mild steel, b) high carbon steel, c) alloy steel and d) soft center steel.
8. What are the criteria are a good ploughing?
9. How can proper post harvest handling reduce the losses of fruit and vegetables? Give a feasible suggestion to reduce the losses in the context of Nepal.
10. Discuss the basis of technology selection for the preservation of perishables focusing temperate fruits and vegetables in Nepal. Give advice for the appropriate methods of post harvest operations of vegetables in the rural farming condition.
11. What are the criteria of selection of godown for the storage of rice and paddy in the tropical conditions like that of terrain?
12. Explain briefly the working of and electric fence. What precautions are needed in installation of electric fence?
13. What are the basic assumptions in Reinforced Cement Concrete? Why only steel has been adopted in R.C.C.?
14. A 200- hectare farm produces wheat, grain, barley, sorghum, maize and cowpea. Which type of grain storage structure will you suggest to be built on the farm?