M.Tech Even Semester Examination, May, 2025

Agricultural Engineering

(2nd Semester)

Course No: 2AG-151

(Design amd Testing of Farm Machinery Systems)

Full Marks: 70
Pass Marks: 28
Time: 3 hours

Note:

1. Attempt any five questions taking one from each unit.
2. Begin each answer in a new page
3. Answer parts of a question at a place
4. Assume reasonable data wherever required
5. The figure in the right margin indicates full marks for the question
6. All the mathematical symbols and abbreviations have their usual meanings.

UNIT-I

1. (a) Write down the merits and demerits of mechanical. What are the limitations of farm mechanization? 3.5+3.5

   (b) What are the different improved hand tools for Hill regions? Write down the functions of improved hand tools. 7

2. A 4 bottom tractor drawn mould board plough cuts a trapezoidal furrow. The furrow has 40 cm top width and 20 cm bottom width. The plough is operating at a depth of 25 cm. Assuming average soil resistance as 0.63 kg/cm^2 and forward speed of 4.8 km/h, determine the followings:

i) Rate of field coverage per hour when field efficiency is 70%

ii) Tractor power required to pull the implement. 7+7

UNIT-II

3. Enlist the different types of sprayer. Write down the short notes on power operated sprayer. 3+11

4. A field sprayer is equipped with nozzles having a rated delivery of 0.42L/min of water at 275 kPa. The nozzle spacing on the boom is 51 cm. Each kilogram of active ingredient (2,4-D) is mixed with 80 L of water and the desired application rate is 0.95 kg of chemical per hectare. What is the correct forward speed for a nozzle pressure of 200 kPa? 14

UNIT-III

5. Write down the steps involved for testing and evaluation of harvesting machine? 14

6. Enlist the different components of combine harvester. Explain the combine harvester with neat sketch. 4+10

UNIT-IV

7. Write down the short notes on gears. Draw the neat diagram of different types of gears 7+7

8. Explain chaff cutter with neat sketch. 14

UNIT-V

9. Write down the steps involved for design of the seed drill. 14

10. Calculate the time required for sowing 1.6 hectares of land by 5 row seed drill making a furrow of 12.5 cm depth. The speed of seed drill is 3.2 km/h and pressure exerted by the soil on the seed drill is 0.42 kg/cm^2. The spacing between furrow openers is 10 cm and time loss in turning is 10%. 14

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