

failing per minute through each tube. If ground wheel diameter is 30 cm, then calculate the seed rate per revolution of the wheel. Also calculate area covered in one day if field efficiency 70%. 6

(b) Write short note on :

(i) minimum tillage (ii) strip tillage (iii) rotary tillage (iv) mulch tillage 4

B. Tech Odd Semester Examination, February, 2023

Agricultural Engineering

(5th Semester)

Course No.: AE-503

(Farm Machinery)

Full Marks: 50

Pass Marks: 25

Time: 2 hours

- Note:**
1. Attempt any five questions.
 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 figures in the right margin indicate full marks for the question.
 6. All the mathematical symbols and abbreviations have their usual meanings.

1. (a) Explain the adjustment of the mould board plough and types of mould board plough. 5
(b) Mention the components of a seed drill with a neat sketch and explain their importance. 5
2. (a) Define the terms: (i) Threshing (ii) Stripping (iii) Shelling (iv) Decortications (v) Hulling 5
(b) How a disc plough differs with the mouldboard plough in principle? Write down the advantages and disadvantages of disc plough? 5
3. (a) Name different parts of a thresher and their functions. 5
(b) A tractor operating at a speed of 4 km per hour develops a drawbar pull of 1000 kg then calculate (i) Drawbar power (ii) Change in

Turn Over

- speed required to increase the drawbar to 15 Kw. 5
4. (a) Differentiate between 'Reaper', 'Mower', and 'Reaper Binder'. 4
- (b) Calculate the energy in kg-meter required to prepare one hectare of seed bed with the following implements:
- (i) An indigenous plough cuts 10 cm deep and 20 cm wide triangular furrow and the unit draft is 0.5 kg / sq cm of furrow cross section. Two ploughing are required.
- (ii) Harrowing twice with 60 cm wide blade harrow (Bakhar) having unit draft of 90 kg/m width of harrow.
- (iii) Levelling twice with a wooden leveler 3 meter long having draft of 40 kg/m width 6
5. (a) What is the difference between Disk angle and tilt angle? 4
- (b) A farmer purchased a tractor of 35 Kw power at a total cost of Rs. 400000/- and a three bottom plough of 40 cm bottom width at Rs 10000/- only. The fuel consumption of the tractor was 5 litres per hour at the ploughing speed of 5 km per hour.
- (i) Calculate the area ploughed per hour
- (ii) Determine the cost of ploughing per hectare. Make necessary assumptions if any. 6
6. (a) Write short notes on :
- (i) Theoretical field capacity
- (ii) Effective field capacity
- (iii) Field efficiency
- (iv) Throat clearance 5
- (b) A small knife chaff cutter fitted with two knives cuts dry hay at 40 rpm giving 400 kg of cut hay per hour. The throat size of chaff cutter is 20 x 5 cm. The effective distance of centre of throat from flywheel is 20 cm. The blade makes a clearance angle of 10 degrees between the knife support and plane of rotation. Distance of inner edge of throat from flywheel centre is 10 cm. Calculate:
- (i) Length of cut of chaff (ii) Effective density of dry hay. 5
7. (a) The application rate of an 20 nozzles hydraulic sprayer is 1120 L/ha. The nozzle spacing and forward speed are 400 mm and 3.4 km/h respectively. The operating pressure is 2.5 MPa and the pump efficiency is 60%. If 10% of the pump output power is used for agitating the liquid. Calculate the power needed to operate the sprayer in kw. 6
- (b) What is spraying? Write different types of sprayer with their advantages and draw a schematic diagram of sprayer indicating all the components of it. 4
8. (a) Differentiate between planter and seed drill. A 3 x 22 cm bullock drawn seed drill is being used for sowing wheat crop. The speed of drilling machine is 3 kmph. Seed rate setting is 90 kg/ha. Calculate the amount of seed