KERALA AGRICULTURAL UNIVERSITY
B.Tech.(Agrl. Engg.) 2019 Admission
VI Semester Final Examination - June 2022

Fpme.3213   **Farm Machinery and Equipment-II (2+1)**   Marks: 50

Time: 2 hours

I   **Fill in the blanks**   (10x1=10)
1. Tractor mounted groundnut digger shaker is driven by_____.
2. Ergonomics principle suggests that _____.
3. In designing an efficient workspace, the left hand will cover _____.
4. Nozzle used in foam spraying is _____.
5. The hold-on type thresher originated in _____.
6. The size of power thresher is determined by _____.

State True or False

7. Air blast sprayer is used for field crops.
8. The pump used in most of the hydraulic sprayers is positive displacement pump.
9. An action involving manual harvesting of crop is slicing and tearing action.
10. A mower with high speed knife rotating in horizontal plane is known as horizontal rotary mower.

II   **Write short notes on ANY FIVE of the following**   (5x2=10)
1. Differentiate between spike tooth and rasp bar cylinder.
2. Differentiate between self propelled and pull type combine.
3. Enlist the different cutting actions.
4. Registration and cutter bar lead
5. Measurement of metabolic heat production
6. Define VMD and NMD for atomized spray fluid.
7. Define dose, coverage and distribution in pesticide application.

III   **Answer ANY FIVE of the following**   (5x4=20)
1. Define reel speed index. Why should reel speed index be always greater than 1? What adjustments are required in pick up reel when harvesting lodged crop?
2. A Chaff cutter having two knives cut dry hay at 60 rev/min giving 480 kg per hr. If the throat size is 18 cmx6 cm, find the effective density of hay for theoretical length of cut of 2.5 cm.
3. What are the various parameters on which performance of cotton pickers depends?
4. Write in brief about the cleaning unit of combine harvester.
5. What do you mean by anthropometry? Define and explain different types of anthropometric data.
6. A tractor drawn mower having a cutter bar length of 2.20m is operated at a forward speed of 5.0 kmph. If time lost during operation of the machine is 15 percent , calculate time required to harvest 8ha area of fodder crop by the mower.
7. Explain functioning of Potato digger elevator.

IV   **Write an essay on ANY ONE of the following**   (1x10=10)

1. Classify different types of combine harvesters on the basis of topography of land and on the basis of they are powered. Explain the advantages of a self propelled combine over a pull type combine. A 1.3 m combine was tested for harvesting grains and following observations were made

Total area harvested	0.8 ha
Total time required	16 hrs
Total material left over the rack	18 kg
Free seeds over the rack	1500 grms
Unthreshed seeds over the rack	1200 grms
Free seeds over the shoe	5.3 Kg
Unthreshed seeds over the rack	1500 grms
Total material left over the shoe	12 kg
Net grain collected in the tank	24 tons

Calculate:
   (a) Grain field and total loss in kg/ha
   (b) Cylinder loss, rack loss, shoe loss and total grain loss as percent of total yield
   (c) Total feed rate in kg/ha
   (d) Rates of straw and chaff over the rack
   (e) and over the shoe in kg/hr

2. Derive an expression of inertia force in the reciprocating cutter bar of a conventional mower.

   The cutter bar of a mower connected to the P.T.O. of a tractor makes 2000 strokes per minute. The mower has following specifications:

Length of pitman	85cm
Radius of rotation of crank pin	05 cm
Height of crankshaft centre above the plain of the joint between the cutter and pitman	21cm
Weight of cutter bar	5.3 kg
Weight of crank pin	0.5 kg

   If the pitman weighing 4.0kg has its centre of gravity at a distance of 45cm from the knife end calculate
   I)   The inertia force at the end of each stroke
   II) Resulting unbalance forces at the end of each stroke

****