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B.Tech Even Semester (CBCS) Exam., May—2019

AGRICULTURAL ENGINEERING

( 6th Semester )

Course No. : AECC32

( Testing and Evaluation of  
Tractors and Machines )Full Marks : 50Pass Marks : 15

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 margin indicate full marks for the questions.

1. Explain standard procedure for testing and evaluation of harvesting machine. 10

2. (a) Write about different types of implements used in farm machinery in brief. What is theoretical field capacity? 4+1=5

(b) The line of pull on an implement is 15° above the horizontal and is in a vertical plane which is at an angle of 10° with direction of travel. Calculate draft and side draft forces for a pull of 500 kg, drawbar horse power required at 4 kmph operation. 5

3. (a) A 35 hp tractor costing ₹ 3,00,000 is expected to have a useful life of 10 years. Calculate the depreciated value after 5 years by different methods, assuming the salvage value as 10% of initial cost. 5

(b) Explain scouring, back furrow, dead furrow, line of pull and draft. 5

4. (a) A three-bottom, 50 cm MB plough is working at a depth of 15 cm. Calculate the unit draft, actual hp required and actual field capacity, if the draft is 1440 kg. Take the speed of the tractor as 5 km/h and field performance index as 0.75. 5

(b) Explain disc angle, tilt angle, horizontal suction, vertical suction and ply rating. 5

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5. (a) Explain alignment and registration in mower with neat sketch. 5
- (b) Write in detail about the types of losses during threshing. 5
6. In field test on wheat crop with a 4 m self-propelled combine, the following data were obtained :
- Length of test run—12 m  
Time—21.5 s  
Total material over walkers—9.4 kg  
Free seeds over walkers—76 kg  
Unthreshed seeds over walkers—60 g  
Total materials over shoe—283 g  
Unthreshed seed over shoe—81 g  
Total seeds collected at grain tank—17.6 kg  
Total material over shoe—4.1 kg  
Average gathering loss—10.2 g/cm<sup>2</sup>
- Calculate (a) cylinder, walker, shoe and total processing losses in percent of grain feed rate and (b) gross seed yield and gathering loss in kg per hectare. 10

( 4 )

7. (a) A field chopper with a flywheel-type cutter head has 6 knives and a diameter of 450 mm. The peripheral speed is 25 m/s. The throat size is 45 cm × 15 cm. For 10 mm length of cut, with corn silage, calculate the linear speed of feed mechanism and the rated feeding capacity. Assume rated capacity 80% of theoretical maximum and chop density 300 kg/m<sup>3</sup>. 5
- (b) What are the main functions of a grain combine? Define centre of resistance. 3+2=5
8. A cut and throw forage harvester has a cylinder cutter head 600 mm in width and 700 mm in diameter. It has 8 knives and rotates at 900 r.p.m. It is to harvest corn at feed rate of 60 mg/h while producing an average length of cut 5 mm. Calculate the required peripheral speed of the feed rolls and the maximum height of the throat area, if the density between rolls is 300 kg/m<sup>3</sup>. 10

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