

respectively. The feed rate of the material on the screen is 10 kg/hr. Find out the following

- (i) The mass flow rate for the overflow stream
 - (ii) The overall effectiveness of the screen. 5
5. What is centrifugation? Discuss the basic theory of centrifugation. Also derive an equation for rate of settling in centrifuges. 10
6. Derive an equation for effectiveness of screen along with fineness modulus. 10
7. a) Write down the equation for the capacity of Bucket elevator and describe its main parts with neat diagram. 5
- b) Write down the design procedure of a screw conveyor with its neat diagram. 5
8. In a bucket elevator for lifting paddy, each bucket is 15 cm long and a cross section which is a section of circle having a radius of 5 cm and subtending an angle of 71° at the centre. The buckets are spaced 25cm apart and the lift is 10 m. the head wheel diameter of 60 cm. Calculate (i) belt speed for centrifugal discharge, (ii) capacity of lifting paddy weighing 580 kg/m³ and (iii) HP required assuming an overall efficiency of 80%. 10

B. Tech Odd Semester Examination, February, 2023

Agricultural Engineering (5th Semester)

Course No.: AE-504/AE-CC-23
(Mechanical Operation in Food Processing)

Full Marks: 50
Pass Marks: 25/15

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 right margin indicate full marks for the question.
 6. All the mathematical symbols and abbreviations have their usual meanings.
1. Define terminal velocity and thermal properties of food materials. Discuss their applications in food processing. 10
 2. With neat sketch diagram discuss the following:
(a) Screw Conveyor (b) Bucket Elevator (c) Centrifugal filter (d) Idler spacing 10
 3. Write down the types of filtration alongwith the principle. 10
 4. a) What do you mean by screening? 5
 - b) In sieve analysis of corn grits wrt any particular screen opening the mass fraction of desired particle size in feed, overflow and underflow stream are 0.47, 0.85 and 0.20