Roll No.....

Date of Exam
04/05/2023

B Tech, 2023 4th Sem.

**Department of Food Technology**
**School of Interdisciplinary Sciences and Technology**
**Jamia Hamdard, New Delhi-110062**
END SEM EXAMINATION, Jan, 2023. B Tech 4th SEM

Paper Title: Unit Operations in Food Processing; Paper Code: BFTC – 401

Time allotted: 3Hrs. Max Marks: 75

*Note: Write to the point. Before answering make sure you have mentioned the Question No. & Section.*
*Important: At the END, mention how many questions from each section you have attempted.*

**Section-A (15 Marks, Attempt All)**

| Questions | Marks | Mapping |
|---|---|---|
| 1. The inclination of cylinder sorter for dry granular materials is kept up to--------- mm/m. | (1). | PEO: 3,4,5/CO: 1,2 |
| 2. In bucket elevator, the top angle is generally taken as 80° while the bottom angle is between ----------° | (1) | PEO: 1,4,5,6/CO: 1,2 |
| 3. A 9x 9 screen has---------- openings per inch | (1) | PEO: 2,3,6/CO: 3,4 |
| 4. Horsepower requirement for the bucket elevator can be calculated by…. | (1) | PEO: 2,3/CO: 1,2,3,4 |
| 5. Fluid energy mill is----------grinder | (1) | PEO: 2,3/CO:1,2 |
| 6. Mechanism of action of colloid mill is---------- | (1) | PEO: 1,3/CO:2 |
| 7. Dimension of oblong opening is---------- | (1) | PEO: 1,3/CO:1,2 |
| 8. In belt conveyors effective tension is equal to---------- | (1) | PEO: 1,2/CO:1,2 |
| 9. Terminal velocity is calculated by formula---------- | (1) | PEO: 1,3,4/CO: 3,4 |
| 10. Back logging of belt is---------- | (1) | PEO: 1,3,4/CO: 1,2 |
| 11. The capacity of screw conveyor is influenced by----------&---------- | (1) | PEO: 1,3,4/CO: 3,4 |
| 12. Hausner's ratio is calculated by---------- | (1) | PEO: 1,3,4/CO: 1,2 |
| 13. If the angle of repose is in between 25-35$^0$ the flow is-------- | (1) | PEO: 1,2,4/CO: 3,4 |
| 14. Value for free flowing for carr's index is--------- | (1) | PEO: 1,2/CO: 1,2 |
| 15. In pneumatic system dispersion of bulk material, air velocities in the range of ---------- m/s is necessary | (1) | PEO: 1,2/CO: 3,4 |

**Section- B (Attempt any 5) (6 Marks Each)**

| Questions | Mapping |
|---|---|
| Q1. How performance of size reduction machines can be improved. | PEO: 3,4/CO: 1,3 |
| Q2. Explain the design criterions of a belt conveyor. | PEO: 4,6 /CO: 1,2,3 |
| Q3. Discuss how aerodynamic properties affect the design of elevators. | PEO: 1,4,5/CO: 2,3,4 |
| Q4. For a fluid flow through orifices explain the properties need to be considered. | PEO: 3,5,6/CO:2,3,4 |
| Q5. Explain how one can improve the storage systems at home. Give suitable examples. | PEO: 1,2/CO:12,3,4 |
| Q6. Describe the principles of size reduction and discuss any crushing equipment. | PEO: 3,5/CO:1,2,3. |

**Section C (Attempt any 3) (10 Marks Each)**

| Questions | Mapping |
|---|---|
| Q1. Derive an expression for power requirement in comminution of solids. Also discuss the laws used to estimate the power requirement when energy per mass of solid is not too high. | PEO: 1,2,4/CO: 1,2 |
| Q2. Particles of average feed size of 50x10$^{-4}$ m at the rate of 20 tonns/hr. At this rate the crusher consumes 40KW of power of which 5KW are required for running the mill empty. Calculate the power consumption if 12 tonnes/hr of this product is further crushed to 5x10$^{-4}$m size in small mill. Assume Rittinger's Law. | PEO:1,2,3/CO: 1,2,3 |
| Q3. Grains are crushed in jaw crusher such that the average particle size is reduced fro 50mm to 10mm with energy consumption of 13KW/kg. Determine the consumption of energy to crush the same material of 75mm average size to an average size of 25mm. | PEO:1,2,5,6/CO: 2,3,4 |
| Q4. Describe how understanding of engineering properties help in increasing the shelf life of the foods. explain using suitable examples. | PEO: 1,2,3/CO:1,2,3 |
| Q5. Explain the pneumatic conveying system with its limitations. Explain grizzly screens. | PEO:1,2,3/CO:2,3,4 |

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