Course Code: 18AG0705 **R18**

SIDDHARTH GROUP OF INSTITUTIONS:: PUTTUR
(AUTONOMOUS)
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QUESTION BANK (DESCRIPTIVE)

Subject with Code: Agricultural Process Engineering(18AG0705) **Course & Branch:** B.Tech-AGE
Year &Sem: III-B.Tech &I-Sem **Regulation:** R18

UNIT – I
PHYSICAL CHARACTERISTICS OF DIFFERENT FOOD GRAINS AND RHEOLOGY

1.	**a.**	Write the classification of Physical & Mechanical properties of biological materials.	[L1][CO2]	**[2M]**
	b.	Give the classification of Thermal and Electrical properties of biological materials.	[L1][CO2]	**[2M]**
	c.	Define specific gravity. List out the methods for determination of specific gravity.	[L1][CO2]	**[2M]**
	d.	Define Thixotropic and Rheopectic fluids.	[L1][CO2]	**[2M]**
	e.	Define Mechanical hysteresis.	[L1][CO2]	**[2M]**
2.	**a.**	Briefly explain the importance of engineering properties of biomaterial materials.	[L2][CO2]	**[5M]**
	b.	Write the applications of Physical, mechanical, thermal and electrical properties of biological materials.	[L1][CO2]	**[5M]**
3.	**a.**	Explain roundness, roundness ratio and sphericity with suitable equations and neat sketch.	[L2][CO2]	**[5M]**
	b.	Define bulk density, true density, apparent density with related expressions.	[L1][CO2]	**[5M]**
4.	**a.**	Define porosity. Explain the method for determination of porosity with neat sketch.	[L2][CO2]	**[7M]**
	b.	Tank 2 of the apparatus is filled with a sample of dry shelled corn to a bulk density of 752.86kg/m3. The pressure readings were P1=0.38m and P3=0.26m. Find the porosity of the corn.	[L3][CO2]	**[3M]**
5.	**a.**	Explain the platform scale for measurement of volume, density and specific gravity of large objects with neat sketch.	[L2][CO2]	**[6M]**
	b.	Define surface area. Explain the methods for determination of the surface are of leaf & stalk, fruits & vegetables, Cereals, pulses and oil seeds.	[L2][CO2]	**[4M]**
6.		Explain the possible force-deformation curve for an agricultural product.	[L2][CO2]	**[10M]**
7.		List out the rheological models and derive kelvin model with related equations.	[L4][CO2]	**[10M]**
8.	**a.**	Define rheology. Write the classification, importance and application of rheological properties.	[L1][CO2]	**[7M]**
	b.	Define stress relaxation, retardation time and creep with diagrams.	[L1][CO2]	**[3M]**
9.		Explain the visco-elastic and visco-plastic behaviour of material with time effects.	[L2][CO2]	**[10M]**

10.		List out the rheological models and derive Maxwell model with related equations.	[L2][CO2]	**[10M]**

UNIT-II
FRICTIONAL, AERODYNAMIC, ELECTRICAL AND THERMAL PROPERTIES

1.	**a.**	Define static and kinetic friction.	[L1][CO2]	**[2M]**
	b.	Define angle of repose and coefficient of friction	[L1][CO2]	**[2M]**
	c.	Define drag coefficient and terminal velocity.	[L1][CO2]	**[2M]**
	d.	Define electrical conductivity and permittivity	[L1][CO3]	**[2M]**
	e.	Define specific heat, thermal conductivity and thermal diffusivity	[L1][CO3]	**[2M]**
2.	**a.**	Explain Amontons laws of friction.	[L2][CO2]	**[4M]**
	b.	Explain the Sherwoods concepts of friction.	[L2][CO2]	**[6M]**
3.	**a.**	What is a drag coefficient? Draw the forces acting on a body immersed in fluid	[L3][CO2]	**[5M]**
	b.	Define terminal velocity and derive equation for terminal velocity of a fluid.	[L3][CO2]	**[5M]**
4.	**a.**	Explain Rolling resistance with neat sketch.	[L2][CO2]	**[5M]**
	b.	Explain the friction testing apparatus used in studying friction forces causing skinning of potatoes with neat sketch.	[L2][CO2]	**[5M]**
5.	**a.**	Explain the difference between angle of repose and angle of internal friction	[L2][CO2]	**[4M]**
	b.	Explain the method for determination of Angle of internal friction	[L2][CO2]	**[6M]**
6.		Define the angle of repose and angle of internal friction. Explain the method for determination of angle of repose of the food grains.	[L2][CO2]	**[10M]**
7.		What are the methods for Measurement of static and kinetic friction and explain with neat sketch	[L2][CO2]	**[10M]**
8.		Explain and derive equations for Frictional drag and Profile or pressure drag	[L3][CO2]	**[10M]**
9.		Write the classification, importance and application of electrical and thermal properties.	[L1][CO3]	**[10M]**
10.		Write the application of engineering properties in handling and processing machines and also in storage structures	[L1][CO1]	**[10M]**

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UNIT-III
THEORY OF SEPARATION

1.	**a.**	Define Grading and Separation.	[L1][CO4]	**[2M]**
	b.	Write the purpose of screen motions.	[L1][CO4]	**[2M]**
	c.	Define aperture with related expression.	[L1][CO4]	**[2M]**
	d.	What are the responsibilities of vibration screen?	[L1][CO4]	**[2M]**
	e.	Enlist the motions of particle.	[L2][CO4]	**[2M]**
2.	**a.**	A screen is used to separate two components (A and B) from a feed where F, O and U are taken as mass flow rates of feed, overflow and underflow streams, respectively. The corresponding mass fraction of the oversize component A in these streams is XF, Xo and Xu. Derive an expression for overall effectiveness of this screen.	[L3][CO4]	**[5M]**
	b.	During the evaluation of an air screen grain cleaner with two screens the following data were observed. (i) The impurities present in feed were 6.5%, (ii) The impurities present in clean grain were 0.5%, (iii) The outflow of blower contained 0.2% clean seed, (iv) The overflow of 1^{st} screen contained 1% clean seed and (v) The overflow contained 0.5% clean seed. Compute the cleaning efficiency of the cleaner.	[L3][CO4]	**[5M]**
3.	**a.**	Explain working principle specific gravity separator with neat sketch.	[L2][CO4]	**[5M]**
	b.	Explain the pneumatic separation of food grains	[L2][CO4]	**[5M]**
4.	**a.**	Explain Ideal and Actual screens and also explain different types of screens with neat sketch	[L2][CO4]	**[5M]**
	b.	Explain rotary air screen cleaner with neat sketch	[L2][CO4]	**[5M]**
5.	**a.**	Explain the different types of screen openings	[L2][CO4]	**[4M]**
	b.	Enlist and explain the various accessories for improving the efficiency of screen cleaner.	[L2][CO4]	**[6M]**
6.		Explain Design consideration of an air-screen grain cleaner with neat sketch	[L2][CO4]	**[5M]**
7.	**a.**	Explain disk separator with neat sketch.	[L2][CO4]	**[5M]**
	b.	Explain the working principle of indented cylinder separation with neat sketch.	[L2][CO4]	
8.	**a.**	With neat sketch explain working principle of cyclone separator	[L2][CO4]	**[6M]**
	b.	Air carrying particles of density 1200kg/m^3 and an average diameter of 25 micron enters a cyclone of 600 mm diameter at linear velocity of 20 m/s. Calculate the centrifugal force acting radially in the cyclone and the separation factor of the cyclone.	[L3][CO4]	**[4M]**
9.		A cyclone separator having the following specifications is used to collect particles of specific gravity 1.2. Cyclone diameter=180 cm; Air inlet diameter=30 cm; Separating height= 2.5 of dia. Of inlet; Helix pitch=15°; Inlet width=10 cm and Entry particle velocity= 15 m/s. Compute the smallest particle which can be collected. Estimate the pressure drop through the unit.	[L3][CO4]	**[10M]**

10.		Explain the working principle of colour separator with neat sketch	[L2][CO4]	**[10M]**

UNIT-IV
SCOPE AND IMPORTANCE CROP PROCESSING, SIZE REDUCTION

1.	**a.**	Define size reduction.	[L1][CO4]	**[2M]**
	b.	What are the characteristics of comminuted products?	[L1][CO4]	**[2M]**
	c.	Define fineness modules.	[L1][CO4]	**[2M]**
	d.	Define crushing efficiency with related expression.	[L1][CO4]	**[2M]**
	e.	What are the parameters for evaluation of performance of a size reduction machine?	[L1][CO4]	**[2M]**
2.		Explain present status, importance and scope of food processing	[L2][CO4]	**[10M]**
3.		Enlist and explain the types of forces used in size reduction equipment's	[L2][CO4]	**[10M]**
4.	**a.**	Write the classification of size reduction equipment's.	[L2][CO4]	**[5M]**
	b.	Write the operation ranges of size reduction equipment for solids.	[L1][CO4]	**[5M]**
5.		Explain Jaw crusher and serrated crusher with neat sketch	[L2][CO4]	**[10M]**
6.		Explain gyratory crusher and smooth roll crusher with neat sketch.	[L2][CO4]	**[10M]**
7.		Explain working principle of Hammer mill with neat sketch.	[L2][CO4]	**[10M**
8.	**a.**	Explain working principle of Ball mill with neat sketch.	[L2][CO4]	**[6M**
	b.	What would be the operating speed of rotations per minute of ball mill of 2000 mm diameter charged with 100 mm balls? Ball mill grinding solid matter.	[L3][CO4]	**[4M]**
9.		In wheat milling experiment it as found that to grind 4.33mm sized grains to IS sieve 35 (0.351 mm opening). The power requirement was 8 KW, calculate the power requirement foe milling of wheat by the same mill to IS sieve 15 (0.157 mm opening) using 1) Rittingers law 2) Kicks law. Feed rate of milling is 200 kg/hr.	[L3][CO4]	**[10M**
10.	**a.**	Explain working principle of Attrition mill with neat sketch	[L2][CO4]	**[6M]**
	b.	Explain the energy requirement of size deduction.	[L2][CO4]	**[4M]**

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UNIT-V
RICE MILLING, THEORY OF FILTRATION

1.	**a.**	Define head rice, broken rice and total rice.	[L1][CO5]	**[2M]**
	b.	What are the main objectives of paddy parboiling?	[L1][CO5]	**[2M]**
	c.	Give the classification of parboiling methods	[L1][CO5]	**[2M]**
	d.	Explain hydrothermal treatment of wheat.	[L2][CO5]	**[2M]**
	e.	Explain filtration process with the help of schematic diagram	[L2][CO5]	**[2M]**
2.		Explain the flow chart of modern rice mill.	[L2][CO5]	**[10M]**
3.		Explain rubber roll Sheller with neat sketch.	[L2][CO5]	**[10M]**
4.		Enlist and explain the components of a wheat mill.	[L2][CO5]	**[10M]**
5.		Explain important unit operations in pulse milling.	[L2][CO5]	**[10M]**
6.	**a.**	Write the importance of oil seed processing.	[L2][CO5]	**[5M]**
	b.	Explain oil expression and oil extraction.	[L2][CO5]	**[5M]**
7.	**a.**	Define Rate of filtration and write the factors affecting the rate of filtration.	[L1][CO6]	**[3M]**
	b.	Explain constant rate filtration and constant–pressure filtration	[L2][CO6]	**[7M]**
8.	**a.**	Enlist filtration equipment's and write the basic requirements for filtration equipment's.	[L2][CO6]	**[4M]**
	b.	Explain centrifugal filters with neat sketch.	[L2][CO6]	**[6M]**
9.		Explain plate and frame filter press with neat sketch.	[L2][CO6]	**[10M]**
10.	**a.**	Write the advantages and disadvantages of parboiling.	[L2][CO5]	**[5M]**
	b.	Explain CFTRI method of parboiling	[L2][CO5]	**[5M]**

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