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MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE
SEMESTER END EXAMINATION

B.Tech. (Agril. Engg.)

Semester	: **V (New)**	**Term**	: **I**	**Academic Year**	: **2011-12**
Course No.	: FS 353	**Title**	: **Strength of Materials**		
Credits	: 3(2+1)				
Day & Date	: Saturday, 05.11.2011	**Time**	: 14.00 to 17.00	**Total Marks**	: **80**

Note :
1. Solve **ANY EIGHT** questions from **SECTION "A".**
2. All questions from **SECTION "B"** are compulsory.
3. All questions carry equal marks.
4. Draw neat diagrams wherever necessary.

SECTION "A"

Q.1 a) Obtain the relation for the thermal stress of a circular bar of uniformly tapering section.

b) Two parallel walls 6 m apart, are stayed together by a steel rod 20 mm diameter, passing through metal plates and nuts at each end. The nuts are tightened home, when the rod is at a temperature of 100 ^{0}C. Determine the stress in the rod, when the temperature falls down to 20 ^{0}C., if a) the ends do not yields, and b) the ends yield by 1 mm. Take rule of E = 2x10 6kg/cm^2 and α = $12x10^6/^0C$.

Q.2 a) Derive an expression showing relation between Bulk modulus and young's modulus E.

b) A Steel bar 2 m long, 2 cm wide and 1 cm thick is subjected to a pull of 2 tones in the direction of its length. Find the changes in length, breadth and thickness. Take E = 2.0x10^6 kg/cm^2 and Poisson's ratio = 0.3

Q.3 a) Show that in a bar, subjected to an axial load, the instantaneous stress due to sudden application of a load is twice the stress caused by the same load is applied gradually.

b) Calculate the strain energy stored in a bar 200 cm long, 5 cm wide and 4 cm thick, when it is subjected to a tensile load of 6 tones. Take E = 2.0x10^{6}kg/cm^2.

Q.4 a) A Cantilever beam 1.5 m long is carrying point loads of 1000 kg each at distances of 0.5 m, 1.0 m and 1.5 m from the fixed end. Draw the shear force and bending moment diagram for the cantilever beam.

b) What are the various types of beams? Explain in detail any one of them.

Q.5 a) What are the assumptions in the theory of simple bending?

b) A rectangular beam 300 mm deep is simply supported over a span of 4 meters. What uniformly distributed load per meter the beam may carry, if the bending stress is not to exceed 120 N/mm^2? Take I = 8 X 10^{6}mm^4.

(P.T.O.)

Q.6 a) What is the relation between slope, deflection and radius of curvature of a simply supported beam?

b) Describe the common types of rivet joints with neat sketches.

Q.7 a) Explain the failure of long columns and short columns.

b) A steel rod 5 m long and of 4 cm diameter is used as a column, with one end fixed and the other free. Determine the crippling load by Euler's formula. Take $E = 2.0 \times 10^6 Kg/cm^2$.

Q.8 Write short notes on:

1) Thermal Stress and Thermal Strain (2) Types of Beam

Q.9 a) A beam 3 meters long, simply supported at its ends, is carrying a point load (W) at its centre. If the slope at the ends of the beam is not to exceed 1^0, Find the deflection at the centre of the beam.

b) What are the advantages and disadvantages of welded joints?

Q.10 a) A single riveted lap joint is made in 15 mm thick plates with 20 mm. diameter rivets. Determine the strength of the joint, if the pitch of rivets is 6 cm. Take fs = 900 kg/cm^2, fb = 1600 kg/cm^2 and ft = 1200 kg/cm^2.

b) A rectangular strut is 15 cm wide and 12 cm thick. It carries a load of 18 tones at an eccentricity of 1 cm in a plane bisecting the thickness. Find the maximum and minimum intensities of stress in the section.

SECTION "B"

Q.11 Fill in the blanks.

1) The ratio of change in volume to the original volume is called as_____.
2) The Plane having no shear stress is called as_____plane.
3) The layer which is neither stretched nor compressed is known as_____.
4) Short column fails due to_____of materials.
5) The maximum strain energy stored in a body is called as_____.
6) The ratio of ultimate stress to working stress is known as_____.
7) The necessary condition to obtain maximum bending moment is_____.
8) Euler's critical load for a column with one end fixed and other free can be written as_____.

Q.12 Match the followings.

Column A		Column B	
1.	Columns and struts	a.	Proof resilience
2.	Slot	b.	Rivet joint
3.	Bending moment	c.	Neutral layer
4.	Direct stress / volumetric strain	d.	Poisson's ratio
5.	Diamond	e.	Euler's theory
6.	Slenderness ratio is less than 80	f.	Weld joint
7.	Maximum strain energy stored	g.	Bending stress
8.	Neither compressed nor stretched	h.	Short columns
		i.	Bulk modulus

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MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE
SEMESTER END EXAMINATION

B.Tech. (Agril. Engg.)

Semester	: **V (New)**	**Term**	: **I**	**Academic Year**	: **2011-12**
Course No.	: FS 354	**Title**	: **Agricultural Structures and Environmental Control**		
Credits	: 3(2+1)				
Day & Date	: Monday, 31.10.2011	**Time**	: 14.00 to 17.00	**Total Marks**	: **80**

Note : 1. Solve **ANY EIGHT** questions from **SECTION "A"**.
2. All questions from **SECTION "B"** are compulsory.
3. All questions carry equal marks.
4. Draw neat diagrams wherever necessary.

SECTION "A"

Q.1 a) Workout the economical diameter and depth of silo to store sufficient quantity of silage for a heard of 400 cows having an average body weight of 450 kg each. They are fed on silage for 200 days in a year.

b) Explain various types of poultry houses and equipments used in the poultry housing.

Q.2 a) Design a bag storage structure for storing 250 tons of paddy.

b) What are the requirements of good storage structures?

Q.3 a) What are the various types of dairy barn? Enlist them and explain in details about milking parlor system.

b) What are the different types of fences? Explain barbed wire fence in detail.

Q.4 a) What are the common impurities found in natural water? Explain their effect on quality of water.

b) What is septic tank? Under what circumstances they are commonly used?

Q.5 a) Write down the objects of treatment of water and name the treatment process.

b) What is farmstead? What factors govern the location of the farmstead on the farm?

Q.6 a) What do you understand by disinfection of water? Give the requirements of a good disinfectant.

b) Discuss the any one method of garbage collection and removal.

Q.7 Write short note (Any Two)

1) Pit silos (2) Sheep housing 3) Hardness of water

Q.8 a) What is Silo? Differentiate between tower silo and horizontal silo.

b) Design a trench silo for a small farm having 40 buffaloes and 60 cows. The silage is fed for 160 days in a year at the ratge of 3.4 kg per 100 kg of animal body weight.

(P.T.O.)

Q.9 a) Determine the size of an water tank for a farmstead demanding a maximum of about 40,000 litres of water per hour for two hours during noon and only about 25,000 litres per hour during rest of the period. The tube well is capable of supplying at the rate of only 28,000 litres per hour.

b) Explain the working of stanchion barn in detail.

Q.10 a) What are the different types of bins?

b) Why do the farmers need to store grain on the farm? What are the agents responsible for the damage of grain during storage/

SECTION "B"

Q.11 Choose correct answers.

1) The maximum length of the barn should be restricted to 40 m so that nearly_____ cows can be housed in one barn unit. (72, 62, 52).
2) The floor area per bird is usually provided ($0.25m^2$, $0.30m^2$, $0.36m^2$, $0.42m^2$)
3) The stanchion barn offers several advantages over the (loose house barn, open air barn, and special barn).
4) In a double range stall barn, the door way should be (2.4 to 2.7 m wide, 3 to 3.3 m wide, 3.5 to 4 m wide)
5) Buttermilk and cream are cooled to about_____in vats (4^0C, 5^0C, 6^0C)
6) The diameter of a silo is usually limited to (6 m, 5 m, 4m)
7) The shape of bukhari type storage structure is_____
8) The capacity of Kothar type storage structure ranges from (9 to 35 tones, 15 to 45 tones, above 50 tones).

Q.12 State True or False.

1) The capacity of Kothar type storage varies from 0-35 tones.
2) In stanchion barn, the maximum length of the barn should be 45cm.
3) Pit silos are made in areas where the soil is deep and the water table is very low.
4) The water consumptions varies with season but not more than 30 litres per day per 100 birds will be required.
5) The septic tank should never be closer than 60 meter from any source of water supply.
6) The loose housing barn offers several advantageous over the stanchion barn.
7) In bag storage structure, the length of the structure is about twice the width.
8) Fumigation of empty gunny bags is done in closed empty drums.

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B.Tech. (Agril. Engg.)

Semester	: **V (New)**	**Term**	: **I**	**Academic Year**	: **2011-12**
Course No.	: IDE 354	**Title**	: **Drainage Engineering**		
Credits	: 3(2+1)				
Day & Date	: Friday, 04.11.2011	**Time**	: 14.00 to 17.00	**Total Marks**	: **80**

Note :
1. Solve **ANY EIGHT** questions from **SECTION "A".**
2. All questions from **SECTION "B"** are compulsory.
3. All questions carry equal marks.
4. Draw neat diagrams wherever necessary.

SECTION "A"

Q.1 a) Explain the causes of water logging and enlist the control measures.
b) What are the positive effects of increasing the efficiency of irrigation water use.

Q.2 a) What principal information are to be collected during detailed drainage survey for preparation of final plans and estimates?
b) Discuss in brief types of land requiring drainage.

Q.3 a) The drainage coefficient of land is 10 mm. Calculate the capacity at the outlet end of the drainage ditch draining a watershed of 300 hectares.
b) Discuss parallel open ditch drainage system.

Q.4 a) Derive an equation for magnitude of the drainage capacity demanded by irrigation. (5)

$$Da = \{1/e_p - 1\} \times E \text{ and } D_a = \{1/e_a - 1\} \times E$$

b) Explain herringbone drainage system. (3)

Q.5 Derive Hoodghout's equation for drain spacing for water table in the equilibrium with rainfall or irrigation water with necessary assumptions.

Q.6 a) Design a drainage canal to drain 550 ha of a land having a drainage coefficient 2.5 cm. The soil is silt loam; maximum permissible velocity of the channel bed is 0.1 per cent. Assume necessary data. (6)
b) What are the disadvantages of the bedding system of drainage? (2)

Q.7 a) Determine the size of clay tile required at the end of 400 m long tile line. If the drainage coefficient is 1 cm, grade is 0.3 per cent and tile spacing is 60 m.
b) Enlist different layouts of pipe drainage systems. Explain gridiron drainage system.

Q.8 a) What are the functions of drain envelope materials.
b) Discuss in brief design of gravel filter.

Q.9 a) What are the practices adopted for increasing the efficiency of leaching and reducing the amount of water needed? (6)
b) Explain the methods generally adopted for leaching of salts. (2)

(P.T.O.)

Q.10 Write short notes on:

a) Interceptor drains b) Conjunctive use of fresh and saline water.

SECTION "B"

Q.11 a) Fill in the blanks.

1) Drainage coefficient is depth of water removed in_____.
2) The water table within_____m is not usually desirable.
3) Exchangeable sodium percentage of saline soil is less than_____.
4) The_____soils are difficult to drain as compared to sandy soil.

b) State True or False.

1) Herringbone system is economical than gridiron system of drainage.
2) In an isotropic soil, hydraulic conductivity is different in all direction.
3) Outlet condition decides the depth of the field drains.
4) In deep organic soil, depth of drain should not be less than 1.2 m.

Q.12 Define the following terms.

1) Drain spacing
2) Waterlogging
3) Hydraulic conductivity
4) Mole drainage
5) Soil structure
6) Percolation
7) Collector drain
8) Salinization

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B.Tech. (Agril. Engg.)

Semester	: V (New)	**Term**	: I	**Academic Year**	: 2011-12
Course No.	: SWCE 355	**Title**	: Soil Conservation Structures Design		
Credits	: 3(2+1)				
Day & Date	: Tuesday,08.11.2011	**Time**	: 14.00 to 17.00	**Total Marks**	: 80

Note :
1. Solve **ANY EIGHT** questions from **SECTION "A".**
2. All questions from **SECTION "B"** are compulsory.
3. All questions carry equal marks.
4. Draw neat diagrams wherever necessary.

SECTION "A"

Q.1 a) Explain the functional use, adaptability, advantages and limitations of Drop spillway.

b) Explain the design steps of permanent gully control structure.

Q.2 a) Explain the hydraulic jump and hydraulic drop as energy dissipaters.

b) Describe the construction of drop inlet spillway.

Q.3 A Drop spillway has a fall of 2.0 m with design peak runoff rate 10 cumec. Determine the total depth of weir and crest length for h /L = 0.45. Also determine the length of head wall extension, length of basin and height of wing wall at junction. Assume necessary data, if required.

Q.4 a) Describe the importance of nala bunding and enlist the steps involved in execution of nala bunding.

b) What is diversion drain? Explain its design criteria.

Q.5 Describe the different types of earthen embankments along with neat labeled figures.

Q.6 a) Estimate the volume of excavation required to construct a dugout type farm pond with an average depth of 3 m, a bottom width of 9m and a bottom length of 24 m. The side slope adopted all along are 2:1 (H : V). Compute the cost of excavation if the average rate of excavation is Rs.80 per cubic metre.

b) Enlist different types of hydraulic jump based on Froude number and describe each in short.

Q.7 What is chute spillway? Discuss its functional use, adaptability, advantages and limitations.

Q.8 a) What are the different types of open channel flow? Explain energy and momentum principles of open channel flow.

b) Enlist the various runoff measuring structures and explain any one structure with a neat sketch.

(P.T.O.)

Q.9 a) Enlist and explain the various components of drop spillway with neat labeled figure. (6)

b) Calculate the critical depth of flow when 3.0 cumec flow discharges from rectangular channel of 2.5 m width. (2)

Q.10 Write short notes on (Any four):

1) Farm pond 2) Regime of flow 3) Gravity dam
4) Stilling basin 5) Retaining wall

SECTION "B"

Q.11 State True or False.

1) Thickness of spillway apron depends upon overfall.
2) Pipe spillways are relatively low capacity structures.
3) Diaphragm type embankments have a thin impervious core, which is surrounded by earth or rock fill.
4) Evaporation from Farm pond can be reduced by minimizing surface area for same storage volume.
5) Floor blocks are provided in apron to increase the velocity of flow.
6) For critical flow, the value of Froude number is less than one.
7) Wing walls are set at an angle of 75^0 with the centre line of the structure.
8) Height of longitudinal sill is less than height of end sill.

Q.12 Define the following terms.

1) Uplift pressure
2) Conduit
3) Free board
4) Factor of safety against Overturning
5) Uniform flow
6) Specific energy
7) Chimney drain
8) Steady flow

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SEMESTER END EXAMINATION

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B.Tech. (Agril. Engg.)

Semester	: V (New)	**Term**	: I	**Academic Year**	: 2011-12
Course No.	: APE 355	**Title**	: Dairy and Food Engineering		
Credits	: 3(2+1)				
Day & Date	: Tuesday, 01.11.2011	**Time**	: 14.00 to 17.00	**Total Marks**	: 80

Note :
1. Solve **ANY EIGHT** questions from **SECTION "A".**
2. All questions from **SECTION "B"** are compulsory.
3. All questions carry equal marks.
4. Draw neat diagrams wherever necessary.

SECTION "A"

Q.1 Explain the principle and operation of Poppet valve.

Q.2 Explain HTST pasteurization process with neat sketch.

Q.3 Define filtration and derive fundamental equation of filtration.

Q.4 If 35,000 kg of whole milk containing 4% fat is to be separated in a 6 hours period into skim milk with 0.45% fat and cream with 45% fat, what are the flow rates of the two output streams from a continuous centrifuge which accomplishes this separation?

Q.5 Enlist the methods of food preservation.

Q.6 Derive Plank's equation to compute freezing time of rectangular slab.

Q.7 If a slab of meat is to be frozen between refrigerated plates with the plate temperature at 340C, how long will it take to freeze if the slab is 10 cm thick and the meat is wrapped in cardboard 1 mm thick on either side of the slab? What will be the freezing time in the absence of cardboard? Assume that for the plate freezer the surface heat transfer coefficient is 600J/m^2 s ^{0}C, the thermal conductivity of cardboard is 0.06 J/m s 0C, its latent heat is 2.56 x 10^5 J/kg and density 1090 kg/m^3. Assume also that meat freezes at –2 ^{0}C.

Q.8 What are the methods used for plant sterilization and explain any one in detail?

Q.9 Write short notes (Any Two).
- a) Plate heat exchanger
- b) Multiple effect evaporators
- c) Constant rate filtration

Q.10 A single effect evaporator is required to concentrate a solution from 10% solids to 30% solids at the rate of 250 kg of feed per hour. If the pressure in the evaporator is 77 kPa absolute, and steam is available at 200 kPa gauge, calculate the quantity of stream required per hour and the area of heat transfer surface if the overall heat transfer coefficient is 1700J/m2^{0}C. Assume that the temperature of the feed is 18^{0}C and that the boiling point of the solution under the pressure of 77 kPa absolute is 91^{0}C. Assume also that the specific heat of the solution is the same as for water that is 4.186 x 10^3 J/Kg.

(P.T.O.)

Given: From the steam table.

1) Condensing temperature of steam at 200 kPa(guage) is 134^0C.
2) Latent heat 200 kPa (gauge) is 2164 kJ/kg.
3) Latent heat at 77 kPa is 2281 kJ/kg.
4) Condensing temperature at 77 kPa(absolute) is 91^0C.

SECTION "B"

Q.11 Fill in the blanks.

1) Drying is simultaneous process of_____and _____transfer.
2) The freezing point of milk is always____than water.
3) Fat globule size distribution is determined by_____.
4) The law of_____states that mass can not be created nor destroyed.
5) In vat pasteurization holding temperature is_____and holding time is_____.
6) Commercial chillers operate at temperature between____to_____^{0}C.
7) _____is used to determine the adulteration of milk with water.
8) _____ of milk rises with concentration.

Q.12 State True or False.

1) When the milk is frozen its volume decreases.
2) The curd tension of milk decreases due to homogenization.
3) Higher the pasteurizing temperature, the greater is the reduction in cream volume.
4) The S.I. unit of pressure is N/m^2 called the Pascal.
5) Boiling occurs when the vapour pressure of water is equal to the atmospheric pressure above the water surface.
6) Butter is very high in fat and fat soluble vitamins A, D, E and K.
7) Homogenizer valve is made up of Stellite metal.
8) Products obtained by quick freezing have inferior quality as compared to those obtained by slow freezing.

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SEMESTER END EXAMINATION
B.Tech. (Agril. Engg.)

Semester	: **V (New)**	**Term**	: **I**	**Academic Year**	: **2011-12**
Course No.	: IDE 353	**Title**	: **Groundwater, Wells and Pumps**		
Credits	: 3(2+1)				
Day & Date	: Wednesday, 02.11.2011	**Time**	: 14.00 to 17.00	**Total Marks**	: **80**

Note : 1. Solve **ANY EIGHT** questions from **SECTION "A".**
2. All questions from **SECTION "B"** are compulsory.
3. All questions carry equal marks.
4. Draw neat diagrams wherever necessary.

SECTION "A"

Q.1 a) Derive an expression for steady state flow to wells in unconfined aquifer. (5)

b) Give classification of variable displacement pumps. State principal of operation of centrifugal pump with neat sketch. (3)

Q.2 a) Enlist the steps involved in design of tube wells. What are the important Considerations for design of well screen and gravel pack. (5)

b) Explain the pump characteristic curves for centrifugal pump. (3)

Q.3 A well penetrating a confined aquifer 10 m thick was tested with a uniform discharge of 1500 lpm. The steady state drawdown measured at two observation wells which were at 1 m and 10 m radial distance from the centre of the pumped well were 5 m and 0.5 m, respectively. Determine the hydraulic properties of the aquifer.

Q.4 A pump lifts 100,000 litres of water per hour; against a total head of 20 m. Compute the water horse power, if the pump has an efficiency of 75%, what size of prime mover is required to operate the pump? If a direct driven electric motor with an efficiency of 80% is used to operate the pump, compute the cost of electrical energy in a month of 30 days. The pump is operated 12 hours daily for 30 days. The cost of electrical energy is 20 paise per unit.

Q.5 a) What is the effect of change of pump speed and impeller diameter on pump performance? Write the mathematical expressions for it. (3)

b) Calculate the right size of centrifugal pump for irrigating 3 ha area for the following cropping pattern. (5)

Season	Crop	Area to be irrigated, ha	Irrigation Depth per irrigation cm	Rotation Period, days	Period of Work, hrs/day
Winter (Rabi)	Wheat	3	7.5	15	10
Summer (Kharif)	Maize	1	7.5	20	10
	Paddy	2	5.0	2	10

(P.T.O.)

Q.6 a) Determine the annual consumption of electrical energy by a motor driven centrifugal pump installed in a shallow well. The pump discharge is 16 lps against a total head of 7 m. The pump efficiency is 70% and the motor efficiency 84%. The drive efficiency may be assumed to be 100%. The pump is operated for 3500 hours per year. (5)

b) Describe working of Archimedian screw with neat diagram. (3)

Q.7 Write short note (Any Two).

a) Rotary drilling b) Multiple well system c) Well interference

Q.8 a) A masonry well is to be constructed in a fine-sand subsoil formation. The discharge of well is anticipated to be 15 m3/hr under a depression head of 4 m. Determine the diameter of the well. The specific yield for fine sand subsoil formation is 0.5. (3)

b) Differentiate between (5)

1) Single-stage and multi-stage pumps

2) Horizontal centrifugal pumps and vertical centrifugal pumps.

Q.9 Derive the equation to determine specific yield per unit area of the well.

Q.10 a) Write the principal of operation of vertical turbine pumps and describe its construction. (5)

b) A fully penetrating tube well in a confined aquifer has a maximum discharge capacity of 3000 lit/min. The thickness of aquifer is 22 m. Design the length of well screen, assuming the effective open area of the available strainer to be 15% and the safe entrance velocity 3 cm/sec. The diameter of the well is 20 cm. (3)

SECTION "B"

Q.11 A) Fill in the blanks.

1) At the water table, the hydrostatic pressure is equal to the_____pressure.

2) The value of coefficient of storage ranges from _____to_____for confined aquifer.

3) Tube wells in hard rock areas are called_____.

4) Amount of energy required to move the water into the eye of the impeller is called as_____.

B) Match the pairs.

"A"		"B"	
1)	Aquiclude	a)	Groundwater reservoir
2)	Aquifuge	b)	Clay
3)	Aquitard	c)	Solid granite
4)	Aquifer	d)	Sandy clay

Q.12 A) Define the following terms. (5)

1) Effective size(d_{10})
2) Transmissibility
3) Specific yield
4) Water horse power (3)

B) State True or False.

1) WHP is the power required by the pump at shaft.
2) Propeller pumps are used for high discharge and low head pumping.
3) Open type impellers are used to pump clear water. (3)
4) Leakage factor and hydraulic resistance are the properties of unconfined aquifer. (5)

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SEMESTER END EXAMINATION
B.Tech. (Agril. Engg.)

Semester	: V (New)	**Term**	: I	**Academic Year**	: 2011-12
Course No.	: FMP 359	**Title**	: Farm Machinery and Equipment –II		
Credits	: 2(1+1)				
Day & Date	: Thursday, 03.11.2011	**Time**	: 14.00 to 16.00	**Total Marks**	: 40

Note :
1. Solve **ANY EIGHT** questions from **SECTION "A".**
2. All questions from **SECTION "B"** are compulsory.
3. All questions carry equal marks.
4. Draw neat diagrams wherever necessary.

SECTION "A"

Q.1 a) What is the principle of cutting?

b) Explain alignment of mower.

Q.2 Explain different types of power threshers on the basis of threshing cylinders.

Q.3 A bullock drawn mower has drive wheel of 90 cm diameter. The power to drive the knife is transmitted to the crank wheel through a transmission gear train. The first step consists of a 120 tooth gear on main axle, driving 20 tooth gear on a countershaft. The second step consists of a 60 tooth bevel pinion on the crankshaft The guards are spaced 8 cm apart with knife stroke 8 cm. Calculate:

a) The number of strokes, the knife will make per minute when the mower is pulled at 4 kmph speed and driven gear of 15 tooth.

b) The total length of knife stroke per minute in cm.

Q.4 a) What are the main functions of combine harvester?

b) What are the advantages and disadvantages of combine harvester?

Q.5 What are the different types of spindles in cotton picker and explain their types of mounting arrangements?

Q.6 Explain the working of tractor drawn potato digger.

Q.7 Explain the procedure for measurement of operating speed, wheel slip and draft of tractor drawn implements.

Q.8 Explain the working of peanut digger.

Q.9 Explain the different types of field choppers.

Q.10 How is the selection of tractor is done for the large farms? Describe the important factors affecting the process of selection.

SECTION "B"

Q.11 Define:

1) Reaper binder 2) Ledger plate 3) Mower 4) Walker loss

Q.12 State True or False.

1) Mower works at higher cutting speed than that of rotating cutter.
2) Drum concave gap in the threshing unit at the inlet should be less than that at the exit.
3) The reel is used to steady the crop against the cutterbar while it is being cut.
4) The wear plates in the reciprocating type cutter bar are useful for protecting the finger bar from wear.

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B.Tech. (Agril. Engg.)

Semester	: **V (New)**	**Term**	: **I**	**Academic Year**	: **2011-12**
Course No.	: APE 356	**Title**	: **Drying of Farm Crops**		
Credits	: 2(1+1)				
Day & Date	: Wednesday, 09.11.2011	**Time**	: 14.00 to 16.00	**Total Marks**	: **40**

Note :
1. Solve **ANY EIGHT** questions from **SECTION "A".**
2. All questions from **SECTION "B"** are compulsory.
3. All questions carry equal marks.
4. Draw neat diagrams wherever necessary.

SECTION "A"

Q.1 Enlist the methods of moisture content determination. Explain any two.

Q.2 State Equilibrium Moisture Content Models. Explain any one model.

Q.3 Determine the quantity of parboiled paddy with 36% Moisture Content (w.b.) required to produce 1.2 tonne of product with 13% Moisture Content (w.b.) Workout the problem on wet basis and check the answer using dry basis.

Q.4 Enlist methods of drying. Explain any one method.

Q.5 What are the heated air dryers used for grain drying. Explain LSU dryer with neat sketch.

Q.6 What are the criterions for selection of a dryer? Explain the factors affecting on the design of grain dryer.

Q.7 Write a short note:

1) Heat utilization factor 2) Coefficient of performance
3) Effective heat efficiency 4) Relation between HUF and COP

Q.8 Explain deep bed drying with neat sketch.

Q.9 Explain the constant rate period and falling rate period of drying (with sketch).

Q.10 What is thin layer drying? Explain empirical drying equations.

SECTION "B"

Q.11 Define the following terms.

1) Dew Point temperature 2) Relative humidity
3) Equilibrium Moisture Content 4) Unbound moisture

Q.12 Fill in the blanks.

1) The difference between desorption and adsorption Curves is known as_____.
2) The safe maximum temperature of drying seed grains is_____.
3) The shedd's equation is used for measurement of_____in grain bed.
4) The Brown Duvel fractional distillation is_____method of moisture determination.

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MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE
SEMESTER END EXAMINATION

B.Tech. (Agril. Engg.)

Semester	: V (New)	**Term**	: I	**Academic Year**	: 2011-12
Course No.	: APE 357	**Title**	: Storage Engineering		
Credits	: 2(1+1)				
Day & Date	: Friday, 11.11.2011	**Time**	: 14.00 to 16.00	**Total Marks**	: 40

Note :
1. Solve **ANY EIGHT** questions from **SECTION "A".**
2. All questions from **SECTION "B"** are compulsory.
3. All questions carry equal marks.
4. Draw neat diagrams wherever necessary.

SECTION "A"

Q.1 Enlist the major causes of food deterioration and explain in brief the role of bacteria in food spoilage.

Q.2 Describe the aerated storage system for grains.

Q.3 Explains the moisture changes of stored grains in cylindrical bins.

Q.4 Discuss the practical considerations of aeration system.

Q.5 Enlist the different types of continuous flow dryers and explain any one in detail.

Q.6 Describe the batch drying system for grains.

Q.7 Give the classification of Modern grain Storage systems and explain in brief the silo storage system.

Q.8 Describe in brief about the importance of Controlled Atmosphere storage system.

Q.9 State the aspects/factors to be considered in design of grain storage.

State the advantages and disadvantages of bulk storage systems.

Q.10. A concrete silo of 6 m diameter and 20 m depth is used for storage of paddy grains. The bulk density of paddy is 636 kg/m^3. The angle of friction between paddy grains and silo wall is 30^0C. If the ratio of horizontal to vertical pressure intensity is 0.4. Calculate the lateral pressure at 2, 4, 8, 16 and 20 m intervals of the depth.

SECTION "B"

Q.11 Fill in the Blanks.

1) _____causes spoilage in canned foods.
2) Mould growth starts as fine thread known as_____.
3) _____developed theory for pressures induced by granular materials against retaining wall.
4) In_____type of drier air and grain travel at 90^0 to each other.

Q.12 State True or False.

1) Moisture migration is slower in small bins than in large bins.
2) Fungi are usually known as yeast.
3) Light destroys vitamins B_2, A and C.
4) Considerable amount of spillage occurs in bulk storage system.

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