MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE
SEMESTER END EXAMINATION
B.Tech. (Agril. Enng.)

<table>
<thead>
<tr>
<th>Semester</th>
<th>VII</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course No.</td>
<td>IDE 474</td>
</tr>
<tr>
<td>Credits</td>
<td>3(2+1)</td>
</tr>
<tr>
<td>Day &amp; Date</td>
<td>Thursday, 12.11.2009</td>
</tr>
<tr>
<td>Time</td>
<td>9.00 to 12.00</td>
</tr>
<tr>
<td>Total Marks</td>
<td>80</td>
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Note:
1. Solve ANY FIVE 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) State the effects of poor drainage on soil and plants.
    b) Enlist the causes of water logging and explain about the control measures of water logging.

Q.2 a) Derive Hooghoudt’s equation of drain spacing with necessary assumptions.
    b) Discuss the drainage properties of soil.

Q.3 a) Enlist the different types of surface drainage system. Explain random ditch system in detail.
    b) Calculate the capacity required at the outlet of the drainage ditch draining a watershed of 500 hectares, if drainage coefficient of land is 12 mm.

Q.4 a) Describe about the reclamtion procedures of salt affected soils.
    b) Estimate the leaching requirement, when the EC of saturation extract of the soil is 11 mmhos / cm at 25 per cent reduction in yield of cotton. The EC of irrigation water is 1.5 mmhos /cm.

Q.5 a) Which are the different auxiliary structures required for pipe drainage system? Give details.
    b) Determine the size of clay tile required at the end of 500 m long tile line, if drainage coefficient is 1 cm, grade is 0.3 per cent and tile spacing is 50 m. (assume n = 0.0108)

Q.6 a) Compute the most efficient bottom width for an open ditch to carry a flow of 2 m deep in clay soil. Compute the velocity and discharge capacity of the channel, if the channel gradient is 0.04 per cent.
    b) Design a drainage canal (outlet ditch) to drain 550 ha of land having drainage coefficient of 2.5 cm. The soil is silt loam. The maximum permissible slope of channel bed is 0.1 per cent.

Q.7 Write short notes on the followings:
1) Mole drains
2) Land grading
3) Herringbone and Gridiron drainage systems
4) Effect of use of poor quality irrigation water
5) Parallel field ditch system

(P.T.O.)
SECTION “B”

Q.8 Fill in the blanks:
1) ______ is depth of water removed in 24 hours from a given area.
2) Clay tiles are usually made in lengths of about ______ cm.
3) Leaching requirement is ratio of ______ water to ______ water.
4) Drainage removes only the ______ water from the soil.
5) The relationship governing the laminar flow of water through capillary tube is known as ______.
6) In order to have Darcy’s law to be valid, the flow of water through the porous medium must be ______
7) A drainage criterion for steady state ground water conditions is ______.
8) Recommended side slope of drainage ditch is ______ for silt loam soil.
9) Allowable velocity in open ditch for sandy clay loam soil is ______ m/s.
10) The reclamation of alkali soils is ______ difficult than saline soils.

Q.9 State whether true or false:
1) The depth of field drains is governed by outlet conditions.
2) The depth of plant rooting zone decreases by providing proper drainage.
3) ‘kd/μ’ stands for the drainage criterion for steady state ground water conditions.
4) Platy structure of soil offers favorable drainage characteristics.
5) Exchangeable sodium percentage of saline alkali soil is less than 15.
6) In most cases the hydraulic conductivity decreases with depth due to accumulation of clay found in the subsoil of soils.
7) Subsurface drainage is always a closed drainage system.
8) An open ditch if extended below water table removes subsurface ground water.
9) Usually channels serving as outlet for tile must be of depth 1.2 m or more.
10) The appropriate choice of drainage criterion will not depend on the economic and agronomic conditions.

Q.10 Define the followings:

1) Agricultural drainage  6) Permanent wilting point
2) Leaching requirement  7) Soil structure
3) Saline Alkali Soil  8) Subsurface drainage
4) Field capacity  9) Hygroscopic water
5) Hydraulic conductivity  10) Capillary flow
MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE SEMESTER END EXAMINATION
B.Tech. (Agril. Engg.)

Semester : VII Academic Year : 2009-10
Course No. : FS 475 Title : Environmental Control Engineering
Credits : 2(1+1) Day & Date : Wednesday, 11.11.2009 Time : 9.00 to 11.00 Total Marks : 40

Note: 1. Solve ANY FIVE 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 What are the various types of poultry housing? Explain in detail about deep litter poultry housing.

Q.2 Explain winter and summer moisture migration in stored grains with neat sketches.

Q.3 Classify the greenhouses based on shape, utility, construction and covering material.

Q.4 Explain different food spoilage agents in detail.

Q.5 What are the types of dairy barn? Explain in short.

Q.6 Enlist different methods of food preservation; explain in detail about freezing method.

Q.7 A cylindrical silo of 2.5 m diameter and 20 m in height is filled with wheat. Calculate the load on the bottom and lateral thrust at 2.0 m depth on the walls. The silo is made of steel with smooth walls. The characteristics of stored wheat are as follows:

   Maximum bulk density : 830 Kg/m³
   Minimum bulk density : 720 Kg/m³
   Maximum angle of internal friction : 30°
   Minimum angle of internal friction : 25°
   Minimum angle of friction on smooth sheeting : 18°
   Angle of repose : 25°

SECTION "B"

Q.8 Fill in the blanks:

1) In ______ type of dairy barn the cows are housed and milked in the same building.

2) ______ is the microorganism responsible for food spoilage and their action is more rapid in acidic conditions.

3) Measurement of ______ is valuable method of measuring the quality losses of frozen fruits and vegetables.

4) ______ of foods is very common phenomenon of frozen foods.

5) Stored fodder is known as ______.

(P.T.O.)
Q.9  State true or false:
1) Bacteria can grow rapidly in natural and slightly alkaline substances.
2) Evan span type greenhouse is constructed on hilly terrain.
3) Well drained sandy soil is most suitable for poultry houses.
4) Food preservation by means of dehydration can preserve the taste of the foods.
5) Mechanical air conditioning is cheapest and viable for animals for maintaining comfort zone.

Q.10 Define:
1) Milking parlor
2) Silo
3) Immersion freezing
4) Preservation of foods
5) Aeration
Note: 1. Solve ANY FIVE 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 with diagram the clearance fit and interference fit. (2)
     b) Derive relation between ‘height of ridge’ and ‘angle of attack’ of disk
        implement with neat sketch. (3)

Q.2  a) Write in short “Grain hopper design for sowing machine”. (2)
     b) Describe in short seed metering mechanisms for inter-tilled crops. (3)

Q.3  Derive an expression for cutting force of harvesting machine with neat sketch
     (Motion of knife is perpendicular to cutting edge)

Q.4  a) Enlist important types of springs and their functions. (2)
     b) Design a chain drive to actuate a compressor from 15 h.p. electric motor
        running at 970 r.p.m. The compressor operates in two shifts. The centre
        distance should be 500 mm minimum. The chain tension can be adjusted
        by shifting the motor on slides. (3)

Q.5  Explain the production capacity of threshers.

Q.6  a) Explain Reactions of soils to mould boards and horizontal force relations. (2½)
     b) By what percentage is the draught of plough bottom increased if the
        horizontal component of pull is inclined at an angle of 15° in the transverse
        plane rather than being straight ahead? The horizontal component of soil
        forces is inclined at an angle 20° with the direction of travel. (2½)

Q.7  A vertical rotor planter has 35 cells around a disc 28 cm in diameter. The
     planter is having seed tubes of diameter 5 cm and vertical length 70 cm. The
     seeds are released 20 cm above by vertical rotor rotating at 20 m/min. If each
     seed is released at the rear end of the tube, find (a) the seed to seed distance
     along a row (b) the time required to strike the ground after the seed is released
     from the rotor cell neglecting the air resistance(c) The distance by which the
     seed moves horizontally before striking the ground after release from the seed
     tube. Take the forward speed of travels 4 km/hr.

(P.T.O.)
SECTION “B”

Q.8 Fill in the blanks:
1) Resistance offered by stalk depends upon physical and mechanical properties of stalk and the _____ of the cutting edge and is perpendicular to the cutting edge.

2) The yield and the size of grass land determine the operating _____ of the mower.

3) In combine harvester _____ brings the stalks to the cutting unit.

4) The _____ determines the lateral displacement, overturn and crushing of soil layer.

5) Chain drives are more practical for _____ speeds.

Q.9 Define:
1) Tolerance
2) Angle of attack
3) Preloading of bearing
4) Whole depth of gear
5) Direct material cost

Q.10 State true or false:
1) In lawn mowers, cutting is done only by impact.
2) The flow of seed through thin walled orifice is more uniform than thick walled orifice.
3) The soil resistance of clay soils is 8-15 N/cm².
4) The arrow shaped sweeps are having crushing angle of 25-30⁰.
5) Factory cost = Direct material cost + Direct labour cost + Direct expenses.
MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE
SEMESTER END EXAMINATION

B.Tech. (Agril. Engg.)

<table>
<thead>
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<th>Semester</th>
<th>VII</th>
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<tr>
<td>Course No.</td>
<td>SWCE 476</td>
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<tr>
<td>Credits</td>
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<tr>
<td>Day &amp; Date</td>
<td>Friday, 13.11.2009</td>
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<tr>
<td>Time</td>
<td>9.00 to 11.00</td>
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</table>

Note: 1. Solve ANY FIVE 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 role of site selection for a permanent structure from layout and foundation point of view. (3)
   b) Determine the volume of excavation needed for making a 3.0 m deep dugout pond with 15.0 m x 15.0 m size at its bottom and having 1.5:1 side slope. (2)

Q.2 a) Write the functional uses, adoptability and limitations of chute spillway. (3)
   b) Classify different types of hydraulic jumps based on Froude number. (2)

Q.3 a) Describe the different forces acting on gravity dam. (3)
   b) What is nala bunding? Describe its functions. (2)

Q.4 Design a drop spillway to carry 13.0 m$^3$/sec flow of runoff across 2.8 m fall in a gully. The gully width is 9 m. Also show with a neat sketch the design dimensions of i) Head wall and ii) Side wall. (3)

Q.5 State and explain how different dimensions of floor blocks are decided in stilling basin design. (2)

Q.6 A pipe spillway of 25 m length and 0.75 diameter is installed with 0.3 m drop between inlet and outlet points. Estimate the capacity of the pipe spillway and also check for neutral slope stating whether pipe flow condition prevails or not when the head causing flow is 1.2 m. Take Ke = 0.5 and Kc = 0.113 (3)

Q.7 Check the stability of a 4.5 m high trapezoidal masonry wall retaining 3.8 m water depth against its vertical face. Top width is 0.60 m and base width is 2.5 m. Take density of masonry and water as 2.2 gm/cc and 1.0 gm/cc respectively. The coefficient of friction is 0.5 and bearing capacity of soil is 20,000 Kg/m$^2$. (3)

SECTION “B”

Q.8 Define:
   1) Critical depth
   2) Freeboard
   3) Eccentricity
   4) Riprap
   5) Berm

Q.9 State true or false:
   1) The design height of earth dam is increased by an amount equal to 10% of design height as settlement allowance.
   2) Evaporation losses can not be reduced by having deeper ponds.
   3) Vegetative gully control measures are not too dependable.
   4) Well-defined hydraulic jump normally occurs when the inflow is critical.
   5) To avoid tension within the structure, the resultant force R should act within the one third of width from innermost ends.

(P.T.O.)
Q.10 Fill in the blanks:

1) For efficient functioning of the stilling basin, floor blocks width should occupy ______ to ______ percent of the transverse length of the stilling basin.

2) ______ are constructed to prevent seepage along the conduit.

3) Minimum farm pond storage is usually computed by estimating the total annual needs and allowing ______ to ______ percent of the total storage for seepage, evaporation and other non usable requirements.

4) ______ and ______ are the causes of failure of permanent gully control structures.

5) The depth of flow before the hydraulic jump is always ______ than the depth of flow ______ the hydraulic jump.
MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE
SEMESTER END EXAMINATION

B.Tech.(Agril. Engg.)

| Semester | VII |
| Course No. | APF 476 |
| Credits | 3(2+1) |
| Day & Date | Tuesday, 10.11.2009 |
| Time | 9.00 to 12.00 |
| Total Marks | 80 |

Note:
1. Solve ANY FIVE 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 What are the different energies considered in energy balance?
   a) Explain the types of each energy in detail.
   b) Derive Bernoulli’s equation and state it in terms of pressure and head of fluid.

Q.2 a) What are the different forms of steam and explain each in detail.
   b) Enlist different pasteurization methods and explain HTST pasteurization in detail.

Q.3 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 if steam is available at 200 Kpa (guage). Calculate the quantity of steam required per hour and area of heat transfer surface, if overall heat transfer coefficient is 1700 joules / m² sec. °c. Assume the temperature of the feed is 18⁰c and that the boiling point of solution under the pressure of 77 Kpa absolute is 91⁰c. Assume sp. heat of solution is as for the water i.e. 4.186 kJ/kg. and latent heat of vaporization of the solution is the same as that for water under the same conditions. Given:
   1) From the steam table, condensing temp. of steam at 200 Kpa (guage) is 134⁰c.
   2) Latent heat at 200 Kpa(guage) is 2164 KJ/Kg
   3) Latent heat at 77 Kpa is 2281 KJ/Kg
   4) Condensing temperature is 91⁰c at 77 Kpa (absolute)

Q.4 a) The skim milk is prepared by the removal of fat from the whole milk. This milk is found to contain 90.5% water, 3.5% protein, 5.1 Carbohydrate, 0.1% fat and 0.8 % ash. If the original milk contained 4.5% fat, Calculate its composition assuming that fat only was removed to make skim milk and there are no losses in processing.
   b) A solution of common salt in water is prepared by adding 20 kg of salt to 100 kg of water to make liquid of density 1323 kg/m³. Calculate the concentration of salt in solution as a (a) Weight fraction (b) Weight volume fraction (c) Mole fraction (d) Molar concentration.

Q.5 a) A food containing 80% water is to be dried at 100⁰c down to moisture content of 10%. If the initial temp. of food is 21 °C, calculate the quantity of heat energy required per unit weight of the original material for drying under atmospheric pressure. The latent heat of vaporization of water at 100⁰c and at standard atmospheric pressure is 2257 KJ/Kg. The specific heat capacity of food is 3.8 KJ/Kg °c and of water is 4.18KJ/Kg °c. Find also energy requirement per Kg of water removed.
   b) Using the same material as mentioned in above example (a) if vacuum drying is to be carried out at 60⁰c under the corresponding situation pressure of 20 Kpa absolute. (or a vacuum of 81.4 Kpa), calculate heat energy required to remove moisture per unit weight of raw material. (latent heat of vaporization is 2356 KJ/Kg at 20 Kpa absolute).

(P.T.O.)
MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE
SEMESTER END EXAMINATION

B.Tech.(Agril. Engg.)

Semester : VII  Academic Year : 2009-10
Course No. : APF 476  Title : Dairy and Food Engineering
Credits : 3(2+1)  
Day & Date : Tuesday, 10.11.2009  Time : 9.00 to 12.00  Total Marks : 80

Note:
1. Solve ANY FIVE 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 What are the different energies considered in energy balance?
   a) Explain the types of each energy in detail.
   b) Derive Bernoulli's equation and state it in terms of pressure and head of fluid.

Q.2 a) What are the different forms of steam and explain each in detail.
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   2) Latent heat at 200 Kpa(guage) is 2164 Kj/Kg
   3) Latent heat at 77 Kpa is 2281 Kj/Kg
   4) Condensing temperature is 91°C at 77 Kpa (absolute)

Q.4 a) The skim milk is prepared by the removal of fat from the whole milk. This milk is found to contain 90.5% water, 3.5% protein, 5.1 Carbohydrate, 0.1% fat and 0.8% ash. If the original milk contained 4.5% fat, Calculate its composition assuming that fat only was removed to make skim milk and there are no losses in processing.
   b) A solution of common salt in water is prepared by adding 20 kg of salt to 100 kg of water to make liquid of density 1323 kg/m³. Calculate the concentration of salt in solution as a (a) Weight fraction (b) Weight volume fraction (c) Mole fraction (d) Molar concentration.

Q.5 a) A food containing 80% water is to be dried at 100°C down to moisture content of 10%. If the initial temp. of food is 21°C, calculate the quantity of heat energy required per unit weight of the original material for drying under atmospheric pressure. The latent heat of vaporization of water at 100°C and at standard atmospheric pressure is 2257 KJ/Kg. The specific heat capacity of food is 3.8 KJ/Kg°C and of water is 4.18 KJ/Kg°C. Find also energy requirement per Kg of water removed.
   b) Using the same material as mentioned in above example (a) if vacuum drying is to be carried out at 60°C under the corresponding situation pressure of 20 Kpa absolute. (or a vacuum of 81.4 Kpa), calculate heat energy required to remove moisture per unit weight of raw material. (latent heat of vaporization is 2356 KJ/Kg at 20 Kpa absolute).
Q.6 State different types of dryers. Explain in detail with diagrams the freeze dryer, fluidized bed dryer and pneumatic dryer.

Q.7 a) Write short note on physical and chemical properties of milk.
  b) Write short note on membrane separation and steam distillation.

SECTION “B”

Q.8 Match the following:

<table>
<thead>
<tr>
<th>“A”</th>
<th>“B”</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Centrifugal force</td>
<td>a) 126°C for 4 sec.</td>
</tr>
<tr>
<td>2) Potential energy</td>
<td>b) Sublimation</td>
</tr>
<tr>
<td>3) Gas law</td>
<td>c) Calandria</td>
</tr>
<tr>
<td>4) Compressible fluids</td>
<td>d) 30 min. at 62.8°C</td>
</tr>
<tr>
<td>5) Steam traps</td>
<td>e) Steam pressure</td>
</tr>
<tr>
<td>6) Magnesia Insulation</td>
<td>f) Steam pipes</td>
</tr>
<tr>
<td>7) Batch pasteurization</td>
<td>g) PV=nRT</td>
</tr>
<tr>
<td>8) UHT pasteurization</td>
<td>h) Cream separation</td>
</tr>
<tr>
<td>9) Single effect evaporator</td>
<td>i) Mgh</td>
</tr>
<tr>
<td>10) Freeze drying</td>
<td>j) Gases</td>
</tr>
</tbody>
</table>

Q.9 State true or false, if false correct it.
1) Equilibrium moisture content occurs between constant rate and falling rate drying.  
2) The mass is transferred under the driving force provided by temperature difference.  
3) An evaporator is also a low pressure steam generator.  
4) In multiple effect evaporators, feed passes from first to last evaporator.  
5) In milk pasteurization, *Tubercule bacillus* is inactivated.  
6) Enzymes are responsible for deterioration of fruit juices, fruits and vegetables.  
7) Mechanical energy in a fluid can be converted through friction into heat energy.  
8) When fluid is at rest, it is called fluid dynamics.  
9) The steam which contains water as droplets is called dry saturated steam.  
10) The curd tension of milk increases due to homogenization.

Q.10 Fill in the blanks:
1) _______ rate of drying is continuing upto critical moisture content.  
2) _______rate period, the water is being evaporated from free water surface.  
3) A liquid boils when the _______ of the liquid is equal to external pressure on the system.  
4) _______ is used in food industry for concentrating essential oils, Flavors and alcoholic beverages.  
5) The rate of filtration = driving force/_______.
6) _______ are used quite extensively to remove suspended dust or particles from air steam.  
7) Milk is fed in centrifugal separator to separate it in to _______ and _______.  
8) The unit of dynamic viscosity is _______ and kinematics viscosity is _______.  
9) The juices, sauces, ketchup, fruit and vegetable pulp are _______ types of fluids.  
10) _______ is the steam for which the temp. is above that of dry saturated steam at the same pressure.
MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE
SEMESTER END EXAMINATION
B.Tech. (Agril. Enng.)

Semester : VII
Course No. : IDE 475
Credits : 2(1+1)
Day & Date : Saturday, 14.11.2009

Academic Year : 2009-10
Title : Irrigation and Drainage
Equipment Design

Time : 9.00 to 11.00
Total Marks : 40

Note:
1. Solve ANY FIVE 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 steps involved in design of tube well. What are the important considerations for design of well screen and gravel pack?

Q.2 Classify the variable displacement pumps. Describe in detail the principle of operation of centrifugal pump alongwith a neat sketch.

Q.3 Derive the equation for steady state flow to wells in unconfined aquifer.

Q.4 Enlist the different tube well drilling methods. Describe the principle of direct circulation rotary drilling.

Q.5 A single acting reciprocating pump has a piston of diameter 10 cm and stroke of 20 cm. The piston makes 40 double strokes per minute. The section and delivery heads are 5 m and 10 m respectively, find
   1) The discharge capacity of pump in lit/min.
   2) The force required for working the piston during the suction and delivery strokes, if the efficiency of suction and delivery strokes are 50 and 60 per cent respectively, and
   3) The hp required by the pump.

Q.6 Explain the pump characteristic curves for centrifugal pumps.

Q.7 Write short notes on (Any two):
   1) Jet pump  
   2) Electrical resistivity survey  
   3) Persian wheel

SECTION "B"

Q.8 Define the terms:
   1) Drawdown  
   2) Specific capacity  
   3) Coefficient of storage
   4) Transmissibility  
   5) Cavitation

Q.9 Fill in the blanks:
   1) In open well design, the critical velocity is usually assumed as ________.
   2) Tube wells in hard rock areas are called ________.
   3) The term ________ refers to the placing of gravel around the well screen.
   4) The distinguishing features of variable displacement pumps are the ________ relationship between the discharge rate and the pressure head.
   5) The impeller of the turbine pump operates on a ________ centrifugal principle.

(P.T.O.)
Q.10 State true or false:

1) Propeller pumps are efficient for application under high discharge and low head situations.

2) The mixed flow pumps are superior under medium head and high discharge situations.

3) In shallow tube wells the average depth of the well is usually less than 35 m.

4) A well curb is a circular cutting edge provided at the bottom of the staining for sinking of open wells.

5) Specific yield is defined as the volume of water released or stored per unit surface area of the aquifer per unit change in the component of head, normal to surface.
B.Tech. (Agril. Engg.)

Semester : VII  Academic Year : 2009-10
Course No. : FLE. FS 471  Title : Construction Technology
Credits : 3(1+2)
Day & Date : Monday, 16.11.2009  Time : 9.00 to 11.00  Total Marks : 40

Note:
1. Solve ANY FIVE 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 meant by foundation? Mention its objectives. (3)
    b) Describe with neat sketch various types of shallow foundations. (2)

Q.2 a) Enlist various methods of soil exploration. (3)
    b) Explain importance of soil investigations. (2)

Q.3 a) State and explain various types of rubble masonries. (3)
    b) Enumerate important points while supervising brick masonry. (2)

Q.4 a) Explain with neat sketch Flemish bond. (3)
    b) Compare English bond with Flemish bond. (2)

Q.5 a) Explain with neat sketch various types of doors. (3)
    b) State various types of windows. (2)

Q.6 a) Define lintel and mention various types of materials used for it. (3)
    b) Define flat roof and give its advantages and disadvantages. (2)

Q.7 Write short notes on (Any two):
1) Drainage and sanitation arrangement in building
2) Collapsible door
3) Paints
4) Arches

SECTION "B"

Q.8 Fill in the blanks:
1) The ______ lintel is not generally favoured.
2) ______ flooring is known as joint less flooring.
3) Bat is a portion of brick cut by some fraction of its ______.
4) The ______ bond is used for curved surfaces.
5) ______ foundation has depth less than its width.
Q.9 State true or false:

1) Brick work is stronger than stone work.
2) Stone pass from facing to backing of wall is known as through stone.
3) The English bond is generally used in practice.
4) Appearance of grooved pointing is better than flush pointing.
5) Terrazzo flooring is very popular in villages.

Q.10 Define followings:

1) Door and windows
2) Foundation
3) Frog
4) Plastering
5) King closer

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MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE
SEMESTER END EXAMINATION

B.Tech. (Agril. Engg.)

Semester : VII  Academic Year : 2009-10
Course No. : ELE. APE 473  Title : Engineering properties of Bio-
Credits  : 3(1+2)  Materials
Day & Date  : Monday, 16.11.2009  Time : 9.00 to 11.00  Total Marks : 40

Note: 1. Solve ANY FIVE 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) Describe the method for determining the volume and density of biological materials.
   b) Explain the importance of physical properties of biological materials in the machine
   Q.2 a) Describe the procedure to determine the porosity of grains.
   b) Explain the importance of hydrodynamic properties in agricultural processing.
   Q.3 600 kg of sorghum at 20% moisture content (wb) is dried to 14% moisture content
        (wb) for milling. Calculate the amount of moisture removed in drying.
   Q.4 a) Derive the generalized equation for the Kelvin model.
       b) Derive the generalized equation for the Maxwell model.
   Q.5 Explain the applications of optical properties in fruit and vegetable processing.
   Q.6 Describe the dynamic test for evaluation of food texture.
   Q.7 Describe in detail the creep and stress relaxation behaviour of biological materials.

SECTION "B"

Q.8 Fill in the blanks:
   1) _______ properties of agricultural products can be used for moisture
determinations.
   2) The rate at which related elastic deformation takes place in a material under dead
load place is called as ________.
   3) The rate of stress decay in a material subjected to a sudden strain is called ________.
   4) The coefficient of viscosity divided by the mass density is called ________.
   5) Those fluids which show a decrease in shear stress with time of shear at a given
shear rate are called ________.

Q.9 State true or false:
   1) Viscosity resists the flow of the liquids.
   2) Rupture point comes after Bio-yield point.
   3) Harvesting does not add in the deformation of biomaterials.
   4) Thermal conductivity of biological materials is not much important in drying.
   5) Electrical conductivity of the biological materials is useful in moisture
measurement.

(P.T.O.)
Q.10 Match the followings:

<table>
<thead>
<tr>
<th>&quot;A&quot;</th>
<th>&quot;B&quot;</th>
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<tbody>
<tr>
<td>1) Thermal conductivity</td>
<td>a) Mechanical property</td>
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<tr>
<td>2) Shearing</td>
<td>b) Thermal property</td>
</tr>
<tr>
<td>3) Deformation</td>
<td>c) Aerodynamic property</td>
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<tr>
<td>4) Blowing</td>
<td>d) Rheological property</td>
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<tr>
<td>5) Colour</td>
<td>e) Physical property</td>
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<tr>
<td></td>
<td>f) Electrical property</td>
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