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AGRICULTURAL UNIVERSITIES OF GUJARAT COLLEGE OF AGRICULTURAL ENGINEERING AND TECHNOLOGY JUNAGADH / GODHRA/ DEDIAPADA Semester: 6 $^{\text {th }}$ (Regular - IV Dean's) B. Tech (Agril. Engg.) \\ Semester End Theory Examination (May/June -2019) \\ | Subject: Agricultural Structures \& Environment Control | Course No: PFE -302 |
| :--- | :--- | :--- |
| Date : 02/05/2019 | Time: 10.00 to 12.30 |
| Day : Thursday | Marks: 80.00 |

}
Q. 1 (A) What is farmstead? What are the important criteria's to be kept in mind for 6.0 selection of farmstead?
(B) Explain the planning of improved farm residence design in brief.6.0
Q. 2 (A) Give classification of dairy barn and explain stanchion barn in brief. ..... 6.0
(B) What are the different types of poultry houses being used in India? Explain ..... 6.0 deep litter poultry house in brief with neat sketch.
Q. 3 (A) Explain different types of woven mesh type of fencing in details with neat ..... 6.0 sketches.(B) Calculate the cost of fencing a farm of 64 ha fenced by barbed wire using6.0angle iron posts. Make rational assumptions.
Q. 4 (A) Explain the working principle and construction of a septic tank. ..... 6.0
(B) Design a septic tank for a farm house having a population of 100 persons. ..... 6.0The rate of water used every day may be taken as 150 liters per person.Also design a soakage pit for discharging the effluent from the septic tank.
Q. 5 (A) Enlist different types of traditional storage structures for food grain in India ..... 6.0and explain any two with neat sketches.
(B) Design a bag storage structure for storing 250 tonnes of paddy. Assume size of the bag $=100 \times 60 \times 30 \mathrm{~cm} \& 75 \mathrm{~kg}$ paddy. Assume rational data and mention clearly.
Q. 6 (A) A RCC cylindrical bin storage has internal diameter of 5 m and is 20 m deep. It's completely filled with paddy weighing $600 \mathrm{~kg} / \mathrm{m}^{3}$. The angle of internal friction for paddy can be taken as $35^{\circ}$ while the angle of friction between paddy and bin wall is $30^{\circ}$. The ratio of horizontal and vertical pressure intensity $(\mathrm{k})$ is 0.4 . Calculate the lateral pressure intensity at 2.0 , $6.0,10.0$ and 14.0 m depth.

## OR

Design a water supply system for a dairy farm keeping 20 cattle. Make rational assumptions. Assume daily water requirement is 300 litres per day per cattle.
(B) Design a trench silo for a small farm having the following herds. The silage is fed 160 days in a year at the rate of 3.4 kg per 100 kg of animal body weight. Assume; (i) Depth of silo $=2.5 \mathrm{~m}$, (ii) Length of silage fed per day

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=15 \mathrm{~cm} \text {, (iii) Side slope }=50 \% \text { and (iv) Density of silage }=800 \mathrm{~kg} / \mathrm{m}^{3}
$$

| Animal breed | Body weight <br> per animal (kg) | Total <br> number of <br> animals | Rate of feeding <br> per 100 kg of <br> body weight $(\mathrm{kg})$ |
| :--- | :---: | :---: | :---: |
| Murrah buffaloes | 680 | 40 | 4.0 |
| Hariyana cows | 450 | 60 | 3.0 |
| Bullocks | 500 | 20 | 3.5 |
| Heifers | 180 | 20 | 3.0 |

Q. $7 \quad$ Write short notes on followings (Any Four)
[A] CAP storage
[B] Pusa bin
[C] Sheep Housing
[D] Trench silo
[E] Waste disposal system at rural level
[F] Animal reaction to thermal and other environmental factors

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===\text { Best of Luck }===
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## AGRICULTURAL UNIVERSITIES OF GUJARAT

 COLLEGE OF AGRICULTURAL ENGINEERING AND TECHNOLOGY JUNAGADH/GODHARA/DEDIYAPADASemester End Examination (Regular-IV Deans') B. Tech (Agril. Engg.)-May/ June 2019

## Semester : Sixth

Subject : Drying and Storage Engineering
Course No.: PFE-304

## Q. 1 Define the following terms:

Date: 03/05/2019 (Friday)
Time: 10:00 to 12:30 hrs.
Max. Marks : 80.00
a) Equilibrium moisture content
b) Psychrometry
c) Aeration
d) Half response time / Plane of rupture
e) Sublimation

## Q. 2 Differentiate between the following:

a) Constant rate drying period and falling rate drying period
b) Modified atmospheric storage and controlled atmospheric storage
c) Sensible heat and latent heat
d) Bag storage and bulk storage

## Q. 3 Answer the following:

a) Explain drum dryer in detail with neat and clean sketch.
b) Explain tray dryer in detail with neat and clean sketch.
c) Explain the various causes of food spoilage.
d) Write down the requirements of an ideal grain storage structure.
e) Explain the moisture migration inside storage bin in summer and winter season.

## Q. 4 Find the answer of following

a) 2000 Kg of soybeans with $20 \%$ moisture content (wb) is dried to $12 \%$ moisture content (db). Calculate (a) the weight of bone dry matter (b) moisture removed during the drying(c) weight of the dried soybean during drying.
b) Determine the value of c and n from the Henderson's equation for the following data obtained under two different conditions of EMC studies of sunflower seed.

| Condition | $\mathbf{R H}, \mathbf{\%}$ | Temperature, $\mathbf{C}$ | EMC, $\%(\mathbf{w b})$ |
| :---: | :---: | :---: | :---: |
| 1 | 50 | 40 | 10 |
| 2 | 70 | 50 | 13 |

Q. 5 Find the answer of following
a) If the temperature of ambient air, heated air and exit air are given as 30,65 and $52^{\circ} \mathrm{C}$ respectively then calculate the Heat Utilization Factor, COP and thermal efficiency given- Weight of water removed $=500 \mathrm{~kg}$, Power supplied $=200 \mathrm{kWh}$ Latent heat of vaporization $=540 \mathrm{kca} / \mathrm{kg}$.
b) Design a bag storage structures for storing 250 tonnes of Paddy.

Assume reasonable data where evcr necessary.
Q. 6 Find the answer of following
a) Eight tonnes of Apple having specific heat of $0.80 \mathrm{kcal} / \mathrm{kg}^{\circ} \mathrm{C}$ is to be cooled from 25 to $14^{\circ} \mathrm{C}$ in 24 hours. The heat of respiration per 24 hour is $745 \mathrm{kcal} / \mathrm{t}$. Three men will work for 4 hours and lighting load is estimated to be 100 watt. Air infiltration load is assumed as 980 kcal in 24 hours. The cold storage measures 6 X 6 X 3 m on the inside and is constructed of bricks laid in cement mortar. Wall thickness is 40 cm and there is 10 cm thick cork insulation on the inside of the four walls. The cement plaster is 1 cm thick. The heat transfer coefficient for the ceiling is $20 \%$ more than that for the walls. The outside temperature is $30^{\circ} \mathrm{C}$ and inside temperature at $5^{\circ} \mathrm{C}$. Calculate the plant capacity needed in tonnes of refrigeration.

1. Thermal conductivity of brick $=0.45 \mathrm{kcal} / \mathrm{hr} / \mathrm{m}^{\circ} \mathrm{C}$
2. Thermal conductivity of cork $=0.025 \mathrm{kcal} / \mathrm{hr} / \mathrm{m}^{\circ} \mathrm{C}$
3. Thermal conductivity of cement plaster $=0.25 \mathrm{kcal} / \mathrm{hr} / \mathrm{m}^{\circ} \mathrm{C}$
4. Heat respiration for men $=170 \mathrm{kcal} / \mathrm{hr}$
5. There is no heat transfer through the floor OR
Derive the expression for Janssen equation for determination of lateral pressure in shallow bin.
b) A RCC cylindrical grain storage bin has internal diameter of 5 m and is 20 m deep. It is completely filled with paddy weighing $600 \mathrm{~kg} / \mathrm{m}^{3}$. Angle of internal friction for paddy can be taken as 350 , while angle of friction between paddy and bin wall is $30^{\circ}$. Ratio of horizontal and vertical pressure intensity k , is 0.4 . Calculate the lateral pressure intensity at $4.0 \mathrm{~m}, 5.5 \mathrm{~m}$ and 18 m depth using Janssen theory.
Q. 7 Select the most appropriate answer.
i. The moisture commonly removed in drying is:
a) Total Moisture
b) EMC
c) Free moisture
d) Bound moisture
ii. Advantage of fluidized bed drying are:
a) complete
b) can be used removal
of moisture
c) fast uniform drying
and d) simple and can for dense and heavy products be done even by unskilled labour
iii. If the moisture content of the grain on wet basis is $25 \%$, then what should be the moisture content on dry basis
a) $20 \%$
b) $30 \%$
c) $33 \%$
d) $40 \%$
iv. In foam mat drying, foaming agent help to:
a) Decrease
b) Increase
c) Neither increase nor
d) Stabilizes surface area
surface area decrease surface area
v. In thin layer drying, generally thickness of grain bed is taken as:
a) Up to 20 cm
b) Up to 30 cm
c) $U p$ to 40 cm
d) Up to 40 cm
vi. About 100 kg of Potato flakes $(75 \% \mathrm{wb})$ are dried in a dryer. It is found that $70 \%$ of original water has been removed in a dryer. The moisture content in the dried potato flakes on dry basis will be:
a) $90 \%$
b) $80 \%$
c) $95 \%$
d) None of the above
vii. Suitable moisture content for paddy storage is in the range of:
a) 4-6
b) $16-18$
c) 22-24
d) $10-12$
viii. The process of moving air through stored grain at low flow rates to maintain or improve its quality is called:
a) Fumigation
b) Aeration
c) Ventilation
d) Infiltration
ix. The relation between EMC and RH for biological materials has been given by
a) Perry
b) Rankine
c) Janseen
d) Henderson
x. Airy's theory is used to calculate lateral pressure exerted by grain in a:
a) Deep bin
b) Shallow bin
c) Deep and
d) Medium bin Shallow bin
xi. If dried grain are stored in a silo for a long period of time and the bottom layer of the grain is spoilt due to accumulation of moisture, then the reason for this spoilage is that the grain, in comparison to outside air is:
a) Cooler
b) Warmer
c) More wet
d) Drier
xii. The most common fumigant for storage of cereals is:
a) Zinc phosphide
b) Ethylene
c) Aluminum
d) DDT
dibromide phosphide
xiii. Water activity of pure water is:
a) Less than one
b) Greater than one
c) Equal to one
d) None of the above
xiv. The difference between adsorption and desorption curve is known as:
a) Sorption
b) Wetting
c) Hysteresis behavior
d) Reabsorption behavior
xv. Wet bulb temperature is same as due point temperature, the Relative Humidity air will be:
a) $100 \%$
b) $50 \%$
c) $25 \%$
d) $0 \%$
xvi. A type of modern permanent storage structure is:
a) Pusa bin
b) Mud kothi
c) Kothar
d) Squat silo
xvii. In the deep bin, depth of the grain is $\qquad$ equivalent diameter:
a) Equal to
b) Greater than
c) Less than
d) Less or equal to
xviii. In modified atmosphere packaging:
a) $\mathrm{CO}_{2}$ and $\mathrm{O}_{2}$ level increases
b) $\mathrm{CO}_{2}$ level increases and $\mathrm{O}_{2} \quad$ level decreases
c) $\mathrm{CO}_{2}$ level decreases and $\mathrm{O}_{2} \quad$ level
d) $\mathrm{CO}_{2}$ and $\mathrm{O}_{2}$ level remains constant
xix. Lateral pressure in shallow bin is determined by
a) Fick's Law
b) Fourier law
c) Airy's
d) Janssen formula
Formula
$\mathbf{x x}$. Which of the following storage structure(s) has/ have storage capacity of 3.5 to 18 tonnes? (i) Bhukhari (ii) Khotar and (iii) Morai
a) i \& ii
b) i \& iii
c) ii $\&$ iii
d) i, ii \& iii

# AGRICULTURAL UNIVERSITIES OF GUJARAT 

# COLLEGE OF AGRICULTURAL ENGINEERING AND TECHNOLOGY <br> JUNAGADH / GODHARA/ DEDIAPADA 

Semester: Sixth (Regular) B.Tech. (Agril. Engg.)

## Semester End Examination - 2019 (Regular) (IV ${ }^{\text {th }}$ Deans)

| Subject: Design of Structures | Course No.: RE-302 |
| :--- | :--- |
| Date: $04 / 05 / 2019$ | Time: $10: 00$ to 12:30 |
| Day: Saturday | Marks: 80 |

Note: Assume necessary data and derive Area of steel by analytical formula.

## Q. 1 Answer the following questions: (Any five)

(A) Provide the provision given in IS:456 ;
(i) Spacing of Reinforcement
(ii) Deflection Control
(iii) Limit state Method
(iv) Effective span
(B) Stress and Strain diagram analysis for Singly Reinforced Beam
(C) How to analyze the Two-way R.C.C. slab as per IS:456? (Design steps)
(D) What do you mean by Factor of safety, design load and design strength?
(E) Explain T-Beam with flow chart.
(F) Enlist assumption made in limit state of collapse as per IS:456.

## Q. 2 Answer the following questions: (Any two)

(A) Enlist Different type of R.C.C. Beam and describe in detail: Analysis of doubly reinforced beam.
(B) Describe in detail: Stress and Strain diagram analysis for Tee-Beam (with sketch/diagram)
(C) Explain the types of column.
(D) Discuss: One-way slab
Q. 3 Answer the following questions: (Any two)
(A) A doubly reinforced beam of $300 \mathrm{~mm} \times 600 \mathrm{~mm}$ overall is reinforced with $4-20 \mathrm{~mm}$ diameter bars as Compression reinforcement and $6-20 \mathrm{~mm}$ diameter bars as Tension Reinforcement effective cover on both side 50 mm , grade of concrete M20, grade of steel $\mathrm{Fe}-415, \mathrm{~F}_{\mathrm{cc}}=11.15$ $\mathrm{N} / \mathrm{mm}^{2}, \mathrm{~F}_{\mathrm{sc}}=353 \mathrm{~N} / \mathrm{mm}^{2}$. Find out moment of resistance.
(B) A RCC beam rectangular in section $230 \mathrm{~mm} \times 450 \mathrm{~mm}$ effective is singly reinforced by 4 Nos. of 18 mm dia. bars of Fe 415 grade steel and M 20 grade of concrete. Determine moment of resistance of the section. Take $\mathrm{X}_{\mathrm{u} \text { max }}$ for Fe 415 as 0.48 d .
(C) A rectangular beam $230 \mathrm{~mm} \times 400 \mathrm{~mm}$ overall section reinforced with 3 Nos. 20 mm bars. Grade of concrete M-20; Grade of steel Fe-250; Effective cover $=50 \mathrm{~mm}$. Take $X_{u} \max =$ 0.53 d . Then calculate the following: (i) Depth of neutral axis $\left(\mathrm{X}_{u}\right)$, (ii) Lever arm $(\mathrm{Z})$.
Q. 4 Design following structural member: (Any Two)
(A) Find out moment of resistance of T-Beam having Flange width $=1500 \mathrm{~mm}$, Web width $=$ 330 mm , effective depth $=650 \mathrm{~mm}$, Tension steel $=1600 \mathrm{~mm}^{2}$, depth of flange $=150 \mathrm{~mm}$.
(B) Design the slab for room sized $3.30 \mathrm{~m} \times 9.20 \mathrm{~m}$. The slab is resting on 350 mm thick wall and resisting live load of $2.4 \mathrm{kN} / \mathrm{m}^{2}$. Use M20 grade concrete and $\mathrm{Fe}-415$ grade steel. Take M.F. 1.15.
(C) Design an isolated square footing for a square column $400 \mathrm{~mm} \times 400 \mathrm{~mm}$ for axial load of 800 kN . Use concrete grade M -20 and $\mathrm{Fe}-250$ grade steel. Take safe bearing capacity of soil is $120 \mathrm{kN} / \mathrm{m}^{2}$. Check for shear is not required.
(D) Design Two-way Slab $3.10 \mathrm{~m} \times 3.10 \mathrm{~m}$ clear span supported on 300 mm thick walls on four sides. Take design load $=11.00 \mathrm{kN} / \mathrm{m}^{2}, \mathrm{MF}=1.5, \mathrm{M} 20, \mathrm{Fe}-415, \alpha \mathrm{x}$ and $\alpha \mathrm{y}=0.062$.
Q. 5 Solve the following problems: (Any three) 15
(A) For a simply supported slab of clear span 3.0 m , effective depth $=140 \mathrm{~mm}$ and width of support is 250 mm . find effective span of slab.
(B) Find out percentage steel for beam having width $=230 \mathrm{~mm}$, effective depth $=460 \mathrm{~mm}$ and subjected to 28.65 kNm of bending moment. Take Fe-415 and grade of concrete M20.
(C) A slab having effective depth of 150 mm provided with 8 mm dia. bar at $170 \mathrm{~mm} \mathrm{c} / \mathrm{c}$ as main steel and 6 mm dia. bar at $130 \mathrm{~mm} \mathrm{c} / \mathrm{c}$. check the spacing for cracking.
(D) Determine development length for 20 mm diameter, $\mathrm{Fe}-250$ grade steel bar in compression. Take concrete grade M20 and design bond stress is $1.2 \mathrm{~N} / \mathrm{mm}^{2}$.

## AGRICULTURAL UNIVERSITIES OF GUJARAT COLLEGE OF AGRICULTURAL ENGINEERING AND TECHNOLOGY GODHRA/DEDIAPADA/JUNAGADH Semester: $6^{\text {th }}$ (Regular IV ${ }^{\text {th }}$ Dean) B.Tech (Agril. Engg.)

Semester End Examination-2019

Subject: Drainage Engineering
Date: 06/05/2019
Day:

Monday

Course No: SWE-302
Time: $\mathbf{1 0 . 0 0}$ to $\mathbf{1 2 . 3 0} \mathbf{~ h r s}$
Marks: $\mathbf{8 0 . 0 0}$

Note: Assume necessary data, if required.
Q. 1 Define the following terms (any TEN):
[10]
(a) Water table contour map
(b) Piezometer
(g) Leaching requirement
(c) Steady flow
(h) Gypsum requirement
(d) Interceptor drain
(i) Tile drain
(e) Isobath
(j) Drainable porosity
(f) Mole drainage
(k) Conjunctive use
(1) Hydraulic conductivity
Q. 2 Write short notes on FOUR of the following terms:
(a) Salt affected soil
(d) Drainage problems in India
(b) Ernst equation for drain spacing
(e) Bio-drainage
(c) Information from drainage survey
(f) Drainage installation

## Q. 3 Answer any FIVE questions of the following:

(a) Which are the materials used for pipe drainage? Explain.
(b) What is salt balance? Explain the salt balance in the agricultural field.
(c) Explain unsteady state drain spacing equations.
(d) Explain use of wells for drainage of agricultural land.
(e) Explain different causes of Waterlogging.
(f) Write the factors affecting movement of water into subsurface drains
(g) Explain different supplementary structures required for subsurface drainage system

## Q. 4 Attempt any TWO question from the following:

(a) Explain different types of layouts required for surface drainage and subsurface drainage systems. Explain with the suitability.
(b) Derive Hooghoudt's drain spacing equation for steady state condition with neat sketch and assumptions.
(c) What are the major factors which influence drainage? Write the merits and demerits of surface and subsurface drainage systems. Also describe common benefits of agricultural drainage.
Q. 5 Attempt any FOUR questions from the following
(a) To remove the excess surface water from the area, design the surface drainage channel. The drainage coefficient is 20 mm and $7.50 \mathrm{sq} . \mathrm{km}$ area required to drain excess water. The slope of the land along the rout of the ditch is $0.10 \%$, the average slope of the watershed is $0.3 \%$ and the soil is silt loam. The ditch should provide sufficient depth to drain excess water. Take side slope 1.5:1 for silt loam soil.
（b）In semi－arid region，the average crop water requirement is $4 \mathrm{~mm} /$ day for the 110 days long rabi cropping season．The crop water requirement is met through surface irrigation at suitable irrigation interval with an application efficiency of $60 \%$ ．The EC of irrigation water is $1 \mathrm{dS} / \mathrm{m}$ and the ECe of the soil water is 5 $\mathrm{dS} / \mathrm{m}$ ，which is to be reduced to $2 \mathrm{dS} / \mathrm{m}$ by leaching．If leaching efficiency $70 \%$ ， calculate the leaching requirement．
（c）The waterlogged area required to drain excess water by installing the subsurface tile drainage system．For this sub surface drainage system，the laterals are laid out 50 m apart and length of the laterals is 200 m ．They are laid on a grade of 0.3 $\%$ ．The drainage coefficient of the area is 2 cm ．Design the size of tile drain． Take $\mathrm{n}=0.018$ ．
（d）A subsurface drainage system is to be installed using PVC pipes of 10 cm radius for draining an area at a discharge rate of $1.0 \mathrm{~mm} /$ day．The drains are to be placed at a depth of 2.0 m below ground level．Hydraulic conductivity of the soil above the impervious layer was found to be $0.14 \mathrm{~m} / \mathrm{d}$ ．The impervious layer is found at 4.9 m from the ground surface．Assume the equivalent depth equal to the depth of impervious layer below the drain level．Assume equivalent depth as 2.9 m ．Depth of water table midway between the drains is to be kept at 1.0 m ． Find the drain spacing for steady state condition．
（e）The maximum permissible height of the water table at mid of two drains in the waterlogged area is required to maintain at 1.0 m below the soil surface．The interval is 10 days．The percolation loss of the irrigation water to the water table is 2.5 cm for each irrigation．The drains are installed at a depth of 180 cm with the drain pipe diameter of 10 cm ．The nearly impervious layer is at 9.5 m below the soil surface．The field test was conducted to find out the average hydraulic conductivity of the soil profile，it was found as $1.0 \mathrm{~m} / \mathrm{d}$ and drainable pore space was 0.05 ．Use the unsteady state condition and determine the drain spacing to control the water table in waterlogged area．

# COLLEGE OF AGRICULTURAL ENGINEERING AND TECHNOLOGY 

 JUNAGADH / GODHARA/DEDIYAPADASemester: $6^{\text {th }}$ (Regular) B.Tech (Agril. Engg.)
Semester End Examination - 2019
Subject: Refrigeration and air conditioning
Date: 08/05/2019
Course No: FMP-302
Day: Wednesday
Time: 10.00 to 12.30
Marks: 80

## 1. A. Fill up the blanks.

1. The $\qquad$ condenser used in steam jet refrigeration.
2. One ton of refrigeration $(\mathrm{TR})$ is equal to $\qquad$ kw.
In refrigeration system $\qquad$ is connected between evaporator and condenser to
3. remove water.
$\qquad$ .
4. Curved line on psychometric chart indicates
5. During sensible heating process of air humidity ratio is $\qquad$ .
6. $\qquad$ defrosting method used for low temperature evaporator.
7. The mass of water vapour present in $\qquad$ is called absolute humidity.
8. The highest temperature during the cycle in a vapour compression system occurs after $\qquad$ .
9. The subcooling is the process of cooling the refrigerant in Vapour compression after $\qquad$ -
10. The pressure at the outlet of a refrigerant compressor is called $\qquad$ .

## B. State True and False

11. An Electrolux refrigerator is called a vapour compression system.
12. An evaporator is also known as cooling coil.
13. The commonly used refrigerant in domestic refrigerator is R717.
14. The sub cooling is a process of cooling the refrigerant in VCRS.
15. The capillary in a refrigeration system removes moisture in the system.
16. Answer the following question (Any five)
17. Difference between sensible Heating and sensible Cooling.
18. Classify the different types of refrigerant. Describe designation for refrigerant.
19. What is role of heat exchanger in vapour absorption cycle? Draw schematic diagram of absorption cycle with heat exchanger and explain how it improves operating efficiency
20. Derive equation of COP for reverse Carnot cycle.
21. What do you mean by refrigeration load?
22. Derive equation for effective diameter of circular duct for rectangular duct by considering same air velocity.
23. With neat sketch explain cycle with superheated vapour before compression.
24. Answer the following question (Any Four)
25. A simple vapour compression plant produces 5 tonnes of refrigeration. The enthalpy values at inlet to compressor, at exit from the compressor, and at exit from the condenser are 183.19, 209.41 and $74.59 \mathrm{~kJ} / \mathrm{kg}$ respectively. Estimate: (i) The refrigerant flow rate, (ii) The C.O.P., (iii) The power required to drive the compressor, and (iv) The rate of heat rejection to the condenser.
26. The capacity of the refrigerator (working on reversed Carnot cycle) is 400 tonnes when operating between $-8^{\circ} \mathrm{C}$ and $35^{\circ} \mathrm{C}$. Determine: (i) Quantity of ice produced within 24 hours when water is supplied at $22^{\circ} \mathrm{C}$. (ii) Minimum power (in kW ) required
27. A vapour compression refrigeration using R 22 works between temperature limits of $-10^{\circ} \mathrm{C}$ and $48^{\circ} \mathrm{C}$.The refrigerant leaves the compressor as dry saturated. Calculate the refrigerating effect and C.O.P if (a) the refrigerant leaves the condenser saturated (b) the refrigerant is sub-cooled to $12^{\circ} \mathrm{C}$ before entering the throttle valve.
28. Consider a two-stage cascade refrigeration system operating between $-60^{\circ} \mathrm{C}$ and $50^{\circ} \mathrm{C}$. Each stage operates on an ideal vapor-compression refrigeration cycle. The upper cycle uses R-22 as working fluid; lower cycle uses R-12. In the lower cycle refrigerant condenses at $10^{\circ} \mathrm{C}$, in the upper cycle refrigerant evaporates at $0^{\circ} \mathrm{C}$. If the mass flow rate in the upper cycle is $0.5 \mathrm{~kg} / \mathrm{s}$, determine (a) the mass flow rate through the lower cycle, (b) the rate of cooling in tons, (c) the coefficient of performance and (d) the compressor power input in kW.
29. The atmospheric air at $35^{\circ} \mathrm{C}$ dry bulb temperature and $65 \%$ relative humidity enters a cooling coil at the rate of $250 \mathrm{~m}^{3} / \mathrm{min}$. The coil dew point temperature is $16^{\circ} \mathrm{C}$ and the bypass factor of the coil is 0.1 . Determine: 1 . The temperature of air leaving the cooling coil; 2. The capacity of the cooling coil in tonnes of refrigeration 3. The sensible heat factor for the process.

## 4. Write short note on following (any three)

1. Vortex tube refrigeration system.
2. Three fluid vapour absorption refrigeration system.
3. Steam jet refrigeration system.
4. Summer air conditioning system.
5. Cooling and dehumidification processes.

# AGRICULTURAL UNIVERSITIES OF GUJARAT COLLEGE OF AGRICULTURAL ENGINEERING AND TECHNOLOGY JUNAGADH / GODHARA / DEDIAPADA <br> Semester End Examination (REGULAR) 

Semester: $-6^{\text {th }}$ B. Tech. (Agril. Engg.) (IV Deans')
Subject: Entrepreneurship Development \& communication skill Date: 9 ${ }^{\text {th }}$ May 2019

Marks: 80.00
Course No: AEE-302
Time: 10.00 To 12.30 hrs
Q. 1 Define entrepreneurship and explain any six characteristics of Entrepreneur
Q. 2 Explain the followings terms in short (any four).
(1) Contract farming (2) Joint Venture (3) Public private partnership (4) Motivation
(5) Characteristics of the ideal business (6) SWOT analysis

(5) Characteristics of the ideal business (6) SWOT analysis[10][20]
Q. 3 Define Management. Explain functions of Management[10]What are the needs, objectives and phases of entrepreneurship development programme?
Q. 4 Briefly explain key areas for assessing feasibility of a new venture[10]Explain project formulation and its process (stages).
Q. 5 Answer the following questions (Any Five).[15]

1. How is communication an integral part of daily life?
2. Give definition of 'Communication' mentioning the essentials of communication.
3. $\qquad$ is the tool of communication.( Fill the gap explaining the sentence)
4. Enlist the levels of communication and explain any three.
5. What is 'Feedback'? Why is it essential?
6. Explain the Basics for Body Language and its importance.
7. Which two forms of Technical Communication are usually in practice in any organization?
Q. 6 (a) Make precise of the following paragraph and give it a suitable title.

The common sense is a gift of nature to human beings. It is a gift which involves a keen sense of observation, emotional balance and practical wisdom born out of varieties of experience. It is the ability to react rationally, without being influenced by emotion to a given situation and take sensible decisions. A person endowed with high degree of common sense displays sound judgment and discretion. It is strange but true that most of us try to know the world with eyes only and very often influenced by our emotions, feel a sense of pride that whatever the eyes have apparently seen is the only truth around us. But the wise, though few in number, always use their power of discretion and thus separate fact from fiction and truth from falsehood. What the eyes fail to observe reason can. The common sense in every human being is the strong arm of reason with
which one can see through the 'life of things' and have a glimpse of 'reality' that governs all things, big and small, high and low.
Q. 6 (b) Correct the following sentences. (any eight)

1. Some people do exercise at his place.
2. This is one of the best college in which we study.
3. He used to visit Shiv Temple on every Monday.
4. As soon as she will enter into the classroom, all will be silent.
5. My sister's flat is more spacious than her friend.
6. When none are present, to whom should I teach?
7. Unless he put into his sincere efforts, he won't pass that Exam.
8. After he talked to principal. he went to see him.
9. While I was talking on phone, my friend was shouting at me.

10 . Children is playing in the garden.

# AGRICULTURAL UNIVERSITIES OF GUJARAT COLLEGE OF AGRICULTURAL ENGINEERING AND TECHNOLOGY JUNAGADH/GODHRA/DEDIYAPADA 

Semester: VI ${ }^{\text {th }}$ (Regular-IV Deans') B.Tech. (Agril. Engg.)

## Semester End Examination-2019

Subject: Soil \& Water Conservation Structures
Date: 07/05/2019
Day: Tuesday

Course No.: SWE-304
Time: $\mathbf{1 0 . 0 0}$ to $\mathbf{1 2 . 3 0} \mathbf{h r s}$.
Marks: 80.00
(Assume necessary data if required)
Q. 1 Write short notes on any Five of the following:
A. Chute spillway
B. Hydraulic jump
C. Toe drain
D. Phreatic line
E. Protection of earthen embankment
F. Uniform flow
Q. 2 Differentiate the following (any five)
A. Dugout farm pond and embankment farm pond
B. Steady state and unsteady state flow
C. Drop spillway and drop inlet spillway
D. Open channel flow and pipe flow.
E. Hydrologic and hydraulic design of spillway
F. Homogeneous and zoned type earthen dam
Q. 3 Answer any four of the following questions. All questions carry equal marks.
A. Derive following relationship of energy loss in hydraulic jump.

$$
E_{1}-E_{2}=\frac{\left(Y_{2}-Y_{1}\right)^{3}}{4 Y_{1} Y_{2}}
$$

B. Enlist the site selection criteria for farm pond.
C. Derive the formula for determining the seepage line in earthen dam.
D. Classify the hydraulic jump based on froud number.
E. Explain the safety criteria to check, while designing the spillway structurally.
Q. 4 Answer any Five of the following questions. All questions carry equal marks.
40.0
A. Compute the value of stream flow rate with help of following data using
a) Two point method and
b) Three point method

| Distance from <br> one end $(\mathrm{m})$ | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Depth $(\mathrm{m})$ | 0 | 1.4 | 3.3 | 5.0 | 9.0 | 5.4 | 3.8 | 1.8 |  |
| Velocity <br> $(\mathrm{m} / \mathrm{s})$ | 0.2 d | 0 | 0.40 | 0.60 | 0.84 | 0.90 | 0.80 | 0.62 | 0.54 |
|  | 0.6 d | 0 | 0.25 | 0.35 | 0.60 | 0.70 | 0.65 | 0.50 | 0.36 |
|  | 0.8 d | 0 | 0.20 | 0.30 | 0.50 | 0.62 | 0.55 | 0.40 | 0.30 |

B. Design the chute spillway with SAF stilling basin which has to be constructed for conveying the runoff generated from $\mathrm{u} / \mathrm{s}$ area of 30 ha , into the gully of 4.5 m width with 3.0 m as drop. The other details are as: Rainfall intensity during 50 years return period $=12 \mathrm{~cm} / \mathrm{h}$ for the duration equal to Tc ; Runoff coefficient $(C)=0.35$ and a straight inlet with depth of flow as 0.70 m at the outlet.
C. Calculate the volume of excavation required to construct a dugout farm pond, if
a) Average depth of pond is 4.5 m
b) Bottom width is 12 m
c) Bottom length is 25 m
d) side slope to be used as $2: 1$
D. In a rectangular hydraulic channel, the discharge per unit width was recorded as $3.0 \mathrm{~m}^{3} / \mathrm{s} / \mathrm{m}$ during a hydraulic jump. Determine the sequent depth and energy lost, if the depth of flow before the hydraulic jump is 0.3 m .
E. A mass concrete dam has a trapezoidal cross section. The height above the foundation is 64 m and its water face is vertical. The width at top is 4.5 m . Calculate the necessary minimum width of dam at its bottom, to ensure that no tension should be developed when water is stored up to 60 meters and also calculate the maximum pressure developed at the base of the dam. Take density of concrete as $22.6 \mathrm{kN} / \mathrm{cu} . \mathrm{m}$ and density of water as $9.81 \mathrm{kN} / \mathrm{cu} . \mathrm{m}$.
F. Calculate the best hydraulic rectangular cross section to convey $\mathrm{Q}=10 \mathrm{~m}^{3} / \mathrm{s}$ discharge with (Manning's roughness coefficient) $n=0.02$ and (Hydraulic slope) $\mathrm{S}_{0}=0.0009$.
G. Design the outlet section of box-inlet drop spillway to handle the discharge of $10 \mathrm{~m}^{3} / \mathrm{s}$. Assume $\mathrm{B} / \mathrm{W}=0.25, \mathrm{~B}=75 \mathrm{~cm}$ and $\mathrm{We}<2.5 \mathrm{~W}$.

