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(21214)

Roll No.

B.Tech. V Sem.

TU-113

B.Tech. Examination, Dec - 2014

Ag. Engineering

RAC

BT-527

Time : Two Hours]

/ Maximum Marks : 50

- Note:** (i) Attempt any **five** questions.
(ii) **All** questions carry equal marks.
(iii) Use of steam table, psychometric chart, refrigerant properties table and chart are permitted.
(iv) Be precise & to the point in your answer.
1. (a) Differentiate between Heat Engine, Refrigerator and Heat pump. 5

P.T.O.

- (b) Define "Coefficient of Performance" and "Ton of Refrigeration (TR)". 5
2. Explain Reversed Carnot cycle with neat sketch and derive an expression for C.O.P. of the cycle. 10
3. What is refrigerant? Enumerate the desired chemical and thermodynamic properties of refrigerant. 10
4. Explain centrifugal and steam jet refrigeration system with neat sketch. 10
5. Explain the working Domestic Electrolux refrigerator with neat sketch. 10
6. Define the following terms and represent the same on Psychrometric chart : 10
- (i) Dew point temperature
 - (ii) Wet Bulb temperature
- (iii) Apparatus dew point
(iv) Relative humidity
(v) Specific humidity
7. Derive an expression for C.O.P. of an Ideal vapour absorption refrigeration system. 10
8. For winter air conditioning, the moist air at 10°C DBT and 8°C WBT enters at the rate of 100 m³/min. Over a steam spray such that the air is heated and humidified upto 20°C DBT and 60% RH. Find the sensible and latent heat added, SHF, moisture added per hour and capacity of heating coil in TR. 10

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B.Tech. V Sem.

TU-345

B.Tech. Examination, Dec. 2014

Ag Engg.

Irrigation & Drainage Engineering

BT-52B(N)

Time : Three Hours] [Maximum Marks : 100

Note: Attempt any five questions. Each question carries equal marks.

1. Discuss in brief about present status and future prospects of water resource development and utilization in India. 20
2. Explain the following: 20
 - (a) Why Irrigation?
 - (b) Necessity of Irrigation.
 - (c) Objectives of irrigation.
 - (d) Benefits of irrigation.

P.T.O.

3. Differentiate the following: 20
- (a) Infiltration and Seepage
 - (b) Check basin and furrow irrigation
 - (c) Delta and Duty
 - (d) Transpiration and Evapo-Transpiration
4. Define drainage and drainage coefficient also discuss various methods of drainage 20
5. Explain in brief about various forms of water available in soil. Inlist the characteristics of different kinds of soil water. 20
6. What do you understand by water logging? Discuss in detail about causes of water-logging. 20
7. What are the different methods/structures used in irrigation water measurement? Briefly describe them. 20
8. Define the followings:
- (a) Project efficiency
 - (b) Necessity of drainage of Agriculture land
 - (c) Water application efficiency
 - (d) factor affecting crop evapo-transpiration
9. Discuss in detail advantages, disadvantages and various components of sprinkler irrigation system. 20
10. Explain in detail about different methods of measurement of Evapotranspiration also define Drip irrigation System. 20

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Roll No.

B.Tech.-V Sem.

TU-115(N)

B. Tech. Examination, Dec. 2014

Ag. Engg. Branch

Machine Design

(BT-529)

Time : Three Hours]

[Maximum Marks : 100

Note : (i) Attempt any **five** questions.

(ii) Design Data Book is allowed.

1. (a) What are the criteria for selection of a material. 10

(b) What is standardization? What are the three basic types of standards used in a design office? 10

2. (a) What is fluctuating stress? Draw a stress-time curve for fluctuating stresses. 10

P.T.O.

- (b) State maximum principal stress theory of failure. 10
3. (a) What is lock nut? What is the principle of lock nut. 10
- (b) Write down the design procedure of cotter joint also draw is neat sketch. 10
4. (a) Write down the design procedure of shaft. 10
- (b) What is muff coupling? Also write down the design procedure. 10
5. (a) Write down the design procedure of V-Belt. 10
- (b) What is helical torsion spring? How does it differ from helical compression spring? 10
6. What is screw Jack? Sketch and explain in brief about screw Jack. 20
7. Two plates are joined together by means of single transverse and double parallel fillet welds as shown in fig. The size of the Fillet weld is 5mm and allowable shear load per mm of weld is 330N. Find the length of each Parallel Fillet weld.
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8. A Rotating bar made of steel 45C8 ($S_{at}=630\text{N/mm}^2$) is subjected to a completely reversed bending stress. The corrected endurance limit of the bar is 315 N/mm^2 . Calculate the fatigue strength of the bar for a life of 90,000 cycles. 20

9. It is required to design a square key for fixing a gear on a shaft of 25mm diameter. The shaft is transmitting 15kw power at 720 rpm to the gear. The key is made of steel 50C4 ($S_{yc} = 460\text{N/mm}^2$) and the factor of safety is 3. For key material, the yield strength in compression can be assumed to be equal to the yield strength in tension. Determine the dimensions of the key.
10. It is Required to design a rigid type of flange coupling to connect two shafts. The input shaft transmits 375kw power at 180rpm to the out put shaft through the coupling the service factor for the application is 1.5 i.e. the design torque is 1.5 times of the rated torque. Select suitable materials for various parts of the coupling, design the coupling and specify the dimensions of its components.

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Roll No.

B.Tech. V Sem.

TU-346

B.Tech. Examination, Dec. 2014

Ag. Engg

P.H.E. of Cereal Pulses and Oil Seeds

BT-529(N)

Time : Three Hours / Maximum Marks : 100

Note: Attempt any five questions. Each question carry equal marks.

1. Define processing. Describe in detail about various unit operations involved in processing. 20
2. What do you mean by size reduction? Explain in detail about cutting machines. 20
3. Explain in brief about Rittingers law, Bonds law and kicks law. 20

P.T.O.

4. Define the milling process and write down its importances in food industry. 20
5. What do you mean by drying of agricultural products? And describe about artificial drying of grains. 20
6. Write short notes on (any of **five**): 20
- (i) Hammer mills
 - (ii) Kelvin equation
 - (iii) Cyclone separators
 - (iv) Screen opening
 - (v) EMC
 - (vi) Cleaning process
7. What do you mean by grading? Explain in detail about crushers. 20
8. Discuss in detail about L.S.U dryer, tray dryer and fluidised bed dryer with their working and advantages. 20
9. Inlist the necesity of grain storage in India also describe tradational methods of grain storage. 20
10. Derine Henelerson equation and discuss the direct methods of moisture content determination. 20

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Roll No.

B.Tech. V Sem.

TU-347

B.Tech. Examination, Dec. 2014

Ag. Engg.

Farm Machinery

BT-530 (N)

Time : Three Hours / Maximum Marks : 100

Note : Attempt any **five** questions.

1. What do you understand by the status and scope of farm mechanization?
2. Write down the difference between the primary tillage and secondary tillage.
3. Explain seed comfertilizer drill with figure?
4. Explain sprayer with figure, how it differ from duster?
5. Explain combine harvestor with figure?

P.T.O.

6. Calculate the seed rate in kg/hect, if :
- (1) No. of furrow = 8
 - (2) Piameter of the wheel is = 1.5m
 - (3) Furrow spacing = 10 cm
 - (4) Seed collected in one revolution is =
5gm
7. Explain :
- (1) Theoritical feild capacity
 - (2) Actual field capacity
 - (3) Effeciency of a machine
8. Short notes (any **three**)
- (1) Planter
 - (2) Cultivator
 - (3) Rotavator
 - (4) Filling equipment

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Roll No.

B.Tech.-V Sem.

TU-116

B.Tech. Examination, Dec - 2014

Ag. Engg.

Irrigation & Drainage Engg.

BT-530(O)

Time : Three Hours]

/ Maximum Marks : 100

Note: Attempt any **five** questions. Use of calculator is permitted but mobile is prohibited.

1. Discuss the various sources of irrigation water systems with neat sketch. 20
2. Define irrigation and irrigation channel. With the diagram differentiate irrigation and drainage channel. 20

P.T.O.

3. What are the basic data needed for efficient economic designing of sprinkler irrigation system and also write design step of Sprinkler irrigation systems? 20
4. What do you mean by lining irrigation channel? What are the advantages and disadvantages of it? 20
5. Write state the assumption made by Hooghoudt for derivation of his equation for spacing of drains. Derive the equation application for a homogeneous said with an impermeable layer below it. 20
6. Discuss the infiltration opportunity time, advance and recession of flow related to border irrigation. 20
7. Assume an earthen channel on a grade of 0.20%, depth of water 1.50 m, bottom width 50 cm and side slopes 1:1. Compute the velocity of flow and the carrying capacity of channel. If Manning's roughness coefficient $n = 0.05$. 20
8. What is drainage? Explain types of drainage and their importance. 20
9. Compute the size of the tile required at the end of a 600 m long tile line, if the drainage coefficient is 1 cm grade is 0.03% and tile spacing is 50 m. 20
10. Write short notes on : $4 \times 5 = 20$
- (i) Drainage efficiency
 - (ii) Emitters
 - (iii) Well screen
 - (iv) Surface irrigation

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Roll No.

B.Tech. V Sem.

TU-348

B.Tech. Examination, Dec. 2014

Ag Engg.

Hydrology

BT-531(N)

Time : Two Hours] [Maximum Marks : 50

Note: Attempt any **five** questions.

1. (a) Define Hydrology. Describe the different process of hydrological cycle with a neat sketch 7
- (b) Discuss the role of solar radiation in the hydrologic cycle. 03
2. (a) Describe about various forms of precipitation and write the difference between rainfall and drizzle 06
- (b) Explain a method for estimating the missing rainfall data at a station in a basin. 04

P.T.O.

3. (a) Define peakrunoff and lists the factors affecting peak runoff. 04
- (b) Give three empirical formula applicable to particular regions in India. 6
4. (a) Define hydrograph Draw a figure showing the elements of a runoff hydrograph and describe the characteristics of recession limb. 6
- (b) State the significance of the inflection point on the recession side of the hydrograph. 4
5. (a) How does stream flow routing differ from reservoir flood ranting? 5
- (b) Show that storage in a stream reach can be expressed in terms of inflow and outflow in the form: 5
- $$S=k[xI+(1-x)o]$$
6. (a) Define transmissibility and storage coefficient of an aquifer. 5
- (b) Describe distribution of ground water. 5

7. The ordinates of a 4-hour unit hydrograph for a particular basin are given below. Derive the ordinates of
- the S-curve hydrograph, and
 - the 2-hour unit hyrograph, and plot them
- area of the basin is 25 km^2 10
- Time (h) 0 4 8 12 16 20 24 28 32 36 40 44 48
 OHU(m³/s) 0 30 55 90 130 170 180 160 110 60 35 25 8
8. (a) A small water shed consists of 12Km^2 of forest area ($c=0.1$), 11.2Km^2 of cultivated area ($C=0.2$) and 11 Km^2 under grass cover ($C=0.35$) A water course falls by 30m in a length of 3 km. The IDF relation for the area may be taken as
- $$i = \frac{80T^{0.2}}{(t+12)^{0.5}} \frac{\text{in cm/r}}{\text{tin min}} \text{ T in yr}$$
- Estimate the peak rate of runoff for a 25yr frequency. 5

(b) What are the factors, which affect infiltration? Explain any one method of determining the infiltration capacity of a soil surface. 5

9. (a) The rainfall rates for successive 30-minutes interval up to 3-hours are given as under. Calculate the ϕ and w indices, assuming that surface runoff is 3.6cm.6

Time (min)	0	30	60	90	120	150	180
Rainfall rate (cm/s)	0	1.6	3.6	5.0	2.8	2.2	1.0

(b) List the types of geological formations encountered in the ground and explain various features of artesian aquifer. 4

10. Distinguish between: $2\frac{1}{2} \times 4 = 10$

- (i) Phytometer and Lysimeter
- (ii) Influent and effluent streams
- (iii) A concentration curve and a recession curve
- (iv) Specific capacity of a well and specific yield of an aquifer.

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Roll No.

B.Tech. V Sem.

TU-349

B.Tech. Examination, Dec. 2014

Ag. Engg. Branch

AGRICULTURAL BUSINESS MANAGEMENT

BT-532(N)

Time : Two Hours]

/Maximum Marks : 50

Note: Attempt any five questions. All questions carry equal marks.

1. Elucidate Agri-Business Management and describe its Basics. 10
2. What is the importance of "Organising" in Agri-Business Management? Explain its main factors. 10
3. What do you mean by "Leading"? State the qualities of a successful leader. 10

P.T.O.

4. "Plant Location is the main factor for Agricultural Business Management". Elucidate. 10
5. "Work force management is the back bone of Agricultural Business" Explain the statement. 10
6. What is the importance of "Maintenance Management" in Agri-Business? Explain its main factors. 10
7. "No one can be successful in Agricultural Business without adopting Quality Management." Discuss. 10
8. Describe budgetary control process in Agricultural Business. 10
9. What do you mean by "Inventory Management"? Give the classification of Inventory. 10
10. Explain the difference between x-Bar and R-Chart. How can they be used together and why would it be important to use them together. 10

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Roll No.

B.Tech. V Sem.

TU-350

B.Tech. Examination, Dec - 2014

Ag. Engg.

Systems Engineering

BT-533(N)

Time : Three Hours]

/ Maximum Marks : 100

Note: Attempt any **five** questions. All questions carry equal marks.

1. (a) A goldsmith manufactures necklaces and bracelets. The total number of necklaces and bracelets that he can handle per day is at most 24. It takes one hour to make a bracelet and half an hour to make a necklace. It is assumed that he can work for a maximum of 16 hours a

P.T.O.

day. Further the profit on a bracelet is Rs. 300 and the profit on a necklace is Rs. 100. Formulate this problem as a linear programming problem so as to maximize the profit. 10

- (b) Solve by graphical method, the linear programming problem : 10

$$\text{Minimize } z = 20x_1 + 10x_2$$

Subject to the constraints

$$x_1 + 2x_2 \leq 40$$

$$3x_1 + x_2 \geq 30$$

$$4x_1 + 3x_2 \geq 60$$

and the non-negative restriction $x_1, x_2 \geq 0$

2. (a) Solve by Simplex method, the L.P.P. 10

$$\text{Maximize } z = 40x_1 + 35x_2$$

Subject to $2x_1 + 3x_2 \leq 60$

$$4x_1 + 3x_2 \leq 96, \quad x_1, x_2 \geq 0$$

- (b) Solve the following L.P.P. by graphical method. 10

$$\text{Maximize } z = 100x_1 + 300x_2$$

$$\text{S.T. } x_1 + 2x_2 \leq 32$$

$$x_1 + x_2 \leq 24$$

$$x_1, x_2 \geq 0$$

3. (a) Find the dual of the following L.P.P. 10

$$\text{Min } z = 10x_1 + 20x_2$$

$$\text{Subject to } 3x_1 + 2x_2 \geq 18$$

$$x_1 + 3x_2 \geq 8$$

$$2x_1 - x_2 \leq 6$$

$$x_1, x_2 \geq 0$$

- (b) Write the dual of the following L.P.P. 10

$$\text{Min } z = x_1 + x_2 + x_3$$

$$\text{Subject to } x_1 - 3x_2 + 4x_3 = 5$$

$$x_1 - 2x_2 \leq 3$$

$$2x_2 - x_3 \geq 4$$

$x_1, x_2 \geq 0, x_3$ is unrestricted.

4. (a) Solve the minimal assignment problem whose effectiveness matrix is : 10

	I	II	III	IV
A	2	3	4	5
B	4	5	6	7
C	7	8	9	8
D	3	5	8	4

- (b) Solve the assignment problem 10

	I	II	III	IV	V	VI
A	9	22	58	11	19	27
B	43	78	72	50	63	48
C	41	28	91	37	45	33
D	74	42	27	49	39	32
E	36	11	57	22	25	18
F	3	56	53	31	17	28

5. (a) Discuss in detail computer based tool? 10

- (b) Why computer tools used in system analysis? 10

6. Find the initial basic feasible solution of the following transportation problem using. 20

- (i) north-west corner rule
- (ii) matrix-minima method
- (iii) Vogel's approximation method

Warehouse

$W_1 \quad W_2 \quad W_3 \quad W_4 \quad$ Capacity

F_1	19	30	50	10	7
F_2	70	30	40	60	9
F_3	40	8	70	20	18

Requirement 5 8 7 14

7. (a) A manufacturer has to supply his customer with 600 units of his product per year. Storages are not allowed and the storage cost amount to Rs. 0.60 per unit per year. The set up cost per run is Rs. 80.00. Find the optimum run size and minimum average yearly cost. 10