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CUET (UG) - AGRICULTURE

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Agrometeorology, Genetics & Plant Breeding, Biochemistry & Microbiology

UNIT 1

SYLLABUS

AGROMETEOROLOGY

ELEMENTS OF WEATHER-RAINFALL, TEMPERATURE, HUMIDITY, WIND VELOCITY, SUNSHINE WEATHER FORECASTING, CLIMATE CHANGE IN RELATION TO CROP PRODUCTION.

GENETICS & PLANT BREEDING

(A) CELL & ITS STRUCTURE, CELL DIVISION-MITOSIS & MEIOSIS & THEIR SIGNIFICANCE
(B) ORGANIZATION OF THE GENETIC MATERIALS IN CHROMOSOMES, DNA, & RNA
(C) MENDEL'S LAWS OF INHERITANCE. REASONS FOR THE SUCCESS OF MENDEL IN HIS EXPERIMENTS, ABSENCE OF LINKAGE IN MENDEL'S EXPERIMENTS.
(D) QUANTITATIVE INHERITANCE, CONTINUOUS & DISCONTINUOUS VARIATION IN PLANTS.
(E) MONOGENIC & POLYGENIC INHERITANCE.
(F) ROLE OF GENETICS IN PLANT BREEDING, SELF & CROSS-POLLINATED CROPS, METHODS OF BREEDING IN FIELD CROPS -INTRODUCTION, SELECTION, HYBRIDIZATION, MUTATION & POLYPLOIDY, TISSUE & CELL CULTURE.
(G) PLANT BIOTECHNOLOGY - DEFINITION & SCOPE IN CROP PRODUCTION

BIOCHEMISTRY

PH & BUFFERS, CLASSIFICATION & NOMENCLATURE OF CARBOHYDRATES; PROTEINS; LIPIDS; VITAMINS, & ENZYMES.

MICROBIOLOGY

MICROBIAL CELL STRUCTURE, MICRO-ORGANISMS- ALGAE, BACTERIA, FUNGI, ACTINOMYCETES, PROTOZOA AND VIRUSES. ROLE OF MICRO-ORGANISMS IN RESPIRATION, FERMENTATION, AND ORGANIC MATTER DECOMPOSITION.

NUMBER OF QUESTIONS ASKED IN CUET-UG AGRICULTURE (2022 to 2024)

Agrometeorology, Genetics & Plant Breeding, Biochemistry and Microbiology		2022	2023	2024
1.	Agrometeorology	3	2	2
2.	Genetics & Plant Breeding	6	9	5
3.	Biochemistry	1	2	3
4.	Microbiology	1	2	2

CHAPTER 1

Agrometeorology, Genetics & Plant Breeding, Biochemistry and Microbiology

Unit 1.1: Agrometeorology

[A] Elements of Weather-rainfall

[17 Aug 2022, Shift 2]

1. According to NASA, the gases in earth's atmosphere include _____% of carbon dioxide.

(1) 78% (2) 0.93%

(3) 0.03% (4) 0.01%

[26 May 2023]

2. Match List - I with List - II.

List – I (Weather element)	List – II (Instruments)
(A) Light	(I) Hygrometer
(B) Wind Velocity	(II) Thermometer
(C) Humidity	(III) Sunshine recorder
(D) Temperature	(IV) Anemometer

Choose the correct answer from the options given below:

(1) (A)-(I), (B)-(II), (C)-(III), (D)-(IV)

(2) (A)-(III), (B)-(IV), (C)-(I), (D)-(II)

(3) (A)-(II), (B)-(I), (C)-(IV), (D)-(III)

(4) (A)-(IV), (B)-(III), (C)-(II), (D)-(I)

[19 July 2024, Shift 1]

3. Arrange the following gases in descending order in terms of percentage in dry air of the lower atmosphere.

(A) Carbon dioxide

(B) Argon

(C) Nitrogen

(D) Oxygen

Choose the correct answer from the options given below:

(1) (D), (C), (A), (B)

(2) (C), (A), (D), (B)

(3) (C), (D), (A), (B)

(4) (C), (D), (B), (A)

Answer Key: 1 - (3), **2** – (2), **3** – (3)

[B] Temperature

[17 Aug 2022, Shift 2]

1. Match List - I with List - II.

List - I	List - II
(A) Temperature	(I) Anemometer
(B) Rainfall	(II) Ordinary rain guage
(C) Wind Velocity	(III) Thermometer
(D) Relative Humidity	(IV) Hygrometer

Choose the correct answer from the options given below:

(1) (A)-(I), (B)-(III), (C)-(IV), (D)-(II)

(2) (A)-(II), (B)-(IV), (C)-(III), (D)-(I)

(3) (A)-(III), (B)-(II), (C)-(I), (D)-(IV)

(4) (A)-(IV), (B)-(III), (C)-(II), (D)-(I)

Answer Key: 1 - (3)

[C] Humidity

[19 July 2024, Shift 1]

1. Match List-I with List-II:

List-I (Parameter)	List-II (Instrument for measurement)
(A) Humidity	(I) Anemometer
(B) Wind	(II) Lysimeter
(C) Light intensity	(III) Hygrometer
(D) Evapotranspiration	(IV) Luxmeter

Choose the correct answer from the options given below:

(1) (A)-(III), (B)-(I), (C)-(IV), (D)-(II)

(2) (A)-(I), (B)-(III), (C)-(II), (D)-(IV)

(3) (A)-(I), (B)-(II), (C)-(IV), (D)-(III)

(4) (A)-(III), (B)-(IV), (C)-(I), (D)-(II)

Answer Key: 1 - (1)

[D] Sunshine Weather Forecasting

[17 Aug 2022, Shift 2]

1. **Short range forecasting of weather is predicted for the period of _____.**
   (1) one or two days
   (2) three to ten days
   (3) four weeks
   (4) two months

[26 May 2023]

2. **If c is the speed of light; and λ and v wavelength and frequency, respectively, of an electromagnetic radiation, then which of the following is true?**
   (1) $\lambda = c^2$ (2) $v = c^2$
   (3) $\lambda = \frac{V}{C}$ (4) $\lambda = \frac{C}{V}$

Answer Key: 1 - (1), **2** – (4)

EXPLANATIONS

[A] Elements of Weather-rainfall

1. **Correct Answer is (3):-** Carbon dioxide (CO_2) makes up about 0.03% of Earth's atmosphere, according to NASA. This small percentage is vital for the greenhouse effect and climate regulation. The other options refer to different gases like nitrogen and argon.

2. **Correct Answer is (2):-** (A)-(III), (B)-(IV), (C)-(I), (D)-(II)
(A) A **sunshine recorder** is used to measure the amount of sunlight or light intensity.
(B) An **anemometer** is used to measure the velocity or speed of the wind.
(C) A **hygrometer** is used to measure the humidity or moisture content in the air.
(D) A **thermometer** is used to measure temperature.

3. **Correct Answer is (3):-** Nitrogen is the most abundant gas in the atmosphere, making up around 78% of dry air. Oxygen follows closely, contributing about 21% of the atmosphere. Carbon dioxide, while much less abundant, makes up around 0.04% of the air. Argon is a trace gas, accounting for about 0.93%.

[B] Temperature

1. **Correct answer is (3):-** (A)-(III), (B) (II), (C) (I), (D) - (IV)
(A) **Temperature** is measured using a **thermometer**, which records the degree of heat or cold.
(B) **Rainfall** is measured using an **ordinary rain gauge**, which collects rainwater to calculate precipitation.
(C) **Wind velocity** is measured with an **anemometer**, which records the speed of wind movement.
(D) **Relative humidity** is measured using a **hygrometer**, which determines the amount of moisture in the air.

[C] Humidity

1. **Correct Answer is (1):-** (A)-(III), (B)-(I), (C) - (IV), (D)-(II)
(A) Humidity is measured using a Hygrometer which detects the amount of moisture in the air.
(B) Wind is measured using an Anemometer which gauges wind speed and sometimes direction.
(C) Light intensity is measured using a Luxmeter which quantifies the amount of light hitting a surface.
(D) Evapotranspiration is measured using a Lysimeter which measures the amount of water lost due to evaporation and plant transpiration.

[D] Sunshine Weather Forecasting

1. **Correct Answer is (1):-** short-range weather forecasting predicts weather for one or two days ahead, providing the most accurate and reliable results. This time frame allows for detailed analysis of current atmospheric conditions. Three to ten days is considered medium-range forecasting, while four weeks and two months fall under long-range or seasonal forecasting.

2. **Correct Answer is (4):-** The relationship between the speed of light (c), wavelength (λ), and frequency (v) of an electromagnetic wave is given by:
$c = \lambda \times v$
Rearranging this equation, we get:
$\lambda = \frac{c}{v}$
Thus, the wavelength λ is equal to the speed of light c divided by the frequency v.

MOCK TEST

1

MOCK TEST

1. **Which of the following is a primary greenhouse gas contributing to climate change?**
   (1) Nitrogen (2) Oxygen
   (3) Carbon dioxide (4) Hydrogen

2. **Which of the following factors directly influences the amount of rainfall in a region?**
   (1) Wind speed
   (2) Atmospheric pressure
   (3) Humidity
   (4) Soil temperature

3. **What is the relationship between sunshine duration and crop yield?**
   (1) Longer sunshine duration generally leads to higher yield
   (2) Shorter sunshine duration is ideal for most crops
   (3) Sunshine duration has no significant impact on yield
   (4) The relationship varies depending on the crop

4. **What is the Beaufort scale used to measure?**
   (1) Atmospheric pressure
   (2) Wind speed
   (3) Relative humidity
   (4) Soil moisture

5. **Which division of algae is commonly known as red algae?**
   (1) Chlorophyta (2) Phaeophyta
   (3) Rhodophyta (4) Chrysophyta

6. **Which milk product is obtained by coagulating milk with rennet or acid?**
   (1) Butter (2) Cheese
   (3) Paneer (4) Chena

7. **Which of the following is commonly used as a diluent for semen during preservation?**
   (1) Phosphate buffer solution
   (2) Glucose solution
   (3) Saline solution
   (4) Egg yolk-based extender

8. **What is the primary advantage of artificial insemination (AI) in cattle breeding?**
   (1) Increased genetic progress
   (2) Reduced disease transmission
   (3) Improved reproductive efficiency
   (4) All of the above

9. **The term "total mixed ration" (TMR) in livestock feeding refers to:**
   (1) A mixture of dry and wet feeds for poultry
   (2) A mixture of concentrate, roughage, and supplements blended together
   (3) Only high-protein grains for cattle
   (4) A type of roughage used for feeding dairy cows

10. **What is the ideal colostrum intake for a newborn calf within the first 12 hours of life?**
    (1) 1 liter (2) 2 liters
    (3) 3 liters (4) 4 liters

11. **Match List - I with List – II**

List - I	**List - II**
(A) Foodgrain production target in 2022-23	**I.** Increased oilseed production
(B) Yellow Revolution	**II.** Increased fish production
(C) Golden Revolution	**III**. Government target of 320 million tonnes
(D) Blue Revolution	**IV.** Increased horticulture production

Choose the correct answer from the options given below:
(1) (A)-(I), (B)-(II), (C)-(III), (D)-(IV)
(2) (A)-(IV), (B)-(I), (C)-(III), (D)-(II)
(3) (A)-(III), (B)-(I), (C)-(IV), (D)-(II)
(4) (A)-(II), (B)-(III), (C)-(I), (D)-(IV)

12. **In the process of canning, the use of "airtight containers" is crucial for:**
    (1) Preventing the growth of aerobic bacteria
    (2) Preventing the breakdown of vitamins during storage

44. Which factor is most critical in designing a poultry house for optimal ventilation?
(1) Bird density (2) House size
(3) Climate conditions (4) Feed type

45. Which vitamin is essential for calcium and phosphorus metabolism in livestock and is often included in balanced rations?
(1) Vitamin A (2) Vitamin C
(3) Vitamin D (4) Vitamin K

46. Which of the following is a characteristic feature of monosaccharides?
(1) They can be hydrolyzed into simpler sugars.
(2) They contain two or more sugar units.
(3) They are simple sugars and cannot be hydrolyzed into simpler sugars.
(4) They are insoluble in water.

47. What are enzymes?
(1) Inorganic catalysts (2) Organic catalysts
(3) Hormones (4) Vitamins

48. Which enzyme class catalyzes the transfer of a functional group from one molecule to another?
(1) Oxidoreductases (2) Transferases
(3) Hydrolases (4) Lyases

49. Which group of algae is characterized by the presence of fucoxanthin, a brown pigment?
(1) Green algae (2) Red algae
(3) Brown algae (4) Golden-brown algae

50. What is the difference between Gram-positive and Gram-negative bacteria?
(1) Gram-positive bacteria have a thick peptidoglycan layer, [1] while Gram-negative bacteria have a thin layer.
(2) Gram-negative bacteria have a thick peptidoglycan layer, while Gram-positive bacteria have a thin layer.
(3) Gram-positive bacteria have a single cell membrane, while Gram-negative bacteria have two.
(4) Gram-negative bacteria have a single cell membrane, while Gram-positive bacteria have two.

ANSWER KEY									
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
(3)	(3)	(1)	(2)	(3)	(2)	(4)	(4)	(2)	(3)
11	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
(3)	(1)	(3)	(1)	(2)	(3)	(2)	(4)	(4)	(2)
21	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
(2)	(1)	(3)	(3)	(3)	(1)	(4)	(3)	(4)	(2)
31	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**
(4)	(3)	(2)	(3)	(4)	(1)	(3)	(3)	(1)	(3)
41	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**
(2)	(3)	(3)	(3)	(3)	(3)	(2)	(2)	(3)	(1)

EXPLANATIONS

1. Correct Answer is (3):- Carbon dioxide because it traps heat in the atmosphere, contributing to the greenhouse effect and climate change. Nitrogen (N_2) and Oxygen (O_2) make up most of the atmosphere but don't absorb infrared radiation, so they don't affect the climate. Hydrogen (H_2) also doesn't contribute to the greenhouse effect as it doesn't absorb or emit infrared radiation.

2. Correct Answer is (3):- Humidity, as it directly affects the amount of moisture available for rainfall. High humidity increases cloud formation, leading to precipitation. Wind speed and atmospheric pressure influence weather patterns but don't directly control rainfall. Soil temperature affects plant growth but has little impact on the amount of rainfall in a region.

3. Correct Answer is (1):- Longer sunshine duration generally leads to higher yield because sunlight is essential for photosynthesis, which drives plant growth. Shorter sunshine duration reduces photosynthesis, limiting crop productivity. Sunshine duration does impact yield. While some crops may have specific needs, longer sunlight generally benefits most crops.

4. Correct Answer is (2):- The Beaufort scale is used to estimate wind speed based on how it affects the environment, like tree movement or sea conditions. It does not measure atmospheric pressure, relative humidity, or soil moisture. These other factors are measured with different instruments, such as barometers, hygrometers, or soil moisture sensors.

5. Correct Answer is (3):- Rhodophyta, which is commonly known as red algae due to the pigment phycoerythrin. Chlorophyta refers to green algae, Phaeophyta refers to

brown algae, and Chrysophyta refers to golden algae. Each division is distinguished by different pigments that give them their characteristic colors.

6. **Correct Answer is (2):-** Cheese, which is made by coagulating milk with rennet or acid, forming curds. Butter is made by churning cream, not coagulating milk. Paneer and Chena are similar to cheese but are made by coagulating milk with acid like lemon or vinegar, and are not aged or processed like cheese.

7. **Correct Answer is (4):-** Egg yolk-based extender, which provides nutrients and protection for sperm during preservation. Phosphate buffer solution helps maintain pH but isn't a primary diluent. Glucose solution provides energy but isn't typically used alone for preservation. Saline solution is used for washing sperm but lacks necessary nutrients for long-term preservation.

8. **Correct Answer is (4):-** Artificial insemination (AI) increases genetic progress by allowing the use of superior genetics. It also reduces disease transmission by avoiding direct animal contact. Additionally, AI improves reproductive efficiency by ensuring precise timing of insemination, leading to better fertilization rates.

9. **Correct Answer is (2):-** A mixture of concentrate, roughage, and supplements blended together. Total Mixed Ration (TMR) is a complete feed for ruminants, combining roughage (like hay), concentrates (like grains), and supplements for a balanced diet. It is not just high-protein grains or roughage alone, and it's primarily used for cattle, not poultry.

10. **Correct Answer is (3):-** 3 liters, as newborn calves ideally require around 3 liters of colostrum within the first 12 hours for proper immune protection and nutrition. 1 liter and 2 liters are insufficient for most calves, leading to lower immunity. 4 liters may be excessive and could cause digestive issues. A balanced intake of 3 liters ensures optimal health and growth.

11. **Correct Answer is (3):-** (3) (A)-(III), (B)-(I), (C)-(IV), (D)-(II)

(A) Foodgrain production target in 2022-23: The target for foodgrain production in India for 2022-23 was 320 million tonnes.

(B) Yellow Revolution: This revolution is related to increased oilseed production, particularly in the production of mustard and other oilseeds.

(C) Golden Revolution: The Golden Revolution refers to the increased horticulture production, especially fruits like mango, citrus, and flowers.

(D) Blue Revolution: This revolution is focused on increased fish production.

12. **Correct Answer is (1):-** Preventing the growth of aerobic bacteria. Airtight containers create an anaerobic environment, preventing the growth of bacteria that need oxygen. While vitamin breakdown, heat circulation, and color preservation are important, they are not the primary functions of airtight containers. The main role is to ensure food safety by inhibiting aerobic bacteria.

13. **Correct Answer is (3):-** The appropriate salt concentration for the dry salting method of pickling is 15-20%. This level effectively inhibits the growth of harmful microorganisms while allowing the development of desired flavors and textures. Concentrations below 15% may not fully prevent spoilage, and levels above 20% can make the food overly salty and affect its texture.

14. **Correct Answer is (1):-** Pruning involves removing unwanted or non-productive shoots to enhance tree health and improve fruit yield. Grafting is the technique of joining two plants together, Intercropping refers to growing multiple crops simultaneously, and Training involves shaping the growth of plants. Therefore, pruning is the specific practice for eliminating excess shoots from fruit trees.

15. **Correct Answer is (2):-** Fruits and vegetables are rich in antioxidants, which help prevent chronic diseases by reducing oxidative stress. High calorie content is incorrect because they are typically low in calories. High fat content is wrong as most fruits and vegetables have minimal fat. Increased sodium levels are also incorrect since they generally contain low sodium, which does not contribute to disease prevention.

16. **Correct Answer is (3):-** Germination is the process where a seed begins to grow and develop into a new plant. Cutting and budding are methods of asexual propagation that use parts of a plant to produce new individuals. Propagation is a broad term that includes all methods of plant reproduction, both sexual (like germination) and asexual.

CUET UG AGRICULTURE MOCK TEST 1

ANSWER SHEET

Name _____

Seat Number

Booklet Code A

Medium E

Marks Obtained

ANSWER COLUMNS

Checked By _____

Q. No.	ANSWER ①	②	③	④
1	○	○	○	○
2	○	○	○	○
3	○	○	○	○
4	○	○	○	○
5	○	○	○	○
6	○	○	○	○
7	○	○	○	○
8	○	○	○	○
9	○	○	○	○
10	○	○	○	○
11	○	○	○	○
12	○	○	○	○
13	○	○	○	○
14	○	○	○	○
15	○	○	○	○
16	○	○	○	○
17	○	○	○	○
18	○	○	○	○
19	○	○	○	○
20	○	○	○	○
21	○	○	○	○
22	○	○	○	○
23	○	○	○	○
24	○	○	○	○
25	○	○	○	○

Q. No.	ANSWER ①	②	③	④
26	○	○	○	○
27	○	○	○	○
28	○	○	○	○
29	○	○	○	○
30	○	○	○	○
31	○	○	○	○
32	○	○	○	○
33	○	○	○	○
34	○	○	○	○
35	○	○	○	○
36	○	○	○	○
37	○	○	○	○
38	○	○	○	○
39	○	○	○	○
40	○	○	○	○
41	○	○	○	○
42	○	○	○	○
43	○	○	○	○
44	○	○	○	○
45	○	○	○	○
46	○	○	○	○
47	○	○	○	○
48	○	○	○	○
49	○	○	○	○
50	○	○	○	○

Note : Roll Number, Subject Code & Centre Code Should Be Filled In the Boxes Using The Pattern Given As :