Maharashtra Agricultural University Examination Board, Pune

SEMESTER END THEORY EXAMINATION

B.Sc. (Hons.) Agriculture

Semester	: VI (New)	Term	: II	Academic Year	: 2022-23
Course No.	: ELE-SSAC-364	Title	: Agrochemicals		
Credits	: 3 (2+1)				
Day & Date	:	Time (hrs.)	: 3 hrs.	Total Marks	: 80

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

SECTION 'A'

Q.1 Enlist the factors to be consider while direct application of rock phosphate.

Ans: Factors:

a) Soil reaction : Not applied in neutral and alkaline soils

b) Dose and time of application : It should be applied in large quantities once in 5-6 years ,it should be finely ground

c) Plant Species: R.P. is useful for calcium loving plants like legumes .It should be applied for long duration commercial crops.

d) Soil organic matter : Can be applied in soils containing higher amounts of organic matter because acids are produced during decomposition , then the tricalcium phosphate(TCP) is converted to mono calcium phosphate (MCP) .

e) Organic manures: R.P can be applied along with un decomposed oganic materials like green manures because during decomposition acids are secreted

.f) Phosphocompost: Applying rock phosphates along with phosphorus solubulizing bacteria with or without sulphur and sulphur oxidizing bacteria. During the decomposition process of plant and animal sources (residues) is called phosphor compost . Acids produced during composting convert TCP to MCP.

Q.2 State the physical and chemical properties of muriate of potash.

Ans: Physical properties

1) MOP in pure form is white crystalline salt. However, colour ranges from white to red based on the impurities present in K minerals and methods of refinement.

2) It has a solubility of 37 grams per 100 grams of water at 30 0C.

3) The crystalline MOP is not very hygroscopic ,flows freely and does not cake

4) Has specific gravity is 1.98.

Chemical properties

1) MOP contains 58% by weight of K2O and about 47 % chloride

2) MOP is neutral in reaction and does not produce acidity and alkalinity on soil application.

Q.3 What are complex fertilizers? Explain in short the main characteristics of complex fertilizer.

Ans: Complex fertilizers **contain two or three primary plant nutrients of which two primary nutrients are in chemical combination.** These fertilisers are usually produced in granular form. eg. Diammonium phosphate, nitrophosphates and ammonium phosphate. They generally have a high content of plant nutrients more than 40 kg per 100 kg of fertilizer.

As such they are also called "high analysis" fertilizers. 2. They usually have a uniform grain size and have good physical condition. 3. They supply N and P in an available form to the soil in one operation.Nitrogen is present as nitrate and ammoniacal form and phosphorus is present in water soluble form up to 50 to 90 per cent of total P2O5. 4. Though their manufacture is costlier to straight fertilizers, they are cheaper to the cultivators when the cost is worked out on the basis of per kg of plant nutrient.5. Transport and distribution costs to the cultivators are less when worked out on the basis of per kg plant nutrient. 6. They are non-caking and non hygroscopic, thus safe for storage

Q.4a What are the fertilizer sources for supplying secondary and micronutrients?

Ans: Calcium- Lime, Magnesium – Dolomite, Sulphur- elemental sulphur, Iron – Ferrous sulphate, Zinc – Zinc sulphate, Manganese- manganese sulphate, Copper- Copper sulphate, Boron – Boric acid, Molybdenum- Ammonium Molybdate

Q4b State the reasons of increasing need of micronutrient fertilization.

Ans: 1.Soil erosion and long-term cropping have resulted in the removal of micronutrients from soils; 2) increasing crop yields generally leads to greater micronutrient removal rates in grain and other harvested products; and 3), the widespread replacement of micronutrient-rich manures with mineral fertilizers has reduced micronutrient additior from fertilizer sources.

Q.5a State the mechanisms of pesticide resistance.

Ans: 1. metabolic detoxification 2.Reduce sensitivity at target site 3.Reduce penetration 4. Sequestration 5. Behavioral resistance

Q5b Explain in short the mode of action of sulphur fungicide.

Ans: Sulphur act as a hydrogen acceptor in metabolic system and disturb the hydrogenation and dehydrogenation reaction in cell and kill the fungi.

Q.6a Classify nitrogenous fertilizer with example.

Ans: Ammonical N fertilizer- ammonium sulphate
Nitrate fertilizer- Sodium nitrate
Ammonical and Nitrate fertilizer- Calcium ammonium nitrate
Amide- Urea

Q6b State the management considerations for nitrogen fertilizer.

Ans: 1. For paddy crop ammonical and ammonia forming fertilizers should be used.
2. For arable crops all N fertilizers are equally effective.
3. In acid soils ammonium sulphate, ammonium chloride, Urea and ammonium sulphate

nitrate should be avoided
4. Nitrate fertilizer should be avoided in light sandy soils.
5. Nitrate fertilizer should be used for top dressing and split applications.

Q.7 Classify insecticides based on their chemical nature with example of each class.

Ans: Insecticide classified as
1. Organic 2. Inorganic
Organic divide in to- 1. Plant based ex. Nicotine
2. Animal based ex. Fish oil
3. Mineral oil ex. Kerosene
4. Chlorinated compounds ex. Chlordane, Aldrine
5. Organophosphorus compounds ex.phosphoric acid- phosphomidon, thio phosphoric acid- chloropyriphos, dithiophosphoric acid- malathion
6. Carbamate ex. Carbaryl
Inorganic divide into- 1. Arsenical- sodium arsenite
2. Fluoride- sodium fluoride

Q.8 Classify fungicides on the basis of chemical nature and give example of each class.
Ans: Based on the chemical nature-
1.Sulphur containing fungicides :
A).Inorganic: Eg .Lime sulphur; powedered sulphur
B). Organic: Eg. Zineb, Maneb, Thiram and Vapam
2. Copper containing fungicides:
Eg.Bordeaux mixture [$Ca(OH)_2 + CuSO^4$]
3. Mercury containing fungicides:
A).Inorganic: Eg. Hg Cl (Mercurous chloride or Calomel)
$HgCl_2$(Mercuric chloride)
B) .Organic: PMA (Phenyl Mercuric Acetate)
EMC (Ethyl Mercuric Chloride)
4. Quinones : Chloranil ; Dichlone
5. Heterocyclic nitrogenous compounds : Captan , Captafol, Folpet
6. Benzimidazoles: Eg. Carbendazim, Thiobendazole, Benomyl
7. Oxanthins: Eg.Carboxin ; Oxycarboxin
8. Morpholines: Tridemorph ; Dodemorph S
9. Thiophanates:
These are derivatives of thio aliphanic acid [H2N- C-NH COOH]
Ex. Topsin and Topsin -M
10. Organophosphorus fungicides: Kitazin; Hinosan
11. Pyrimidines : Ethrimol, Dimethrimol; Triarimol

Q.9 Explain in short the general mode of action of herbicides.

Ans: Photosynthetic poison
Interfere the hill reaction and electron transport chain
Interfere with cellular metabolism,
Interfere in protein metabolism,
Interfere in oxidative Phosphorylation

Q.10

Ans: Explain in short the biochemical processes affected by the action of herbicide.
Biochemical processes
I. Respiration and Mitochondrial Activities
II. Photosynthesis
III. Protein and Nucleic acid metabolism
IV. Synthesis of hydrolytic enzymes
Herbicides inhibit these processes by uncoupling the reaction of ATP formation or interference with electron transport and energy transfer. Uncouples usually act on the membranes of mitochandria where phosphorylation takes place.
A large number of herbicides inhibit photosynthesis principally by inhibiting or blocking or enacting

a) The Hill reaction and the production of oxygen from H_2O in P.S.II Ex Ureas, Uracils, Nitriles and Dphenyl ethers.

b) The transfer or transport of electron in P.S-II Eg. Nitriles and Ureas

c) Removal of electrons from the electron transport chain from Ferredoxin in P.S.II eg. Bypyridiliniums.

d) The non-cyclic photopohprylation or ATP synthesis Eg. Ureas , Triazines , Uracils, Nitriles

SECTION 'B'

Q.11 Do as directed for the followings.

Ans:
1. $CO(NH_2)_2$
2. Chemical fertilizer which supply single nutrient.
3. Control and kill the mites.

4. ZnEDTA, FeEDTA etc.
5. Ammonium hydroxide
6. 21%
7. 2-4 D
8. 1985

Q12 Match the appropriate pair.

Ans: **1 (d) , 2 (h), 3 (e), 4 (a), 5 (c), 6 (g) 7 (f), 8 (b)**

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