

Uni. Seat No.: _____
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AGRICULTURAL UNIVERSITIES OF GUJARAT

1. Anand Agricultural University, Anand
2. Junagadh Agricultural University, Junagadh
3. Navsari Agricultural University, Navsari
4. S.D. Agricultural University, S.K. Nagar

Fourth Semester End Examination of B.Sc. (Hons.) Horticulture (Regular) June- 2016

PART A- OBJECTIVE

Course No.: NRMH 4.6

Title of Course: Soil and Plant Analysis (1+1)

Date : 21/06/2016

Time: 14:30 to 15:15 hrs.

Day : Tuesday

Marks: 40.00

Tick mark (✓) most appropriate option from the following.

1. The most widely occurring clay mineral in the soil is _____.
a Kaoline
b Illite
c Montmorillonite
d Smectite
2. _____ is a acid tolerant crop.
a Tea
b Sapota
c Brinjal
d Date palm
3. Most resistant mineral to the weathering is _____.
a Olivine
b Feldspar
c Montmorillonite
d Quartz
4. Mica group of minerals are _____ type of minerals.
a Expanding
b Non-expanding
c Allophane
d Volcanic
5. Among the following is a sulphate mineral.
a Elemental S
b Copper sulphide
c Gypsum
d Lime
6. The vertical axis is more develop than horizontal axis is not the characteristics of _____ structure.
a Platy
b Prismatic
c Blocky
d b & c
7. Grades of structure indicate the _____ of the aggregates.
a Resistancy
b Stability
c Flexibility
d Buffering capacity
8. Fairly durable and distinct aggregates are the characteristics of _____ structure.
a Moderate
b Weak
c Structure less
d Strong
9. _____ is a store house of nutrients in the soil.
a Mineral
b Sand
c Silt
d Organic matter

10. Among the following is responsible for aggregate formation.
 a Sand c Clay
 b Silt d All
11. Wet sieving method for aggregate size analysis is given by _____.
 a Shoemaker c Jackson
 b Schoonover d Yoder
12. When CO₂ content becomes as high as _____ in soil, than it become toxic to the plants.
 a 0.3% c 15%
 b 10% d 25%
13. Oxygen diffusion rate _____ at shallow soil depth.
 a Increases c Partially decreases
 b Decreases d Not affected
14. If E_h is positive and high, means _____ condition exists.
 a Weak oxidizing c Strong reducing
 b Strong oxidizing d Weak reducing
15. The root growth ceases when oxygen diffusion rate dropped to about _____ cm²/min.
 a 0.32×10^{-8} c 20×10^{-8}
 b 10×10^{-8} d 28×10^{-8}
16. Most of the gaseous interchange in soils is occurs by _____.
 a Aeration c Mass flow
 b Contact exchange d Diffusion
17. With increase in water content of soil, mass flow of air is _____.
 a Decrease c Partially increase
 b Increase d Not affected
18. Formula for residual sodium carbonate is _____.
 a $(\text{CO}_3^{2-} + \text{HCO}_3^-) - (\text{Na}^+ + \text{K}^+)$ c $(\text{CO}_3^{2-} + \text{HCO}_3^-) - (\text{Ca}^{+2} + \text{Na}^+)$
 b $(\text{Ca}^{+2} + \text{Mg}^{+2}) - (\text{CO}_3^{2-} + \text{HCO}_3^-)$ d $(\text{CO}_3^{2-} + \text{HCO}_3^-) - (\text{Ca}^{+2} + \text{Mg}^{+2})$
19. Among the following microorganisms _____ is less in number per gram of dry soil.
 a Algae c Fungi
 b Bacteria d Actinomycetes
20. Largest number of species present in soil is genus of _____.
 a Bacillus c Trichoderma
 b Pseudomonas d Actinomycetes
21. Lignin is mostly decomposed by _____.
 a Bacteria c Fungi
 b Algae d All
22. _____ is not adsorbed by soil particles.
 a NO₃⁻ c Ca²⁺
 b Na⁺ d Al³⁺
23. Generally fungi are dominant in _____ soil.
 a Alkaline c Acid
 b Sandy soil d All
24. Nitrogen fixing capacity of algae is increased by the application of _____.
 a Nitrogen c Micronutrient
 b Potash d Phosphate

25. Legumes fail to develop nodules in soil having pH _____.
 a < 5.0 c > 6.5
 b 7.0 d All
26. Mycorrhizae fungi shows _____ association.
 a Associative c Non-symbiotic
 b Symbiotic d Free living
27. Soil pH > 8.5, ESP > 15 and EC < 4 dS/m is characteristics of _____.
 a Saline soil c Saline-alkali soil
 b Alkali soil d Both a & b
28. _____ ion is not considered as a deflocculated ion.
 a Ca c N
 b Na d All
29. Salt content _____ is injurious to plant growth.
 a < 0.1% c < 10%
 b > 0.1% d > 10%
30. It is generally found that higher the ESP, _____ is the soil pH.
 a Higher c Lower
 b Neutral d No change
31. Among the following is a example of organic amendment.
 a Gypsum c Urea
 b Lime d Pressmud
32. To replace 20 me Exch. Na/100g, _____ t/ha gypsum is required.
 a 22.4 c 1.12
 b 1.92 d 38.4
33. Unit for electrical conductivity is _____.
 a dS/m c ppm
 b meq/l d per cent
34. Among the following is not relates with cohesion phenomena.
 a Soil to soil c Fertilizer to fertilizer
 b Water to water d Water to soil
35. Sandy soil possess _____ infiltration rate than clayey soil.
 a Higher c Medium
 b Low d Equal
36. Diameter of clay particle is _____.
 a < 0.02 mm c < 0.02 cm
 b < 0.002 mm d < 0.002 cm
37. _____ is a salt tolerant crop.
 a Date palm c Pea
 b Lemon d Tea
38. Acid sulphate soil is also known as _____.
 a White alkali soil c Solonchak
 b Black alkali soil d Cat clays
39. Not all the water hold by soil is available to plants. This sentence is _____.
 a True c Partially false
 b False d No means

40. Soil contains CEC 25 me/100g and base saturation 76%. Then what will be the value of base unsaturation.
- a 42% c 24%
b 34% d 12%
41. In the case with gravitational water, _____ pores play major role.
- a Micro c Macro
b Microorganisms d All
42. Among the following, _____ moves in the vapor form.
- a Gravitational water c Hygroscopic water
b Capillary water d Water at Wilting coefficient stage
43. Available capillary water is held with _____ atmospheric pressure in the soil.
- a $< 1/3$ c 15
b $1/3$ to 31 d $1/3$ to 15
44. The effective range for the measurement of soil moisture through tensiometer is _____ atmosphere.
- a 0 to 0.33 c 1 to 15
b 0 to 0.85 d 1 to 31
45. In neutron scattering method for soil moisture estimation _____ radioactive material is used.
- a Beryllium c Gypsum
b Uranium d Cesium
46. H^+ ion activity in the soil solution is generally measured as _____.
- a Exchange acidity c Residual acidity
b Active acidity d Electrical conductivity
47. Acid soils show the deficiency of _____.
- a Ca c N
b P d All
48. The rate of lime requirement is determined in the laboratory by _____ method.
- a Subbiah and Asija c Shoemaker
b Olsen d Schoonover
49. To replace 1 me H/100g soil, it requires _____ milligram lime/ 100g of soil.
- a 86 c 1.2
b 50 d 1.9
50. Gypsum is recommended for reclamation of _____ soil.
- a Saline c Acid
b Alkali d Sandy
51. Among the following is the alternate option of lime for acid soil.
- a Gypsum c Calcium oxide
b Sulphuric acid d None
52. Among the following is the alternate option of gypsum for sodic soil.
- a Sulphuric acid c Calcium oxide
b Hydroxide of lime d None
53. The overall effect of submergence is to _____ the pH of alkaline soil.
- a Increase c Decrease
b Not change d Initially increase

54. Wetland soil which is not wet above a depth of 25 cm is comes under _____.
 a Class 1 c Class 3
 b Class 2 d Class 4
55. Among the following _____ is used for the analysis of soil organic carbon.
 a 0.32% KMnO_4 c 1N $\text{K}_2\text{CR}_2\text{O}_7$
 b 0.5 M NaHCO_3 d 1N $\text{CH}_3\text{COONH}_4$
56. Flame photometer is _____ type of instrument.
 a Emission c Radiation
 b Absorption d Turbidimetric
57. Flame photometer is used for the analysis of _____.
 a P c K
 b Zn d All
58. For electrical conductivity (EC) analysis _____ soil:water ratio is used.
 a 1:1 c 1:2.5
 b 1:10 d 1:5
59. Unit for residual sodium carbonate is _____.
 a mg/kg c Kg/ha
 b me/l d Unit less
60. _____ is submergence tolerant crop.
 a Rice c Tomato
 b Maize d Lemon
61. Water having RSC value _____, cannot suitable for irrigation purpose.
 a 10-18 me/l c > 2.50 me/l
 b >15% d 4 dS/m
62. For the analysis of Ca from irrigation water _____ indicator is used.
 a Ferroin c Murexide
 b EBT d Mixed
63. Lambert's and Beer's law is associated with _____.
 a EC meter c Flamephotometer
 b Spectrophotometer d Atomic absorption spectrophotometer
64. Soil sample should be dried in a hot air oven at _____ °C for moisture determination.
 a 45 c 60
 b 90 d 105
65. Which is a secondary mineral?
 a Plagioclase feldspar c Orthoclase feldspar
 b Hornblende d Gypsum
66. In the volumetric composition of mineral soil, mineral matter accounts _____.
 a 45% c 5%
 b 25% d 100%
67. Which type of soil structure is best for agriculture point of view?
 a Blocky c Crumby
 b Platy d None of these
68. Which one is the most important factor for hysteresis in the soil?
 a Entrapment of air c Entrapment of water
 b Bulk density d Microorganisms

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Fourth Semester End Examination of B.Sc. (Hons.) Horticulture (Regular) June- 2016

PART B: SUBJECTIVE

Course No.: NRMH 4.6

Title of Course: Soil and Plant Analysis (1+1)

Date : 21/06/2016

Time: 15:15 to 17:00 hrs.

Day : Tuesday

Marks: 40.00

Molecular weight: Ca=40, Mg=24, K=39, Na=23 S=32, H=1, C=12

Q.1 A Define or explain (any five). 5.0

- | | | |
|--------------------|----------------|---------------------------|
| 1. Primary mineral | 3. Saline soil | 5. Sandy soil |
| 2. Soil aggregate | 4. Soil pH | 6. Field capacity of soil |

B Explain in detail (any one). 5.0

1. Reclamation and management of acid soil.
2. Management of alkali soil for crop production.

Q.2 A Give scientific reasons of the following (any five). 5.0

1. Gypsum is not considered as a liming material.
2. Clay and organic matter plays an important role in the forming of soil aggregates.
3. Soil air contains more CO₂ than atmospheric air.
4. Salt affected soils developed in arid and semi-arid regions.
5. Soil samples are taking in a zig-zag manner in the field.
6. Gravitational water is not useful to the plants.

B Calculate any one of the following. 5.0

A soil having CEC 20 me/100g soil and various cations are present in following proportion: Ca: 10 me/100g, K: 1 me/100g, Mg: 5 me/100g and Na: 3 me/100g. By using these data calculate the value of, i) % base saturation, ii) % base unsaturation, iii) Ca, Mg, Na and K in kg/ha, iv) Workout lime requirement to neutralize the soil acidity.

OR

Soil contains 10 me exch. Na/100g soil and CEC 40 me/100g. It is desire to reduce the ESP to 10 %. Calculate the gypsum requirement to amending the plough layer.

Q.3 A Differentiate the following (any two). 5.0

1. Gypsum requirement Vs. Lime requirement
2. Symbiotic N fixation Vs. Non symbiotic N fixation
3. Montmorillonite clay mineral Vs. Kaolinite clay mineral
4. Bacteria Vs. Fungi

PTO

B Explain following with figure (any two). **5.0**
1. Chemistry of waterlogged soil
2. Hysteresis
3. Flame photometer

Q.4 A Do as directed of the following (any five). **5.0**
1. Enlist cultural method for reclamation and management of saline soil.
2. Give the objectives of soil analysis.
3. Give the volumetric composition of soil.
4. Enlist the different methods for soil moisture measurement.
5. Write the characteristics of degraded alkali soils.
6. Classify different types of soil structure.

B Write short notes (any two). **5.0**
1. Physical classification of water.
2. Management of sandy soil for crop production.
3. Kinds of soil acidity.
